

**INFORMATION TO OFFERORS OR QUOTERS  
SECTION A - COVER SHEET**

1. SOLICITATION NUMBER

2. (X one)

N00173-99-R-AT04

a. SEALED BID

b. NEGOTIATED (RFP)

c. NEGOTIATED (RFQ)

**INSTRUCTIONS**

NOTE THE AFFIRMATIVE ACTION REQUIREMENT OF THE EQUAL OPPORTUNITY CLAUSE WHICH MAY APPLY TO THE CONTRACT RESULTING FROM THIS SOLICITATION.

You are cautioned to note the "Certification of Non-Segregated Facilities" in the solicitation. Failure to agree to the certification will render your reply nonresponsive to the terms of solicitations involving awards of contracts exceeding \$25,000 which are not exempt from the provisions of the Equal Opportunity clause.

"Fill-ins" are provided on the face and reverse of Standard Form 18 and Parts I and IV of Standard Form 33, or other solicitation documents and Sections of Table of Contents in this solicitation and should be examined for applicability.

See the provision of this solicitation entitled either "Late Bids, Modifications of Bids or Withdrawal of Bids" or "Late Proposals, Modifications of Proposals and Withdrawals of Proposals."

When submitting your reply, the envelope used must be plainly marked with the Solicitation Number, as shown above and the date and local time set forth for bid opening or receipt of proposals in the solicitation document.

If NO RESPONSE is to be submitted, detach this sheet from the solicitation, complete the information requested on reverse, fold, affix postage, and mail. NO ENVELOPE IS NECESSARY.

Replies must set forth full, accurate, and complete information as required by this solicitation (including attachments). The penalty for making false statements is prescribed in 18 U.S.C. 1001.

3. ISSUING OFFICE (Complete mailing address, including ZIP Code)

CONTRACTING OFFICER  
NAVAL RESEARCH LABORATORY  
ATTN: CODE 3220.AT  
WASHINGTON DC 20375-5326

4. ITEMS TO BE PURCHASED (Brief description)

DEVELOPMENT OF MATERIALS FOR NAVAL WEAPONS AND WEAPON PLATFORMS

5. PROCUREMENT INFORMATION (X and complete as applicable)

a. THIS PROCUREMENT IS UNRESTRICTED

b. THIS PROCUREMENT IS A \_\_\_\_\_ % SET-ASIDE FOR ONE OF THE FOLLOWING (X one). (See Section I of the Table of Contents in this solicitation for details of the set-aside.)

(1) Small Business

(2) Labor Surplus Area Concerns

(3) Combined Small Business/Labor Area Concerns

6. ADDITIONAL INFORMATION

The Naval Research Laboratory Contracting Division issues solicitations and amendments to solicitations electronically via the Internet at the following website: <http://heron.nrl.navy.mil/contracts/home.htm>.

Any amendments to this solicitation will be posted at that website. Amendments will not be distributed by any other means. It is the responsibility of potential offerors to periodically review the website for amendments to this solicitation.

7. POINT OF CONTACT FOR INFORMATION

a. NAME (Last, First, Middle Initial)

Toledo, Evangelina, R

b. ADDRESS (Include Zip Code)

Naval Research Laboratory  
4555 Overlook Ave. S.W.  
Washington DC 20375-5362

c. TELEPHONE NUMBER (Include Area Code and Extension) (NO COLLECT CALLS) (202) 767-2021

<b>8. REASONS FOR NO RESPONSE (X all that apply)</b>			
<input type="checkbox"/>	<b>a. CANNOT COMPLY WITH SPECIFICATIONS</b>	<input type="checkbox"/>	<b>b. CANNOT MEET DELIVERY REQUIREMENT</b>
<input type="checkbox"/>	<b>c. UNABLE TO IDENTIFY THE ITEM(S)</b>	<input type="checkbox"/>	<b>d. DO NOT REGULARLY MANUFACTURE OR SELL THE TYPE OF ITEMS INVOLVED</b>
<input type="checkbox"/>	<b>e. OTHER (Specify)</b>		
<b>9. MAILING LIST INFORMATION (X one)</b>			
<input type="checkbox"/>	<b>YES</b>	<input type="checkbox"/>	<b>NO</b>
<b>WE DESIRE TO BE RETAINED ON THE MAILING LIST FOR FUTURE PROCUREMENT OF THE TYPE OF TIME(S) INVOLVED.</b>			
<b>10. RESPONDING FIRM</b>			
<b>a. COMPANY NAME</b>		<b>b. ADDRESS (Include Zip Code)</b>	
<b>c. ACTION OFFICER</b>			
<b>(1) Typed or Printed Name (Last, First, Middle Initial)</b>	<b>(2) Title</b>	<b>(3) Signature</b>	<b>(4) Date Signed (YYMMDD)</b>

DD FORM 1707 REVERSE, MAR 90

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FROM

AFFIX  
STAMP  
HERE

SOLICITATION NUMBER N00173-99-R-AT04	
DATE (YYMMDD) 26 AUG 99	LOCAL TIME 4:00 P.M.

TO

<b>SOLICITATION, OFFER AND AWARD</b>		1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 350)		RATING <b>DO-C9</b>	PAGE OF 1   31 PAGES
2. CONTRACT NO.	3. SOLICITATION NO. <b>N00173-99-R-AT04</b>	4. TYPE OF SOLICITATION <input type="checkbox"/> SEALED BID (IFB) <input checked="" type="checkbox"/> NEGOTIATED (RFP)		5. DATE ISSUED <b>26 JUL 99</b>	6. REQUISITION/PURCHASE NO.
7. ISSUED BY <b>CONTRACTING OFFICER NAVAL RESEARCH LABORATORY ATTN: CODE 3220.AT WASHINGTON DC 20375-5326</b>		CODE <b>N00173</b>	8. ADDRESS OFFER TO (If other than Item 7)		

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

**SOLICITATION**

9. Sealed offers in original and 4 copies for furnishing the supplies or services in the Schedule will be received at the place specified in Item 8, or if handcarried, in the depository located in Bldg. 222, Room 115A, Naval Research Lab. until 4:00 local time 26 AUG 99  
(Hour) (Date)

CAUTION - LATE Submissions, Modifications, and Withdrawals: See Section L, Provision No. 52.214-7 or 52.215-10. All offers are subject to all terms and conditions contained in this solicitation.

10. FOR INFORMATION CALL:	A. NAME <b>EVANGELINA R. TOLEDO</b>	B. TELEPHONE NO. (Include area code) (NO COLLECT CALLS) <b>(202) 767-2021</b>
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11. TABLE OF CONTENTS							
(✓)	SEC.	DESCRIPTION	PAGE(S)	(✓)	SEC.	DESCRIPTION	PAGE(S)
PART I - THE SCHEDULE				PART II - CONTRACT CLAUSES			
<input checked="" type="checkbox"/>	A	SOLICITATION/CONTRACT FORM	1	<input checked="" type="checkbox"/>	I	CONTRACT CLAUSES	14-18
<input checked="" type="checkbox"/>	B	SUPPLIES OR SERVICES AND PRICES/COSTS	2-4	PART III - LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACH.			
<input checked="" type="checkbox"/>	C	DESCRIPTION/SPECS./WORK STATEMENT	5	<input checked="" type="checkbox"/>	J	LIST OF ATTACHMENTS	19
<input checked="" type="checkbox"/>	D	PACKAGING AND MARKING	5	PART IV - REPRESENTATIONS AND INSTRUCTIONS			
<input checked="" type="checkbox"/>	E	INSPECTION AND ACCEPTANCE	5	<input checked="" type="checkbox"/>	K	REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFERORS	20
<input checked="" type="checkbox"/>	F	DELIVERIES OR PERFORMANCE	6	<input checked="" type="checkbox"/>	L	INSTRS., CONDS., AND NOTICES TO OFFERORS	21-28
<input checked="" type="checkbox"/>	G	CONTRACT ADMINISTRATION DATA	6-9	<input checked="" type="checkbox"/>	M	EVALUATION FACTORS FOR AWARD	29-31
<input checked="" type="checkbox"/>	H	SPECIAL CONTRACT REQUIREMENTS	10-13				

**OFFER (Must be fully completed by offeror)**

NOTE: Item 12 does not apply if the solicitation includes the provisions at 52.214-16, Minimum Bid Acceptance Period.

12. In compliance with the above, the undersigned agrees, if this offer is accepted within \_\_\_\_\_ calendar days (60 calendar days unless a different period is inserted by the offeror) from the date for receipt of offers specified above, to furnish any or all items upon which prices are offered at the price set opposite each item, delivered at the designated point(s), within the time specified in the schedule.

13. DISCOUNT FOR PROMPT PAYMENT (See Section I, Clause No. 52-232-8)	10 CALENDAR DAYS	20 CALENDAR DAYS	30 CALENDAR DAYS	CALENDAR DAYS
	%	%	%	%

14. ACKNOWLEDGMENT OF AMENDMENTS (The offeror acknowledges receipt of amendments to the SOLICITATION for offerors and related documents numbered and dated:	AMENDMENT NO.	DATE	AMENDMENT NO.	DATE

15A. NAME AND ADDRESS OF OFFEROR	CODE	FACILITY	16. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or print)
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15B. TELEPHONE NO. (Include area code)	15C. CHECK IF REMITTANCE ADDRESS IS DIFFERENT FROM ABOVE - ENTER SUCH ADDRESS IN SCHEDULE.	17. SIGNATURE	18. OFFER DATE
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**AWARD (To be completed by Government)**

19. ACCEPTED AS TO ITEMS NUMBERED	20. AMOUNT	21. ACCOUNTING AND APPROPRIATION
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22. AUTHORITY FOR USING OTHER THAN FULL AND OPEN COMPETITION: <input type="checkbox"/> 10 U.S.C. 2304(c) ( ) <input type="checkbox"/> 41 U.S.C. 253(c) ( )	23. SUBMIT INVOICES TO ADDRESS SHOWN IN (4 copies unless otherwise specified)	ITEM
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24. ADMINISTERED BY (If other than Item 7)	CODE	25. PAYMENT WILL BE MADE BY	CODE
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26. NAME OF CONTRACTING OFFICER (Type or print)	27. UNITED STATES OF AMERICA  (Signature of Contracting Officer)	28. AWARD DATE
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IMPORTANT - Award will be made on this Form, or on Standard Form 26, or by other authorized official written notice.

**PART I - THE SCHEDULE  
SECTION B  
SUPPLIES OR SERVICES AND PRICES/COSTS**

**B-1 SUPPLIES/SERVICES AND COSTS**

<b>ITEM NUMBER</b>	<b>SUPPLIES/SERVICES</b>	<b>ESTIMATED COST</b>	<b>FIXED FEE</b>	<b>ESTIMATED COST PLUS FIXED FEE</b>
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**BASEYEAR**

0001	The Contractor shall conduct research as described below and in Section C.			
0001AA	Research	\$	\$	\$
0001AB	Data in accordance with Exhibit A (DD 1423)	* NSP	* NSP	* NSP
<b>TOTAL EST. COST PLUS FIXED FEE FOR THE BASE YEAR:</b>		<b>\$</b>	<b>\$</b>	<b>\$</b>

**OPTION YEAR 1**

0002	The Contractor shall conduct research as described below and in Section C.			
0002AA	Research	\$	\$	\$
0002AB	Data in accordance with Exhibit A (DD 1423)	* NSP	* NSP	* NSP
<b>TOTAL EST. COST PLUS FIXED FEE FOR OPTION YEAR 1:</b>		<b>\$</b>	<b>\$</b>	<b>\$</b>

ITEM NUMBER	SUPPLIES/SERVICES	ESTIMATED COST	FIXED FEE	ESTIMATED COST PLUS FIXED FEE
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**OPTION YEAR 2**

0003	The Contractor shall conduct research as described below and in Section C.			
0003AA	Research	\$	\$	\$
0003AB	Data in accordance with Exhibit A (DD 1423)	* NSP	* NSP	* NSP

**TOTAL EST. COST PLUS FIXED FEE FOR OPTION YEAR 2:**

\$ \$ \$

**OPTION YEAR 3**

0004	The Contractor shall conduct research as described below and in Section C.			
0004AA	Research	\$	\$	\$
0004AB	Data in accordance with Exhibit A (DD 1423)	* NSP	* NSP	* NSP

**TOTAL EST. COST PLUS FIXED FEE FOR OPTION YEAR 3:**

\$ \$ \$

ITEM NUMBER	SUPPLIES/SERVICES	ESTIMATED COST	FIXED FEE	ESTIMATED COST PLUS FIXED FEE
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**OPTION YEAR 4**

0005	The Contractor shall conduct research as described below and in Section C.			
0005AA	Research	\$	\$	\$
0005AB	Data in accordance with Exhibit A (DD 1423)	* NSP	* NSP	* NSP
<b>TOTAL EST. COST PLUS FIXED FEE FOR OPTION YEAR 4:</b>		<b>\$</b>	<b>\$</b>	<b>\$</b>

**TOTAL EST. COST PLUS FIXED FEE IF ALL OPTIONS ARE EXERCISED:**

- Not Separately Priced

Note: The options may be exercised by written notice to the contractor at anytime during the period of performance which preceded the period for which the option is to be exercised. See Section H.

**SECTION C**  
**DESCRIPTION/SPECIFICATIONS/STATEMENT OF WORK**

**STATEMENT OF WORK**

The work and services to be performed hereunder shall be subject to the requirements and standards contained in Attachment (1), Statement of Work, with Exhibit A, Contract Data Requirements List, and all other Attachments cited in Section J, which are incorporated by reference into Section C.

**REQUIREMENTS FOR ON-SITE CONTRACTORS**

For those portions of the work under this contract performed at any NRL site, the contractor shall comply with the Requirements for On-Site Contractors dated 02 February 1998 which are hereby incorporated by reference. The full text is available at <http://heron.nrl.navy.mil/contracts/home.htm>.

**SECTION D**  
**PACKAGING AND MARKING**

**D-1 PACKAGING AND MARKING**

Preservation, packaging, packing and marking of all deliverable contract line items must conform to normal commercial packing standards to assure safe delivery at destination.

**SECTION E**  
**INSPECTION AND ACCEPTANCE**

**E-1 INSPECTION AND ACCEPTANCE CLAUSES INCORPORATED BY REFERENCE****FAR CLAUSE    TITLE**

52.246-8       -    Inspection Of Research And Development - Cost Reimbursement (APR 1984)

**DFARS CLAUSE    TITLE**

252.246-7000   -    Material Inspection And Receiving Report (DEC 1991)

**E-2 INSPECTION AND ACCEPTANCE**

Inspection and acceptance of the final delivery will be accomplished by the Technical Manager (TM) or Contracting Officer Representative (COR) designated in Section G of this contract. Inspection and acceptance will be performed at the Naval Research Laboratory, Washington DC 20375-5320.

**SECTION F  
DELIVERIES OR PERFORMANCE**

**F-1 DELIVERIES OR PERFORMANCE CLAUSES INCORPORATED BY REFERENCE:**

**FAR CLAUSE    TITLE**

52.242-15    -    Stop-Work Order (AUG 1989) - Alternate I (APR 1984)  
52.247-34    -    F.O.B. Destination (NOV 1991)

**F-2 PERIOD AND PLACE OF PERFORMANCE**

- (a) The term of this contract is from date of contract award through twelve (12) months.
- (b) Option Year 1 (CLIN 0002), Option Year 2 (CLIN 0003), Option Year 3 (CLIN 0004), Option Year 4 (CLIN 0005), if exercised shall be for a period of twelve (12) months from the effective date of the modification exercising the option(s).
- (c) The principal place of performance of this contract shall be at the contractor's site.

**SECTION G  
CONTRACT ADMINISTRATION DATA**

**G-1 PROCURING OFFICE REPRESENTATIVE**

In order to expedite administration of the contract, the Administrative Contracting Officer (ACO) will direct inquiries to the appropriate office listed below. Please do not direct routine inquiries to the person listed in Item 20A on Standard Form 26.

Contract Matters- \*

Security Matters- \*

Safety Matters- \*

Patent Matters- \*

Release of Data- \*

The ACO will forward invention disclosures and reports directly to the Associate Counsel for Patents, Code 3008.2, Naval Research Laboratory, Washington DC 20375-5320. The Associate Counsel for Patents will return the reports along with a recommendation to the Administrative Contracting Officer. The Associate Counsel for Patents will represent the Contracting Officer with regard to invention reporting matters arising under this contract.

**G-2 CONTRACTING OFFICER'S REPRESENTATIVE (COR) - FUNCTIONS AND LIMITATIONS**

\* is hereby designated the cognizant COR who will represent the Contracting Officer in the administration of technical details within the scope of this contract and inspection and acceptance. The COR is not otherwise authorized to make any representations or commitments of any kind on behalf of the Contracting Officer or the Government. The COR does not have the authority to alter the Contractor's obligations or change the specifications in the contract. If, as a result of technical discussions, it is desirable to alter contract obligations or statements of work, a modification must be issued in writing and signed by the Contracting Officer. The COR is responsible for reviewing the bills and charges submitted by the Contractor and informing the ACO of areas where exceptions are to be taken.

( \* To be filled in at time of award)

**G-3 TECHNICAL DIRECTION MEMORANDUM (TDM)**

- (a) For the purposes of this clause, technical direction includes the following:
- (1) Direction to the Contractor which shifts work emphasis between work areas or tasks, requires pursuit of certain lines of inquiry, fills in details or otherwise describes work which will accomplish the objectives described in the statement of work;
  - (2) Guidelines to the Contractor which assist in interpretation of drawings, specifications or technical portions of work description.
- (b) Technical instructions must be within the scope of work stated in the contract. Technical instructions may not be used to:
- (1) Assign additional work under the contract;
  - (2) Direct a change as defined in the contract clause entitled "Changes";
  - (3) Increase or decrease the estimated contract cost, the fixed fee, or the time required for contract performance; or
  - (4) Change any of the terms, conditions or specifications of the contract
- (c) The TDM shall be written by the Contracting Officer's Representative (COR), with the original given to the Contractor and a copy retained in the CORs file. Technical direction may be issued orally only in emergency situations. If technical direction is issued orally, a TDM must follow within two (2) working days from the date of the oral direction. Amendments, corrections, or changes to TDMs shall also be in written format and shall include all the information set forth in paragraph (e) below.
- (d) A TDM shall be considered issued when the Government deposits it in the mail, or if transmitted by other means, when it is physically delivered to the contractor.
- (e) TDMs shall include, but not be limited to, the following information:
- (1) Date of TDM,
  - (2) Contract Number,
  - (3) Reference to the relevant portion or item in the Statement of Work,
  - (4) The specific technical direction or clarification, and
  - (5) The signature of the COR.
- (f) CORs shall retain all files containing TDMs for a period of two (2) years after the final contract completion date.
- (g) The only individual authorized in any way to amend or modify any of the terms of this contract shall be the Contracting Officer. When, in the opinion of the Contractor, any technical direction calls for effort outside the scope of the contract or inconsistent with this special provision, the Contractor shall notify the Contracting Officer in writing within ten (10) working days after its receipt.

**G-4 SUBCONTRACTORS/CONSULTANTS**

(a) Advance notification or requests for consent pursuant to the contract clause entitled "Subcontracts" (FAR 52.244-2) shall be directed to the cognizant administrative contracting officer (ACO).

(b) The following subcontractors/consultants have been identified in the Contractor's proposal as necessary for performance of this contract:

Subcontractor/Consultant Name	Estimated Cost
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*(Paragraph (b) will be included and filled in at time of award if subcontractor/consultants are proposed by the successful offeror)*

**G-5 NAPS 5252.232-9001 - SUBMISSION OF INVOICES (COST-REIMBURSEMENT, TIME-AND-MATERIALS, LABOR-HOUR, OR FIXED PRICE INCENTIVE (JUL 1992))**

(a) "Invoice" as used in this clause includes contractor requests for interim payments using public vouchers (SF 1034) but does not include contractor requests for progress payments under fixed price incentive contracts.

(b) The Contractor shall submit invoices and any necessary supporting documentation, in an original and 4 copies, to the contract auditor at the following address:

(To be filled in at time of award)

unless delivery orders are applicable, in which case invoices will be segregated by individual order and submitted to the address specified in the order. In addition, an information copy shall be submitted to [See Section G for designated COR]. Following verification, the contract auditor will forward the invoice to the designated payment office for payment in the amount determined to be owing, in accordance with the applicable payment (and fee) clause(s) of this contract.

(c) Invoices requesting interim payments shall be submitted no more than once every two weeks, unless another time period is specified in the Payments clause of this contract. For indefinite delivery type contracts, interim payment invoices shall be submitted no more than once every two weeks for each delivery orders. There shall be a lapse of no more than 30 calendar days between performance and submission of an interim payment invoice.

(d) In addition to the information identified in the Prompt Payment clause herein, each invoice shall contain the following information, as applicable:

- (1) Contract line item number (CLIN)
- (2) Subline item number (SLIN)
- (3) Accounting Classification Reference Number(ACRN)
- (4) Payment terms
- (5) Procuring activity
- (6) Date supplies provided or services performed
- (7) Costs incurred and allowable under the contract
- (8) Vessel (e.g., ship, submarine or other craft) or system for which supply/service is provided

- (e) A DD Form 250, "Material Inspection and Receiving Report",  
\*\* is required with each invoice submittal.  
\*\* is required only with the final invoice.  
\*X\* is not required.
- (f) A Certificate of Performance  
\*\* shall be provided with each invoice submittal.  
\*\*X is not required.
- (g) The Contractor's final invoice shall be identified as such, and shall list all other invoices (if any) previously tendered under this contract.
- (h) Cost of performance shall be segregated, accumulated and invoiced to the appropriate ACRN categories to the extent possible. When such segregation of costs by ACRN is not possible for invoices submitted with CLIN/SLINS with more than one ACRN, an allocation ratio shall be established in the same ratio as the obligations cited in the accounting data so that costs are allocated on a proportional basis.

#### **G-6 INCREMENTAL FUNDING**

This contract is incrementally funded pursuant to the Limitation of Funds clause, FAR 52.232-22. Funds are allotted to the contract in the amount of \$ \* and it is estimated that they are sufficient for contract performance through \*.

( \* To be filled in at time of award)

#### **G-7 PAYMENT INSTRUCTIONS FOR MULTIPLE ACCOUNTING CLASSIFICATION CITATIONS (COST-REIMBURSEMENT)**

The purpose of these instructions is to permit the paying office to charge the accounting classification citations in the contract in a manner that reflects the performance of the contract. These instructions do not create any obligation on the part of the Government or the contractor nor do they in any way alter any obligation created by any other provision of the contract. Invoices should be paid from available ACRNs in the following order:

- (a) ACRNs cited on the contractor's invoice.
- (b) On a proportional basis from any ACRNs assigned to funds which will cancel at the end of the current fiscal year.
- (c) The ACRN assigned to the following line of accounting:  
 97X4930.NH4A 000 77777 0 000173 2F 000000 N00173Z45000.
- (d) If funds appropriated in more than one fiscal year are allotted to the contract, the ACRN assigned to the oldest allotment of funds.
- (e) On a proportional basis from all ACRNs assigned to allotments of funds appropriated in a single fiscal year.

**SECTION H  
SPECIAL CONTRACT REQUIREMENTS**

**H-1 TYPE OF CONTRACT**

This is a

(To be filled in at time of award)

**H-2 ONR 5252.237-9705 - KEY PERSONNEL (DEC 88)**

(a) The Contractor agrees to assign to the contract tasks those persons whose resumes were submitted with its proposal and who are necessary to fulfill the requirements of the contract as "key personnel". No substitutions may be made except in accordance with this clause.

(b) The Contractor understands that during the first ninety (90) days of the contract performance period, no personnel substitutions will be permitted unless these substitutions are unavoidable because of the incumbent's sudden illness, death or termination of employment. In any of these events, the Contractor shall promptly notify the Contracting Officer and provide the information described in paragraph (c) below. After the initial ninety (90) day period the Contractor must submit to the Contracting Officer all proposed substitutions, in writing, at least fifteen (15) days in advance (thirty (30) days if security clearance must be obtained) of any proposed substitution and provide the information required by paragraph (c) below.

(c) Any request for substitution must include a detailed explanation of the circumstances necessitating the proposed substitution, a resume for the proposed substitute, and any other information requested by the Contracting Officer. Any proposed substitute must have qualifications equal to or superior to the qualifications of the incumbent. The Contracting Officer or his/her authorized representative will evaluate such requests and promptly notify the Contractor of his/her approval or disapproval thereof.

(d) In the event that any of the identified key personnel cease to perform under the contract and the substitute is disapproved, the contract may be immediately terminated in accordance with the Termination clause of the contract.

The following are identified as key personnel:

(To be filled in at time of award)

**H-3 ONR 5252.216-9706 - LEVEL OF EFFORT (DEC 88)**

(a) The Contractor agrees to provide the total level of effort specified in the next sentence in performance of the work described in this contract. The total level of effort for performance of this contract shall be 65,000 per year (for each of the base year and option years) total hours of direct labor, including subcontractor direct labor for those subcontractors specifically identified in the Contractor's proposal as having hours included in the proposed level of effort. A breakdown of labor categories and hours is set forth in paragraph (k) below.

(b) The level of effort for this contract shall be expended at an average rate of 5,417 hours per month. It is understood and agreed that the rate of hours per month may fluctuate in pursuit of the technical objective, provided such fluctuation does not result in the use of the total hours of effort prior to the expiration of the term of the contract.

(c) The Contractor is required to notify the Contracting Officer when any of the following situations occur, or are anticipated to occur: If during any three consecutive months the monthly average is exceeded by 25% or, if at any time it is forecast that during the last three months of the contract less than 50% of the monthly average will be used during any given month; or, when 85% of the total level of effort has been expended.

(d) If, during the term of the contract, the Contractor finds it necessary to accelerate the expenditure of direct labor to such an extent that the total hours of effort specified would be used prior to the expiration of the term, the Contractor shall notify the Contracting Officer in writing, setting forth the acceleration required, the probable benefits which would result, and an offer to undertake the acceleration at no increase in the estimated cost or fixed fee together with an offer setting forth a proposed level of effort, cost breakdown, and proposed fixed fee for continuation of the work until expiration of the term hereof. The offer shall provide that the work proposed will be subject to the terms and conditions of this contract and any additions or changes required by then current law, regulations, or directives, and that the offer, with a written notice of acceptance by the Contracting Officer, shall constitute a binding contract. The Contractor shall not accelerate any effort until receipt of such written approval by the Contracting Officer. Any agreement to accelerate will be formalized by contract modification.

(e) The Contracting Officer may, by written order, direct the Contractor to accelerate the expenditure of direct labor such that the total hours of effort specified in paragraph (a) above would be used prior to the expiration of the term. This order shall specify the acceleration required and the resulting revised term. The Contractor shall acknowledge this order within five days of receipt.

(f) If the total level of effort specified in paragraph (a) above is not provided by the Contractor during the term of this contract, the Contracting Officer shall either (i) reduce the fixed fee of this contract as follows:

$$\text{Fee Reduction} = \text{Fixed Fee} \times \frac{(\text{Required LOE Hours} - \text{Expended LOE Hours})}{\text{Required LOE Hours}}$$

or (ii) subject to the provisions of the clause of this contract entitled "Limitation of Cost," require the Contractor to continue to perform the work until the total number of hours of direct labor specified in paragraph (a) shall have been expended, at no increase in the fixed fee of this contract.

(g) In the event the government fails to fully fund the contract in a timely manner, the term of the contract may be extended accordingly with no change to cost or fee. If the government fails to fully fund the contract, the fee will be adjusted in direct proportion to that effort which was performed.

(h) Notwithstanding any of the provisions in the above paragraphs, the Contractor may furnish hours up to five percent in excess of the total hours specified in paragraph (a) above, provided that the additional effort is furnished within the term hereof, and provided further that no increase in the estimated cost or fixed fee is required, and no adjustment in the fixed fee shall be made provided that the Contractor has delivered at least 95% of the level of effort required in paragraph (a) above.

(i) It is understood that the mix of labor categories provided by the Contractor under the contract, as well as the distribution of effort among those categories, may vary considerably from the initial mix and distribution of effort which was estimated by the government or proposed by the Contractor.

(j) Nothing herein shall be construed to alter or waive any of the rights or obligations of either party pursuant to the Clause entitled "Limitation of Costs" or "Limitation of Funds," either of which clauses as incorporated herein applies to this contract.

(k) The anticipated breakdown by labor category of the total level of effort is as follows:

LABOR CATEGORY	Base Year	Option Year 1	Option Year 2	Option Year 3	Option Year 4
<b>NRL-Site Direct Labor</b>					
Program Manager	1,000	1,000	1,000	1,000	1,000
Sr. Scientist/Engineer (Materials)	2,800	2,800	2,800	2,800	2,800
Sr. Scientist/Engineer (Mechanical)	1,900	1,900	1,900	1,900	1,900
Scientist/Engineer (Corrosion/ Combustion)	3,800	3,800	3,800	3,800	3,800
Scientist/Engineer (Chlorofluorocarbons)	1,900	1,900	1,900	1,900	1,900
Scientist/Engineer (Materials)	1,900	1,900	1,900	1,900	1,900
Analyst/Programmer	200	200	200	200	200
Technician	1,900	1,900	1,900	1,900	1,900
<b>TOTAL</b>	<b>15,400</b>	<b>15,400</b>	<b>15,400</b>	<b>15,400</b>	<b>15,400</b>

**Contractor-Site Direct Labor**

Deputy Program Manager	1,900	1,900	1,900	1,900	1,900
Sr. Scientist/Engineer (Oily Waste/ Non-Oily Waste/Plasma Arc)	5,700	5,700	5,700	5,700	5,700
Sr. Scientist/Engineer (Applied Mechanics)	3,800	3,800	3,800	3,800	3,800
Sr. Scientist/Engineer (Environmental Effects/Technologies)	3,800	3,800	3,800	3,800	3,800
Sr. Scientist/Engineer (Sensors)	3,800	3,800	3,800	3,800	3,800
Scientist/Engineer (Materials)	3,800	3,800	3,800	3,800	3,800
Engineer (Mechanical)	1,900	1,900	1,900	1,900	1,900
Sr. Technologist (Electronics)	1,900	1,900	1,900	1,900	1,900
Sr. Analyst (Counterproliferation)	1,900	1,900	1,900	1,900	1,900
Analyst/Programmer	5,700	5,700	5,700	5,700	5,700
Technician	11,400	11,400	11,400	11,400	11,400
Technical Assistant	4,000	4,000	4,000	4,000	4,000
<b>TOTAL</b>	<b>49,600</b>	<b>49,600</b>	<b>49,600</b>	<b>49,600</b>	<b>49,600</b>

**H-4 ONR 5252.235-9714 - REPORT PREPARATION (FEB 97)**

Scientific or technical reports prepared by the Contractor and deliverable under the terms of this contract will be prepared in accordance with format requirements contained in ANSI/NISO Z39.18-1995, "Scientific and Technical Reports: Elements, Organization, and Design. "[NOTE: ANSI Z39.18 may be obtained from NISO Press Fulfillment Center, P. O. Box 338, Oxon Hill, MD. 20750-0338.Telephone 1-800-282-6476]

**H-5 OPTION TO EXTEND TERM**

This contract shall be renewable at the unilateral option of the Government by the Contracting Officer's notice of renewal to the Contractor within the existing term of the contract.

**H-6 YEAR 2000 COMPLIANT INFORMATION TECHNOLOGY**

This requirement applies to information technology (IT) that processes date-related information. All such IT delivered under this contract shall be Year 2000 compliant as defined at FAR 39.002.

**H-7 REPRESENTATIONS AND CERTIFICATIONS**

The Contractor's completed Representations, Certifications, and Other Statements of Offerors or Respondents is incorporated herein by reference in any resultant award.

**PART II - CONTRACT CLAUSES**  
**SECTION I**  
**CONTRACT CLAUSES**

**I-1 52.252-2 - CLAUSES INCORPORATED BY REFERENCE (FEB 1998)**

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

<http://www.arnet.gov/far>  
<http://heron.nrl.navy.mil/contracts/home.htm>

**a. FEDERAL ACQUISITION REGULATION CLAUSES**

<b>FAR CLAUSE</b>	<b>TITLE</b>
52.202-1	- Definitions (OCT 1995)
52.203-3	- Gratuities (APR 1984)
52.203-5	- Covenant Against Contingent Fees (APR 1984)
52.203-6	- Restrictions On Subcontractor Sales To The Government (JUL 1995)
52.203-7	- Anti-Kickback Procedures (JUL 1995)
52-203-8	- Cancellation, Rescission, And Recovery Of Funds For Illegal Or Improper Activity (JAN 1997)
52.203-10	- Price Or Fee Adjustment For Illegal Or Improper Activity (JAN 1997)
52.203-12	- Limitation On Payments To Influence Certain Federal Transactions (JUN 1997)
52.204-4	- Printing/Copying Double-Sided On Recycled Paper (JUN 1996)
52.209-6	- Protecting The Government's Interest When Subcontracting With Contractors Debarred, Suspended, Or Proposed For Debarment (JUL 1995)
52.211-15	- Defense Priority and Allocation Requirements (SEP 1990)
52.215-2	- Audit And Records-Negotiation (JUN 1999)
52.215-8	- Order of Precedence - Uniform Contract Format (OCT 1997)
52.215-10	- Price Reduction for Defective Cost or Pricing Data (OCT 1997)
52.215-11	- Price Reduction for Defective Cost or Pricing Data - Modifications (OCT 1997)
52.215-12	- Subcontractor Cost or Pricing Data (OCT 1997)
52.215-13	- Subcontractor Cost or Pricing Data Modifications (OCT 1997)
52.215-14	- Integrity of Unit Prices (OCT 1997)
52.215-15	- Pension Adjustments And Asset Reversions (DEC 1998)
52.215-17	- Waiver of Facilities Capital Cost of Money (OCT 1997) ( <i>will be included if the successful offeror does not propose facilities capital cost of money</i> )
52.215-18	- Reversion or Adjustment of Plans for Post-retirement Benefits (PRB) Other than Pensions (OCT 1997)
52.215-19	- Notification of Ownership Changes (OCT 1997)
52.215-21	- Requirements for Cost or Pricing Data or Information Other Than Cost or Pricing Data -Modifications (OCT 1997)
52.216-7	- Allowable Cost And Payment (APR 1998)

- 52.216-8 - Fixed-Fee (MAR 1997)
- 52.219-4 - Notice of Price Evaluation Preference For HUBZone Small Business Concerns (JAN 1999)  Offeror elects to waive the evaluation preference.
- 52.219-8 - Utilization Of Small Business Concerns (JUN 1999)
- 52.219-9 - Small Business Subcontracting Plan (JAN 1999) - Alternate II (JAN 1999)
- 52.219-16 - Liquidated Damages-Subcontracting Plan (JAN 1999)
- 52.219-25 - Small Disadvantaged Business Participation Program-Disadvantaged Status And Reporting (JAN 1999)
- 52.222-1 - Notice To The Government Of Labor Disputes (FEB 1997)
- 52.222-2 - Payment For Overtime Premiums (JUL 1990) -The Use Of Overtime Is Authorized Under This Contract If The Overtime Premium Does Not Exceed "0"
- 52.222-3 - Convict Labor (AUG 1996)
- 52.222-21 - Prohibition of Segregated Facilities (FEB 1999)
- 52.222-26 - Equal Opportunity (FEB 1999)
- 52.222-35 - Affirmative Action For Disabled Veterans And Veterans Of The Vietnam Era (APR 1998)
- 52.222-36 - Affirmative Action For Workers With Disabilities (JUN 1998)
- 52.222-37 - Employment Reports On Disabled Veterans And Veterans Of The Vietnam Era (APR 1998)
- 52.223-2 - Clean Air And Water (APR 1984)
- 52.223-3 - Hazardous Material Identification And Material Safety Data (JAN 1997)
- 52.223-5 - Pollution Prevention and Right-To-Know Information (APR 1998)
- 52.223-6 - Drug-Free Workplace (JAN 1997)
- 52.223-14 - Toxic Chemical Release Reporting (OCT 1996)
- 52.225-11 - Restrictions On Certain Foreign Purchases (AUG 1998)
- 52.226-1 - Utilization Of Indian Organizations And Indian-Owned Economic Enterprises (MAY 1999)
- 52.227-1 - Authorization And Consent (JUL 1995)- Alternate I (APR 1984)
- 52.227-2 - Notice And Assistance Regarding Patent And Copyright Infringement (AUG 1996)
- 52.227-11 - Patent Rights - Retention By The Contractor (Short Form) (JUN 1997)  
*(will be included if the successful offeror is a small business or a non-profit organization)*
- 52.227-12 - Patent Rights - Retention By The Contractor (Long Form) (JAN 1997)  
*(will be included if the successful offeror is not a small business or a non-profit organization)*
- 52.228-7 - Insurance - Liability To Third Persons (MAR 1996)
- 52.230-2 - Cost Accounting Standards (APR 1998)
- 52.230-3 - Disclosure And Consistency Of Cost Accounting Practices (APR 1998)
- 52.230-6 - Administration Of Cost Accounting Standards (APR 1996)
- 52.232-9 - Limitation On Withholding Of Payments (APR 1984)
- 52.232-17 - Interest (JUN 1996)
- 52.232-18 - Availability Of Funds (APR 1984)
- 52.232-20 - Limitation Of Cost (APR 1984) (Applicable when the contract or task order is fully funded)
- 52.232-22 - Limitation Of Funds (APR 1984) (Applicable when the contract or task order is not fully funded)

- 52.232-23 - Assignment Of Claims (JAN 1986) Alternate I (APR 1984)
- 52.232-25 - Prompt Payment (JUN 1997)
- 52.232-33 - Payment By Electronic Funds Transfer-Central Contractor Registration (MAY 1999)
- 52.233-1 - Disputes (DEC 1998)
- 52.233-3 - Protest After Award (AUG 1996) - Alternate I (JUN 1985)
- 52.237-2 - Protection Of Government Buildings, Equipment And Vegetation (APR 1984)
- 52.237-10 - Identification of Uncompensated Overtime (OCT 1997)
- 52.242-1 - Notice Of Intent To Disallow Costs (APR 1984)
- 52.242-3 - Penalties For Unallowable Costs (OCT 1995)
- 52.242-13 - Bankruptcy (JUL 1995)
- 52.243-2 - Changes - Cost-Reimbursement (AUG 1987) - Alternate V (APR 1984)
- 52.243-6 - Change Order Accounting (APR 1984)
- 52.243-7 - Notification Of Changes (APR 1984)fill in 30
- 52.244-2 - Subcontracts (AUG 1998) - Alternate I (AUG 1998)
- 52.244-5 - Competition In Subcontracting (DEC 1996)
- 52.244-6 - Subcontracts for Commercial Items and Commercial Components (OCT 1998)
- 52.245-5 - Government Property (Cost-Reimbursement, Time-And-Material, Or Labor-Hour Contracts) (JAN 1986) (DEVIATION)
- 52.245-9 - Use And Charges (APR 1984) (DEVIATION)
- 52.246-23 - Limitation Of Liability (FEB 1997)
- 52.246-25 - Limitation Of Liability - Services (FEB 1997)
- 52.247-1 - Commercial Bill Of Lading Notations (APR 1984)
- 52.247-63 - Preference For U. S. Flag Carriers (JAN 1997)
- 52.249-6 - Termination (Cost-Reimbursement) (SEP 1996)
- 52.249-14 - Excusable Delays (APR 1984)
- 52.252-6 - Authorized Deviations in Clauses (APR 1984)( fill in Defense Federal Acquisition Regulation Supplement (48 CFR Chapter 2))
- 52.253-1 - Computer Generated Forms (JAN 1991)

**b. DEPARTMENT OF DEFENSE FEDERAL ACQUISITION REGULATION CLAUSES**

**DFARS CLAUSE    TITLE**

- 252.201-7000 - Contracting Officer's Representative (DEC 1991)
- 252.203-7001 - Prohibition On Persons Convicted Of Fraud Or Other Defense Contract Related Felonies (MAR 1999)
- 252.203-7002 - Display Of DoD Hotline Poster (DEC 1991)
- 252.204-7000 - Disclosure Of Information (DEC 1991)
- 252.204-7003 - Control Of Government Personnel Work Product (APR 1992)
- 252.204-7004 - Required Central Contractor Registration (MAR 1998)
- 252.205-7000 - Provision Of Information To Cooperative Agreement Holders (DEC 1991)
- 252.209-7000 - Acquisition From Subcontractors Subject To On-Site Inspection Under The Intermediate-Range Nuclear Forces (INF) Treaty (NOV 1995)
- 252.209-7004 - Subcontracting With Firms That Are Owned Or Controlled By The Government Of A Terrorist Country (MAR 1998)

- 252.215-7000 - Pricing Adjustments (DEC 1991)
- 252.215-7002 - Cost Estimating System Requirements (OCT 1998)
- 252.219-7003 - Small Business And Small Disadvantaged Business Subcontracting Plan (DoD Contracts) (APR 1996)
- 252.223-7006 - Prohibition On Storage And Disposal Of Toxic And Hazardous Materials (APR 1993)
- 252.225-7012 - Preference For Certain Domestic Commodities (MAY 1999)
- 252.225-7026 - Reporting Of Contract Performance Outside The United States (MAR 1998)
- 252.225-7031 - Secondary Arab Boycott Of Israel (JUN 1992)
- 252.227-7000 - Non Estoppel (OCT 1966)
- 252.227-7001 - Release Of Past Infringement (AUG 1984)
- 252.227-7013 - Rights In Technical Data -- Noncommercial Items (NOV 1995) - Alternate I (JUN 1995)
- 252.227-7014 - Rights In Noncommercial Computer Software And Noncommercial Computer Software Documentation (JUN 1995) - Alternate I (JUN 1995)
- 252.227-7016 - Rights In Bids or Proposal Information (JUN 1995)
- 252.227-7019 - Validation Of Asserted Restrictions--Computer Software (JUN 1995)
- 252.227-7026 - Deferred Delivery Of Technical Data Or Computer Software (APR 1988)
- 252.227-7027 - Deferred Ordering Of Technical Data Or Computer Software (APR 1988)
- 252.227-7030 - Technical Data--Withholding Of Payment (OCT 1988)
- 252.227-7034 - Patents--Subcontracts (APR 1984)
- 252.227-7036 - Declaration Of Technical Data Conformity (JAN 1997)
- 252.227-7037 - Validation Of Restrictive Markings On Technical Data (NOV 1995)
- 252.227-7039 - Patents--Reporting of Subject Inventions (APR 1990)
- 252.231-7000 - Supplemental Cost Principles (DEC 1991)
- 252.235-7010 - Acknowledgment of Support and Disclaimer (MAY 1995)
- 252.235-7011 - Final Scientific Or Technical Report (MAY 1995)
- 252.242-7000 - Post Award Conference (DEC 1991)
- 252.242-7004 - Material Management And Accounting System (SEP 1996)
- 252.243-7002 - Requests for Equitable Adjustment (MAR 1998)
- 252.245-7001 - Reports of Government Property (MAY 1994)
- 252.246-7001 - Warranty Of Data (DEC 1991)
- 252.247-7023 - Transportation Of Supplies By Sea (NOV 1995)
- 252.247-7024 - Notification Of Transportation Of Supplies By Sea (NOV 1995)  
*(will be included if the successful offeror made a negative response to the inquiry at DFARS 252.247-7022)*

**I-2 FAR 52.223-11 - OZONE-DEPLETING SUBSTANCES (JUN 1996)**

(a) Definitions.

“Ozone-depleting substance”, as used in this clause, means any substance designated as Class I by the Environmental Protection Agency (EPA) (40 CFR Part 82), including but not limited to chlorofluorocarbons, halons, carbon tetrachloride, and methyl chloroform; or any substance designated as Class II by EPA (40 CFR Part 82), including but not limited to hydrochlorofluorocarbons.

(b) The Contractor shall label products which contain or are manufactured with ozone-depleting substances in the manner and to the extent required by 42 U.S.C. 7671j (b), (c), and (d) and 40 CFR Part 82, Subpart E, as follows:

"WARNING: Contains (or manufactured with, if applicable) \_\_\_\_\_\*, a substance(s) which harm(s) public health and environment by destroying ozone in the upper atmosphere."

\* The Contractor shall insert the name of the substance(s).

**PART III - LIST OF DOCUMENTS, EXHIBITS, AND OTHER ATTACHMENTS**  
**SECTION J**  
**LIST OF ATTACHMENTS**

- J-1** Attachment (1) - Statement Of Work -11 Pages, With Exhibit A - DD Form 1423, Contract Data Requirements-15 Pages
- J-2** Attachment (2) – Material and Equipment List – 8 pages (For Solicitation Purposes Only)
- J-3** Attachment (3) Estimated Required Travel –2 pages (For Solicitation Purposes Only)
- J-4** Attachment (4) Personnel Qualifications – 7 pages

**PART IV - REPRESENTATIONS AND INSTRUCTIONS**  
**SECTION - K**  
**REPRESENTATIONS, CERTIFICATIONS**  
**AND OTHER STATEMENTS OF OFFERORS OR RESPONDENTS**

**K-1 Representations, Certifications, and Other Statements of Offerors or Respondents**

Each Offeror must submit a completed Representations, Certifications, and Other Statements Of Offerors or Respondents with its proposal which is available electronically in full text at <http://heron.nrl.navy.mil/contracts/rep&certs.htm>

**K-2 FILL IN FOR FAR 52.219-1 - SMALL BUSINESS PROGRAM REPRESENTATIONS (MAY 1999)**

The fill in information is as follows:

The standard industrial classification (SIC) code for this acquisition is \_\_\_\_8731\_\_\_\_.

The small business size standard is \_\_\_\_500\_\_\_\_.

**K-3 COMMERCIAL AND GOVERNMENT ENTITY (CAGE) CODE REPORTING**

The Offeror's CAGE Code is {fill-in}\_\_\_\_\_.

See DFARS 252.204-7001 in Section L for procedures on requesting a CAGE Code.

**SECTION L  
INSTRUCTIONS CONDITIONS AND NOTICES  
TO OFFERORS OR RESPONDENTS**

**L-1 52.252-1 SOLICITATION PROVISIONS INCORPORATED BY REFERENCE (FEB 1998)**

This solicitation incorporates one or more solicitation provisions by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. The offeror is cautioned that the listed provisions may include blocks that must be completed by the offeror and submitted with its quotation or offer. In lieu of submitting the full text of those provisions, the offeror may identify the provision by paragraph identifier and provide the appropriate information with its quotation or offer. Also, the full text of a solicitation provision may be accessed electronically at this/these address(es):

<http://www.arnet.gov/far>  
<http://heron.nrl.navy.mil/contracts/home.htm>

**FAR CLAUSE    TITLE**

52.204-6	-	Data Universal Numbering System (DUNS) Number (APR 1998)
52.214-34	-	Submission Of Offers In The English Language (APR 1991)
52.214-35	-	Submission Of Offers In U.S. Currency (APR 1991)
52.215-16	-	Facilities Capital Cost Of Money (OCT 1997)
52.219-24	-	Small Disadvantaged Business Participation Program - Targets (JAN 1999)
52.222-24	-	Preaward On-Site Equal Opportunity Compliance Evaluation (FEB 1999)

**L-2 FAR 52.211-14 - NOTICE OF PRIORITY RATING FOR NATIONAL DEFENSE USE (SEP 1990)**

Any contract awarded as a result of this solicitation will be a  DX rated order;  DO rated order certified for national use under the Defense Priorities and Allocations system (DPAS) (15 CFR 700), and the Contractor will be required to follow all of the requirements of this regulation.

**L-3 FAR 52.215-20 REQUIREMENTS FOR COST OR PRICING DATA OR INFORMATION OTHER THAN COST OR PRICING DATA (OCT 1997)**

(a) *Exceptions from cost or pricing data.* (1) In lieu of submitting cost or pricing data, offerors may submit a written request for exception by submitting the information described in the following subparagraphs. The Contracting Officer may require additional supporting information, but only to the extent necessary to determine whether an exception should be granted, and whether the price is fair and reasonable.

(i) *Identification of the law or regulation establishing the price offered.* If the price is controlled under law by periodic rulings, reviews, or similar actions of a governmental body, attach a copy of the controlling document, unless it was previously submitted to the contracting office.

(ii) *Commercial item exception.* For a commercial item exception, the offeror shall submit, at a minimum, information on prices at which the same item or similar items have previously been sold in the commercial market that is adequate for evaluating the reasonableness of the price for this acquisition. Such information may include--

(A) For catalog items, a copy of or identification of the catalog and its date, or the appropriate pages for the offered items, or a statement that the catalog is on file in the buying office to which the proposal is being submitted. Provide a copy or describe current discount policies and price lists (published or unpublished), e.g., wholesale, original equipment manufacturer, or reseller. Also explain the basis of each offered price and its relationship to the established catalog price, including how the proposed price relates to the price of recent sales in quantities similar to the proposed quantities.

(B) For market priced items, the source and date or period of the market quotation or other basis for market price, the base amount, and applicable discounts. In addition, describe the nature of the market.

(C) For items included on an active Federal Supply Service Multiple Award Schedule contract, proof that an exception has been granted for the schedule item.

(2) The offeror grants the Contracting Officer or an authorized representative the right to examine, at any time before award, books, records, documents, or other directly pertinent records to verify any request for an exception under this provision, and the reasonableness of price. For items priced using catalog or market prices, or law or regulation, access does not extend to cost or profit information or other data relevant solely to the offeror's determination of the prices to be offered in the catalog or marketplace.

(b) *Requirements for cost or pricing data.* If the offeror is not granted an exception from the requirement to submit cost or pricing data, the following applies:

(1) The offeror shall prepare and submit cost or pricing data and supporting attachments in accordance with Table 15-2 of FAR 15.408.

(2) As soon as practicable after agreement on price, but before contract award (except for unpriced actions such as letter contracts), the offeror shall submit a Certificate of Current Cost or Pricing Data, as prescribed in FAR 15.406-2.

#### **L-4 FAR 52.216-1 - TYPE OF CONTRACT (APR 1984)**

The Government contemplates award of a Cost Plus Fixed Fee Term contract resulting from this solicitation.

#### **L-5 FAR 52.233-2 - SERVICE OF PROTEST (AUG 1996)**

(a) Protests, as defined in Section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO) shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from the Control Desk, Code 3200, Bldg. 222, Rm. 115, Naval Research Laboratory, 4555 Overlook Ave., S.W., Washington DC 20375-5326.

(b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

**L-6 DFARS 252.204-7001 - COMMERCIAL AND GOVERNMENT ENTITY (CAGE) CODE REPORTING (DEC 1991)**

- (a) The Offeror is requested to enter its CAGE code on its offer in the block with its name and address. The CAGE code entered must be for that name and address. Enter CAGE Before the number.
- (b) If the Offeror does not have a CAGE code, it may ask the Contracting Officer to request one from the Defense Logistics Services Center (DLSC). The Contracting Officer will--
  - (1) Ask the Contractor to complete section B of a DD Form 2051, Request for Assignment of the Commercial and Government Entity (CAGE) Code;
  - (2) Complete section A and forward the form to DLSC; and
  - (3) Notify the Contractor of its assigned CAGE code.
- (c) Do not delay submission of the offer pending receipt of a CAGE code.

**L-7 DFARS 252.227-7017 - IDENTIFICATION AND ASSERTION OF USE, RELEASE, OR DISCLOSURE RESTRICTIONS (JUN 1995)**

- (a) The terms used in this provision are defined in following clause or clauses contained in this solicitation--
  - (1) If a successful offeror will be required to deliver technical data, the Rights in Technical Data--Noncommercial Items clause, or, if this solicitation contemplates a contract under the Small Business Innovative Research Program, the Rights in Noncommercial Technical Data and Computer Software--Small Business Innovative Research (SBIR) Program clause.
  - (2) If a successful offeror will not be required to deliver technical data, the Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation clause, or, if this solicitation contemplates a contract under the Small Business Innovative Research Program, the Rights in Noncommercial Technical Data and Computer Software--Small Business Innovative Research (SBIR) Program clause.
- (b) The identification and assertion requirements in this provision apply only to technical data, including computer software documents, or computer software to be delivered with other than unlimited rights. For contracts to be awarded under the Small Business Innovative Research Program, the notification requirements do not apply to technical data or computer software that will be generated under the resulting contract. Notification and identification is not required for restrictions based solely on copyright.
- (c) Offers submitted in response to this solicitation shall identify, to the extent known at the time an offer is submitted to the Government, the technical data or computer software that the Offeror, its subcontractors or suppliers, or potential subcontractors or suppliers, assert should be furnished to the Government with restrictions on use, release, or disclosure.
- (d) The Offeror's assertions, including the assertions of its subcontractors or suppliers or potential subcontractors or suppliers shall be submitted as an attachment to its offer in the following format, dated and signed by an official authorized to contractually obligate the Offeror: Identification and Assertion of Restrictions on the Government's Use, Release, or Disclosure of Technical Data or Computer Software.  
The Offeror asserts for itself, or the persons identified below, that the Government's rights to use, release, or disclose the following technical data or computer software should be restricted:

Technical Data or Computer Software to be Furnished With Restrictions*	Basis for Assertion**	Asserted Rights Category***	Name of Person Asserting Restrictions****
(LIST)*****.	(LIST)	(LIST)	(LIST)

\* For technical data (other than computer software documentation) pertaining to items, components, or processes developed at private expense, identify both the deliverable technical data and each such items, component, or process. For computer software or computer software documentation identify the software or documentation.

\*\* Generally, development at private expense, either exclusively or partially, is the only basis for asserting restrictions. For technical data, other than computer software documentation, development refers to development of the item, component, or process to which the data pertain. The Government's rights in computer software documentation generally may not be restricted. For computer software, development refers to the software. Indicate whether development was accomplished exclusively or partially at private expense. If development was not accomplished at private expense, or for computer software documentation, enter the specific basis for asserting restrictions.

\*\*\* Enter asserted rights category (e.g., government purpose license rights from a prior contract, rights in SBIR data generated under another contract, limited, restricted, or government purpose rights under this or a prior contract, or specially negotiated licenses).

\*\*\*\* Corporation, individual, or other person, as appropriate.

\*\*\*\*\* Enter "none" when all data or software will be submitted without restrictions.

Date \_\_\_\_\_

Printed Name and Title \_\_\_\_\_

Signature \_\_\_\_\_

(End of identification and assertion)

- (e) An offeror's failure to submit, complete, or sign the notification and identification required by paragraph (d) of this provision with its offer may render the offer ineligible for award.
- (f) If the Offeror is awarded a contract, the assertions identified in paragraph (d) of this provision shall be listed in an attachment to that contract. Upon request by the Contracting Officer, the Offeror shall provide sufficient information to enable the Contracting Officer to evaluate any listed assertion.

**L-8 DFARS 252.227-7028 - TECHNICAL DATA OR COMPUTER SOFTWARE PREVIOUSLY DELIVERED TO THE GOVERNMENT (JUN 1995)**

The Offeror shall attach to its offer an identification of all documents or other media incorporating technical data or computer software it intends to deliver under this contract with other than unlimited rights that are identical or substantially similar to documents or other media that the Offeror has produced for, delivered to, or is obligated to deliver to the Government under any contract or subcontract. The attachment shall identify - -

- (a) The contract number under which the data or software were produced;
- (b) The contract number under which, and the name and address of the organization to whom, the data or software were most recently delivered or will be delivered; and
- (c) Any limitations on the Government's rights to use or disclose the data or software, including, when applicable, identification of the earliest date the limitations expire.

**L-9 GOVERNMENT-FURNISHED PROPERTY**

No material, labor, or facilities will be furnished by the Government unless provided for in the solicitation.

**L-10 INQUIRIES CONCERNING THE RFP**

Any questions concerning the RFP must be submitted in writing to the Contracting Officer at the location noted in blocks 7 and 9 of the Standard Form 33, "Solicitation, Offer and Award," no less than fifteen (15) days before closing. The Government will not consider questions received after this date. Offerors are cautioned against directing any questions concerning this RFP to technical personnel at the Naval Research Laboratory.

**L-11 INSTRUCTIONS FOR SUBMISSION AND INFORMATION REQUIRED TO EVALUATE PROPOSALS**

(1) Information for the technical/management proposal shall be placed in Volume I and be completely separate from the business proposal (Volume II).

(2) Proposal Identification/Mailing - The proposal should be packaged for delivery so as to permit safe and timely arrival at destination. The proposal package should be sent to the address shown in Block 7 of the RFP face page and marked:

**Solicitation No. N00173-99-R-AT04**  
**Closing Date:**  
**(As specified in Block 9, RFP face page)**  
**Attn: Code 3220.AT**

(3) Proposal Format and Length - No attempt is made to restrict the proposal format and style. However, the proposal should be written and organized so as to be compatible with the RFP, the Statement of Work, company's organization and accounting structure, and proposed cost estimate. Offerors are encouraged to use recycled paper and maximize the use of double sided copying when preparing responses to solicitations. The total technical proposal for all tasks should not exceed 100 pages.

**L-12 VOLUME I - TECHNICAL/MANAGEMENT PROPOSAL**

REQUIRED COPIES: 1 ORIGINAL AND 4 COPIES .

- (1) Offerors must propose in accordance with Level-of Effort breakdown identified in RFP.
- (2) The following information is required for evaluation of your technical/management :

(a) QUALIFICATIONS OF PERSONNEL

The offerors must provide resumes, publication records and other information that will demonstrate the offeror's key personnel's competence, and the degree to which they meet or exceed the requirements set forth in L-16 Personnel Qualification.

(b) UNDERSTANDING THE PROBLEM

The offerors must provide information that will demonstrate understanding of the requirements, the technical issues, and the general nature of the tasks.

(c) CORPORATE EXPERIENCE

The offerors must provide applicable references to demonstrate corporate experience both general and task specific, in providing the necessary technical support for performance of the SOW requirements and in successfully managing research and development efforts "on site" in a Government laboratory setting.

(d) PAST PERFORMANCE

See "Past Performance Information. "

(e) FAMILIARITY WITH NAVY PROCEDURES AND/OR EQUIPMENT

The offerors must provide information that will demonstrate knowledge of or access to procedures and/or equipment currently used at either Navy research establishments or in the fleet.

(f) MANAGEMENT PLAN

The offerors must provide information to demonstrate completeness, clarity, and reasonableness. of the management plan, which should detail clear organizational lines of authority, responsibility, and communication. This will include the levels of authority required, depicted through organizational charts.

**PAST PERFORMANCE INFORMATION**

(a) Offerors shall submit the following information as part of their proposal. (Offerors are encouraged to submit the information prior to other parts of the proposal to assist the government in reducing the length of the evaluation period.) List the last 5 contracts or subcontracts completed during the past 3 years for services similar in nature to this requirement. Include in the 5 any current contracts or subcontracts for similar services that were awarded at least one year prior to the date of this solicitation. Offerors that have no similar previous or current contracts should provide the requested information for proposed subcontractors that will perform major or critical aspects of the requirement or for the proposed project manager or key personnel responsible for major or critical aspects of the requirement.

1. Name of contracting organization.
2. Contract number
3. Contract type
4. Total contract value
5. Description of the contract work
6. Contracting officer and telephone number
7. Contracting officer's representative, program manager, or similar official and telephone number

(b) Offerors shall contact the contracting organizations identified pursuant to paragraph (a) as soon as possible and request them to send past performance information on the identified contracts to the address in Block 7 of the face page of this solicitation. The past performance report which is available electronically in full text at <http://heron.nrl.navy.mil/contracts/home.htm> is to be provided to the contracting organization for this purpose. If the contracting organization has already collected past performance information on the contract pursuant to FAR Subpart 42.15, the format used to collect the information may be used instead of the past performance report.

(c) Offerors may include in their proposals specific information relating to problems encountered in performing the identified contracts and any corrective actions by the offeror. Offerors should not provide general information on their performance on the identified contracts as this will be obtained from the contracting organizations.

**L-13 VOLUME II - BUSINESS PROPOSAL**

REQUIRED COPIES: 1 ORIGINAL AND 4 COPIES

**(1) COST PROPOSAL**

The offeror shall submit a business proposal that includes a cost proposal with supporting information for each cost element consistent with offeror's cost accounting system. The supporting breakdown should include such elements as materials, direct labor, indirect cost, and other costs such as travel. The offeror shall provide exhibits as necessary to substantiate the cost elements. Should rates be used in the proposal which are not DCAA approved, the offeror shall provide complete documentation and the rationale for their use at time of proposal submission.

## (2) SMALL BUSINESS PARTICIPATION

(a) In addition to complying with the clause at FAR 52.219-9, Small Business Subcontracting Plan (Jan 1999) with its Alternate II, proposals must include information to permit evaluation of the extent of participation of small businesses and historical black colleges or universities and minority institutions in performance of the contract. Participation to be identified may be in the form of a joint venture, teaming arrangement, or subcontract. Small business concerns that are not required by FAR 52.219-9 to submit a subcontracting plan must indicate the extent to which proposed joint ventures, teaming arrangements, or subcontracts are with historically black colleges or universities and minority institutions. Information provided should include the extent of participation of such firms in terms of the value of the total acquisition and the complexity and variety of the work such firms are to perform.

(b) Proposals must also include information to permit evaluation of the extent of participation of small disadvantaged business concerns in performance of the contract. See the provision at FAR 52.219-24, Small Disadvantaged Business Participation Program--Targets (Jan 1999), and the clause at 52.219-25, Small Disadvantaged Business Participation Program--Disadvantaged Status and Reporting (Jan 1999). Any targets will be incorporated into and become part of any resulting contract. Information provided should include the extent of participation of such firms in terms of the value of the total acquisition and the complexity and variety of the work such firms are to perform.

### **L-14 MATERIALS**

The contractor shall provide direct materials to support R&D effort and must acquire consumable materials and supplies during the period of performance. Some off-site tasks have a considerable development component which will require acquisition and development of hardware, instrumentation, Original Equipment Manufacturer (OEM) components, and software. All of these items become deliverables for the contract following their integration into the systems.

Attachment No. (2) is a representative (not all-inclusive) list of the needed materials and equipment for each year of the contract. Offerors should include any applicable indirect costs.

### **L-15 TRAVEL**

U.S. and/or foreign travel to scientific meetings are projected for all tasks. Additional travel costs are associated with support for field studies, gathering analytical samples, or supporting sponsor reporting requirements.

Off-site tasks, in addition to travel associated with scientific meetings will require travel to NRL or other sites for progress and planning reviews and will require travel to support several field tests and demonstrations at other DOD and non-DOD facilities.

Attachment No. (3) is the estimated required travel (per year) for this contract. Offerors should include any applicable indirect costs.

### **L-16 PERSONNEL QUALIFICATIONS**

Attachment No. (4) is a list of personnel qualifications, by category and level, which will be needed in the various technical disciplines to carry out the successful performance of the program.

**SECTION M**  
**EVALUATION FACTORS FOR AWARD**

**M-1 EVALUATION**

Award will be made to that offeror whose proposal is determined to be the best value to the Government, proposed cost and other factors considered. The Government reserves the right to make award to other than the low offeror. Although technical considerations are more important than the cost factor, the closer the technical scores of the various proposals are to one another, the more important the business considerations become.

**M-2 EVALUATION FACTORS FOR AWARD**

Proposals will be evaluated in accordance with the following criteria. The technical factor is more important than the cost factor. The Technical Sub factors are listed below in descending order of importance with Technical Sub factors 3 and 4 being of equal weight.

**M-2-1. TECHNICAL/MANAGEMENT**

(1) QUALIFICATIONS OF PERSONNEL

The proposals will be evaluated on the technical competence of the offeror's key personnel as demonstrated by their resumes, experience (both general and project related), publication records, and the degree to which they meet or exceed the requirements set forth in Personnel Qualifications

The proposal will be evaluated on the availability of key personnel to support the effort on a permanent basis.

The proposals will be evaluated on the expense of the Project Manager and proposed technical team over the total requirements of the SOW. This will include the Project Manager(s) qualifications to address the total scope of the effort.

The proposal will be evaluated on the key personnel's demonstrated oral and written communication skills and the ability to work independently.

(2) UNDERSTANDING THE PROBLEM

The proposal will be evaluated on the offeror's understanding of the requirements, the technical issues, and the general nature of the tasks. The offeror's understanding of the Statement of Work (SOW) will be evaluated.

**(3) CORPORATE EXPERIENCE**

The proposals will be evaluated on the offeror's demonstrated corporate experience, both general and task specific, in providing the necessary technical support for performance of the SOW requirements, particularly in an "on site" environment. This will include addressing the ability to administratively support "on site" efforts with minimum requirements for Government personnel assistance.

The proposals will be evaluated on the sufficiency of the offeror's staff to accommodate program changes within the scope of the SOW.

The proposals will be evaluated on the offeror's experience in successfully managing research and development efforts "on site" in a Government laboratory setting. This shall be demonstrated by providing applicable references.

**(4) PAST PERFORMANCE**

Past performance will be evaluated on the basis of the quality of work performed, timeliness of performance, cost control and business relations. The evaluation will be based on the information provided pursuant to Section L and other sources if available. Offerors that have no relevant performance history or for which past performance information is not available will not be evaluated favorably or unfavorably on past performance. The government may begin proposal evaluation prior to receipt of past performance information. If after completion of proposal evaluation except evaluation of past performance, the contracting officer determines that evaluation of past performance will not affect the outcome of competitive selection, the contracting officer may waive its evaluation in accordance with FAR 15.304 (c) (3) (iii).

**(5) FAMILIARITY WITH NAVY PROCEDURES AND/OR EQUIPMENT**

The proposals will be evaluated on the offeror's knowledge of or access to procedures and/or equipment currently used at either Navy research establishments or in the fleet.

**(6) MANAGEMENT PLAN**

The proposal will be evaluated on their completeness, clarity, and reasonableness. The management plan should detail clear organizational lines of authority, responsibility, and communication. This will include the levels of authority required, depicted through organizational charts.

**M-2-2 COST TO THE GOVERNMENT**

Proposed estimated cost to the Government. The Government may adjust the proposed cost for purposes of evaluation based upon an evaluation of cost realism. Cost Realism means that the costs in an offeror's proposal are realistic for the work to be performed; reflect a clear understanding of the requirements; and are consistent with the various elements of the offeror's technical proposal. The cost realism evaluation includes an analysis of the adequacy of the hours, labor mix, and other direct costs to perform the work as proposed in the technical proposal as well as the proposed labor and indirect rates. It also includes evaluation of the likelihood that the risks inherent in the offeror's technical approach will result in higher actual costs than anticipated.

**M-2-3 SMALL BUSINESS PARTICIPATION**

- (a) The extent of participation of small businesses and historically black colleges or universities and minority institutions in performance of the contract will be evaluated on the basis of the proposed extent of participation of such firms in terms of the value of the total acquisition and the complexity and variety of the work such firms are to perform.
- (b) The extent of participation of small disadvantaged business concerns in performance of the contract will be evaluated on the basis of the proposed extent of participation of such firms in terms of the value of the total acquisition and the complexity and variety of the work such firms are to perform.

**M-3 FAR 52.217-5 - EVALUATION OF OPTIONS (JUL 1990)**

Except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate offers for award purposes by adding the total price for all options to the total price for the basic requirement. Evaluation of options will not obligate the Government to exercise the option(s).

STATEMENT OF WORK  
DEVELOPMENT OF MATERIALS, DEVICES, AND ENGINEERING DESIGN  
FOR NAVAL WEAPONS AND WEAPON PLATFORMS

## INTRODUCTION

The mission of the Materials Science and Technology (MS&T) Division of the U.S. Naval Research Laboratory is to conduct research and development activities associated with novel materials and materials technologies for Navy applications. Accordingly, the MS&T Division's research, development and engineering efforts are exceptionally diverse in both technical content and scope.

Encompassing materials development, materials testing and analysis, failure analysis, as well as applications development, engineering and testing, the MS&T Division requires both general and highly specialized technical support to meet critical mission requirements. The following Statement of Work details the research, development and engineering support required under this effort. Highly interdisciplinary in nature, this effort will require the contractor not only to demonstrate generalized expertise within each of the designated Task Areas, but also to establish specific and explicit technical credentials within each of the enumerated tasks. It is the intent of the MS&T Division to make one award based on this procurement.

## TASK AREA A – DEVELOPMENT, TESTING, AND EVALUATION OF ADVANCED MATERIALS

### BACKGROUND

The Material Science and Technology Division conducts both basic and applied research on the development of state-of-the-art materials for naval applications. These research efforts encompass every conceivable class of material, including but not limited to: structural alloys; ceramics; ceramic, metal or organic matrix composites; magnetic, and electronic (semiconductor, superconductor) materials; and every conceivable architecture (bulk, film, etc.). The formulation of new materials, as well as investigations focusing on new processing procedures that improve the materials already in fleet service, represents the most substantial fraction of our total research effort. Current research and development efforts within the Navy's materials community center upon the development of novel materials with properties that are vastly superior to those currently available. It is expected that these new materials will be utilized in the next generation of systems, components (structural or otherwise), and devices, thereby enhancing the capabilities of the Navy. To this end, new alloys, ceramics, and composites must be developed having the desired characteristics with respect to mechanical, electrical, electronic, magnetic, and thermal behavior, as well as response to various environmental loads. An integral portion of the development of novel materials is the requirement to determine the composition, as well as the materials microstructure. In addition to physical determination of the effects of mechanical, thermal, electrical, and environmental loading on novel materials, a complementary research effort is required to develop predictive models. The failure criteria for naval structures are based on the analysis of failure mechanisms that are determined after subjecting the materials to simulated service conditions. The results of experimental data specifying the strength, fracture toughness, fatigue, crack growth, etc., are used in combination with theoretical and numerical approaches in continuum mechanics to predict the structural behavior of a particular material. In so doing, predictions as to the materials response to mechanical, thermal, and environmental loading may be made, as well as providing valuable insights into the optimization of metallurgical and processing

variables used during component fabrication. These experiments require the use of a variety of techniques, are vital to the successful completion of research efforts in the materials sciences. The MS&T Division's technical requirements within this Task Area are described in the following subtasks:

## TECHNICAL REQUIREMENTS

- (1) The contractor shall conduct basic and applied research in the area of computational mechanics relating to the mechanics of materials, structural behavior, smart materials, and fluid-structure interaction. Areas of involvement include: optimization and material modeling, fluid-structure interaction, smart structures, acoustics, novel acoustic frequency windowing techniques, continuum damage models, and strain visualization techniques. It also involves performing theoretical and computational studies of materials involving electronic structure and applications in such areas as mechanical or transport properties, phase transitions, magnetism, superconductivity and the theory of alloys.
- (2) The contractor shall conduct research and provide engineering expertise in the area of materials evaluation and corrosion control for seawater applications. This work encompasses a broad area from basic laboratory chemical and electrochemical analyses, prototype engineering/fabrication, computerized data analysis and bio-fouling control up to direct fleet support. The contractor shall: conduct ship and submarine physical scale modeling studies for the design of Impressed Current Cathodic Protection (ICCP) systems along with evaluation and minimization of the resultant electric field signatures; assist in design and fabrication of ballast tank corrosion sensors and cathodic protection systems; install sensors in existing ships and develop an analysis package for ranking the state of preservation of a ballast tank coating system; design and conduct research studies to define the mechanism of crevice corrosion in nickel alloys; and evaluate countermeasures to mitigate the existing crevice corrosion problem.
- (3) The contractor shall maintain superconducting magnet systems and assist in the preparation and characterization of thin superconducting films. This work involves operating and maintaining vacuum systems, handling cryogenic materials, and the use of equipment for sputtering, film thickness measurement, and machining.
- (4) The contractor shall perform all phases of lithographic patterning and materials evaporation. The work involves spinning and curing photoresist, alignment and exposure of samples using a UV mask aligner, developing, wet and dry etching of both metals and dielectrics, deposition of metals in a thermal evaporator, and the use of reactive ion beam etching and profilometry. This work will be performed in an NRL clean-room environment, requiring familiarity with clean-room procedures and protocol. Typical systems involve Si or GaAs substrates, III-V semiconductor heterostructures or superconducting Nb layers, ferromagnetic thin film components, and nonmagnetic metal layers. Prototype samples typically have minimum features of a micron and require one or more alignments.
- (5) The contractor shall conduct research in the destructive and non-destructive testing of a broad range of metallic and non-metallic materials. Specific tasks include: failure analysis and fractography using both light and electron microscopes; materials characterization through the use of x-ray fluorescence spectrometers, energy dispersive x-ray spectrometers and the scanning Auger microprobe; microstructural analysis of materials by polishing, etching and sectioning; destructive materials testing via monotonic, cyclic and impact loading in tensile, compressive or flexural modes. The contractor shall: perform appropriate tests on metals, polymers and organic matrix composites in accordance with

American Society for Testing and Materials (ASTM) and Suppliers of Advanced Composite Materials Association (SACMA) specifications; develop innovative test methods to solve problems not addressed by standard tests; and develop and conduct non-destructive materials evaluation using ultrasonic, x-ray, and other technologies.

(6) In conjunction with scanning and transmission electron microscopies, the contractor shall conduct compositional studies of selected materials. These measurements shall be made using techniques including but not limited to energy dispersive x-ray analysis, wavelength dispersive analysis, and electron energy loss spectrometry. Other appropriate techniques, such as Auger Electron Spectrometer or X-ray fluorescence may also be involved.

(7) Other characterizations may be required for some materials and will include but not be limited to determinations of specific heat, coefficients of thermal expansion, electrical conductivity, vibrational damping, and indentation hardness. In addition, the contractor will, as required, investigate materials uses pertaining to the measurement and reduction of magnetic signatures of materials, structures, and vessels.

(8) The contractor shall perform all necessary tasks relating to testing antifouling and corrosion preventative coatings (including paints) used on shipboard. This includes but it is not limited to substrate surface preparation, coating application, and coating testing for effectiveness and durability under service conditions.

(9) For selected materials designated by NRL, the contractor shall conduct constant load-amplitude fatigue crack growth rate tests, as well as examinations of mechanical fatigue and creep deformation using servo-hydraulic testing systems. These systems will employ advanced transducers, crack sensing devices (e.g. optical, crack opening displacement, DC potential and capacitance devices) and computer controlled data acquisition. As necessary, the contractor will conduct these studies at temperatures and/or pressures which are similar to those expected in service. This may involve the design and fabrication of specialized enclosures and sample heating or cooling stages and associated ancillary equipment.

(10) The contractor shall evaluate fracture mechanics applicability to ceramic and metal alloys using the facilities at NRL. In addition, the contractor shall determine the deformation and fracture characteristics of these materials under similar service conditions, and conduct experimental and analytical studies (e.g. using dislocation dynamics and diffusion kinetics of the behavior of high temperature materials under monotonic and cyclic loads). The contractor shall evaluate damage mechanisms using electron microscopy and computer simulation techniques. In environmental-assisted fracture, the contractor will address effects related to stress corrosion, corrosion fatigue, hydrogen effects, and strain rate.

(11) The contractor shall develop new or modify existing methodologies for non-destructive evaluation (NDE) or non-destructive inspection (NDI). The contractor will use these, as well as standard methods, as appropriate, for the evaluation or inspection of metals, ceramics, composites, and other organic and inorganic materials to analyze the condition of components.

(12) The contractor shall evaluate the interactions between materials and newly introduced chemicals and materials. This will include, but not be limited to the effects of waste effluent streams on piping and container materials, and the selection of appropriate materials for various marine pollution control device (MPCD) systems.

(13) The contractor shall examine the effect of ship seawater system antifouling systems/technologies on materials. The use of current and proposed systems/technologies, including chlorination, copper dosing, other injectable biocides, piping interior coatings, modified cathodic protection, pulsed electric/acoustic power, shall be evaluated for their effects on materials and resistance to corrosion. These techniques shall be evaluated in contractor designed and constructed piping flow loops. In addition, the contractor shall consider the environmental impact of these antifouling systems and other emergent technologies, such as dechlorination and ultrafiltration, by conducting engineering studies, conducting environmental testing with appropriate aquatic organisms, and developing novel *in-situ* monitoring methodologies to ensure environmental compliance of antifouling systems.

## TASK AREA B – DEVELOPMENT, TESTING, AND EVALUATION OF SENSORS AND ACTUATORS

### BACKGROUND

The Materials Science and Technology Division conducts both basic and applied research on the development of sensors and sensor technologies for naval applications. The possibility of attack on U. S. naval personnel using chemical agents necessitates the development of detection systems that will serve as sensors for the toxic agents in question. Several different detection schemes show great promise as microsensors with low power requirements, low cost, and small size. Optical, chemiresistor, surface acoustic wave, tunneling devices, force transducers, micromachined devices and other appropriate schemes are to be developed to this end. The sensors may also be targeted to the detection of other hazardous or noxious gases/liquids, for instance in the ship damage control network. Application of sensor systems to environmental needs of the Navy will also be emphasized. The Naval Research Laboratory also has among its missions support for Department of Defense (DoD) Counterproliferation Advanced Concept Tactical Demonstration (ACTD) programs. In support of these programs the DoD, under the auspices of the Defense Special Weapons Agency (DSWA), has an ongoing Counterproliferation 1 (CP1) program to develop sensor systems and computational tools to support the warfighter in countering the threat from facilities producing weapons of mass destruction. The Counterproliferation 2 (CP2) program will further support these efforts: specifically the development of the Ion Mobility Spectrometer (IMS) and Surface Acoustic Wave (SAW) System, the Finder Miniature Unmanned Aerial Vehicle (UAV), Predator UAV modifications with a Fourier Transform InfaRed (FTIR) system. These project components are combined into a conduct of operations to support the warfighter. The Materials Science and Technology Division will take the lead in the sensor development aspects of the program. These efforts support all elements of the program including design, development, fabrication, and field demonstration. This effort will include review, analysis, and documentation of program elements defined by the DSWA Sensor Working Group and the DSWA Sensor Program Manager. The MS&T Division's technical requirements within this Task Area are described in the following subtasks:

## **TECHNICAL REQUIREMENTS**

- (1) The contractor shall support the MS&T Division with all aspects of the Counterproliferation 2 ACTD program. Elements within this program include the Ion Mobility Spectrometer (IMS) and Surface Acoustic Wave (SAW) System, the Finder Miniature Unmanned Aerial Vehicle (UAV), and the Predator UAV modifications to include an FTIR. This will include all aspects in the design, development, fabrication, and demonstration testing. The contractor shall support the DSWA Counterproliferation 2 ACTD Sensor Working Group and will conduct research and reviews to support DSWA and contractors associated with all elements of the program.
- (2) The contractor shall construct model sensors and/or actuators based on optical properties, surface acoustic waves, electrical conductivity, force transducers, piezoresistance, magnetoresistance or other suitable effects or material properties. The contractor shall apply selective coatings or surface modification chemistries to these devices by appropriate techniques.
- (3) The contractor shall maintain an automated testing system using calibrated diffusion tubes and agent simulants. The response of sensors must be determined as a function of simulant concentration and humidity, with primary emphasis on elucidating minimum detection limits, time response reproducibility and lifetime. Mixtures of agent simulants and innocuous gases must be examined.
- (4) The contractor shall develop signal processing software which will allow hardware interfacing with automated data acquisition and data processing for interpretation of results.
- (5) The contractor shall maintain surface chemistry and immunology laboratories for preparing surfaces to immobilize specific antibodies or DNA to capture specific antigens. The bioactivity of polyclonal and monoclonal antibodies must also be determined.
- (6) The contractor shall develop new sensor and sensor systems for evaluation of land and underwater sites for the presence of radioactive waste, and conduct radiological surveys of such sites. This includes characterization of the solid waste radioactive waste stream associated with the Russian military and the selection of proper and effective methods of dealing with military hazardous material spills in the Arctic environment.
- (7) The contractor shall mobilize on-site to collect raw geophysical data using either total field magnetometry, gradient magnetometry, chemical sensors, or radiological sensors, linking these sensors to differential Global Positioning System (GPS). Magnetic sensors (as alternatives to the full-field vapor magnetometers, i.e. equivalent to the DOD Mk 22) shall be evaluated including: sensors which will independently evaluate the vector components of the earth's field; inexpensive gradiometer arrays, perhaps fielded at various heights or in tightly packed arrays; new rugged compact magnetic sensors based upon fiber optics- or other promising magnetic field sensing devices. Capabilities of chemical vapor sensors shall be evaluated to determine their usefulness for Multi-Sensor Towed Array Detection System (MTADS), marine, and airborne sensors. Sensitivities, specificity, ruggedness, and independence from vehicular and environmental interferences must be considered. Procedures shall be developed to "extract" information from soil bound chemicals without the use of techniques which would be considered intrusive (by EPA or DOE standards at toxic/hazardous waste landfills). The use of sensors for detecting radiological hazards shall be developed. A primary concern at large area surveys at DOD and DOE sites is

depleted uranium. This should not rule out considerations for detection of other radionuclides, if a need and an appropriate solution can be demonstrated. Other alternative sensor concepts may be proposed for evaluation. The sensors shall be able to be integrated with a navigation system such as the Trimble 4000 SSE DGPS instruments previously selected and evaluated with existing equipment. The contractor shall produce a data acquisition system with capability to acquire the real-time sensor and navigation data. The system must be based upon ruggedized PC hardware, suitable sensor, and navigation interfaces and suitable software to produce data files appropriate for post processing using the Unix-based data analysis system (DAS). The contractor shall conduct demonstrations and field evaluations of the sensor systems. These will include prepared sites, using known targets to be characterized in blind surveys, and demonstrations at contaminated sites of interest to the Government. The contractor shall conduct these demonstrations and surveys, analyze the data, and prepare reports of the results. Contractor may be asked to prosecute targets at live sites to evaluate the performance of the instrumentation. The contractor shall provide personnel who are qualified to conduct studies.

## TASK AREA C - APPLICATIONS ENGINEERING AND SYSTEMS DEVELOPMENT

### BACKGROUND

The Materials and Science and Technology (MS&T) Division of the Naval Research Laboratory has a requirement to investigate emerging technologies for the development and demonstration of environmental quality equipment for surface ships and submarines. This includes the full spectrum of RDT&E, from basic research, through exploratory development and engineering development, to installation, testing, and modification of new shipboard equipment for Navy environmental compliance and pollution prevention, afloat and ashore. Activities are directed towards, but not limited to, solid and liquid waste management systems and thermal destruction systems. This includes scientific, engineering, and technical support for system and subsystems design; producibility and survivability studies; standardization and reverse engineering; reliability and maintainability analyses; integrated logistics support, test and evaluation; shipboard installation support; drawing preparation and review; Engineering Development Models, prototyping and design and fabrication of test articles; program support; configuration management; software development, environmental equipment support; management of auxiliary parts for environmental shipboard equipment and specifications and standards. The MS&T Division's technical requirements within this Task Area are described in the following subtasks:

### TECHNICAL REQUIREMENTS

(1) The contractor shall provide test planning and development of test plans. Test plans will be formulated for laboratory testing or shipboard testing in order to meet government-defined objectives. The test plans will include clearly defined objectives, background, approach, procedure, specifications for data collection, and figures and tables as determined necessary.

- (2) The contractor shall support test execution aboard ships and submarines, at NRL, at contractor owned facilities, at designated contractor operated facilities, or at other government facilities. Contractor shall include data collection, analysis and interpretation. Theoretical calculations will be performed to estimate test results and evaluate test system performance. Test plans will be carried out to gather data on environmental systems. Data will be gathered by observation or recorded on laboratory equipment. Analysis of the collected data will be completed by engineering personnel and/or with commercially available software. The data will be interpreted to provide trends or the best answers to the original test objectives, and documented in technical reports and/or briefings.
- (3) The contractor shall provide environmental simulation of shipboard operating conditions for environmental equipment either analytically or in laboratory spaces such as shock and vibration and Electro Magnetic Interference (EMI) testing.
- (4) The contractor shall complete cost studies of current and future systems. Cost estimates will be generated for operation of current equipment and the initial and life cycle costs of future systems from drawings and engineering studies.
- (5) The contractor shall perform solid waste generation surveys aboard ship. Data will be collected from current ships on their waste generation rates by measuring the weight and volume of waste products generated by the ship and its personnel during operations. This information will be used to help determine the size, capacity, or number of environmental systems required aboard the ship to bring it into compliance with current and future laws and directives.
- (6) The contractor shall perform manufacturability studies to determine the ease of manufacture of new environmental systems based on analytical studies, laboratory models, prototypes, or engineering development models. Alternatives to subsystems will be explored to determine which configuration will result in the easiest and most cost-effective production in quantity for acquisition programs.
- (7) The contractor shall perform failure analyses of environmental systems to determine safety limits and cost-effective usage. Failure Mode Effects and Critical Analysis (FMECA), and other analytical methods will be used to determine failure mechanisms and the statistical basis for projecting failure rates. These results will be used to determine recommendations for spares, level of repair analysis, and in the determination of training required.
- (8) The contractor shall develop control systems for operation of prototype and shipboard systems. This work will include, but not be limited to, selecting and integrating sensors to maintain system parameters; recording and processing data; programming computer control systems; and selecting and integrating control system hardware.
- (9) The contractor shall support the Navy clearinghouse for environmental information. The Navy has an array of systems, equipment, and procedures at various stages of development and implementation for controlling and preventing pollution from its ships. Comprehensive databases shall be developed, maintained, and disseminated on shipboard pollution abatement systems, equipment, and procedures to minimize cost and adverse impact on mission performance.

(10) The contractor shall support the U.S. Navy's need to interface its environmental program with those of other nations as part of the International exchange of environmental technology. Data exchange annexes, international agreements, international requirements documents, and memoranda of understanding will be developed, reviewed, and analyzed for their impact and relevance to the U.S. Navy's environmental quality programs.

(11) The contractor shall provide theoretical and experimental Scientific and Engineering (S&E) support in a wide variety of technical areas in the development of advanced waste management systems including, electrical engineering, mechanical engineering, chemical engineering, and environmental engineering and sciences. Tasks may include, but not be limited to: review of recent technical literature to quantitatively evaluate new technological developments and concepts for their potential application to Navy waste management; assessment of current state-of-the-art technology and quantitative definitions of how and where improvements can be made to existing Navy environmental systems; identification technology gaps which must be filled before new concepts can be transformed into operational equipment; integration of technical information from a wide variety of disciplines and sources leading to the formation of conceptual designs to meet Navy mission requirements that are both scientifically credible and operationally practical.

(12) The contractor shall support the demonstration of emerging technologies for the concentration of liquid wastes. Detailed engineering analysis of the emerging technologies will be provided to include energy and material balances, proof of concept analysis, and small-through-full-scale system demonstrations. Technical reports will be prepared for documentation of results.

(13) The contractor shall support development of membrane filtration technology for treatment of liquid waste streams. Laboratory, pierside and shipboard prototype membrane based systems will be fabricated, tested and evaluated. These systems may include pre- and post-membrane treatment technologies.

(14) The contractor shall support the demonstration of technology for the thermal destruction of concentrated liquid wastes. These wastes include concentrated blackwater/graywater, concentrated bilgewater, vacuum-collected blackwater oily waste and waste oil. A broad range of thermal destruction technology may be investigated including, but not limited to, vortex incineration, hydrothermal oxidation, and plasma arc incineration.

(15) The contractor shall support the development of advanced technology for solid waste incineration. Analyses will be performed to determine the impact of variations in the waste categories, amounts, heating values, water content and destruction chemistry. Support will be provided for developing preliminary designs which specify operational parameters, control system (including safety), material requirements, energy and mass balances and handling of output (ash and flue gas).

(16) The contractor shall provide technical and program support for ship installation of environmental equipment on surface ships and submarines to determine space requirements and ship interfaces including electrical power, water, Heating, Ventilation and Air Conditioning (HVAC), and other ship supplied resources. The contractor shall provide planning, technical and shipboard assistance for shipboard testing including SHIPEVAL / TECHEVAL /OPEVAL (Ship Evaluation, Technical Evaluation, Operational

Evaluation) aboard ship and on shore during test phases. Contractor shall also determine equipment maintainability requirements in terms of repair frequency and repair requirements and participate in determining the Integrated Logistics Support (ILS) requirements including developing and providing support packages for environmental equipment. Products include technical manuals, allowance parts lists (APL), and detailed engineering drawings, etc.

(17) The Contractor shall provide the technical personnel and facilities to design and fabricate test equipment, test articles, prototype equipment units, Engineering Development Models (EDM) and upgrades to existing EDMs, and pre-production units of environmental equipment for eventual installation aboard ship. Engineering drawings, shop drawings and process and instrumentation drawings shall also be completed by the contractor. The effort may also include modifications to commercial off-the-shelf equipment, for installation and use aboard ship.

(18) The contractor shall provide support for installation, trouble shooting, repair, maintenance and removal of environmental equipment on ships and submarines including debriefs to NRL and/or ships force to report status of equipment problems/repairs. The contractor shall also perform and document failure analysis of shipboard component assemblies to determine cause and effect including monitoring Situation Report (SITREP) and Casualty Report (CASREP) data to assist the Fleet with resolution of the equipment failures. The effort will include shipchecks and functional checks to diagnose catastrophic failures, transport component assemblies to/from the Fleet and assisting the Fleet with installation and/or repair of the equipment.

(19) The contractor shall support the U.S. Navy in the management of auxiliary parts for environmental shipboard equipment throughout the programmed life cycle including development of repair fixes as necessary. Support will be provided for the development, implementation, and maintenance of databases consisting of equipment location, manufacturer, Reliability / Maintainability / Availability data, configuration management, maintenance, etc. The databases must also have sufficient information to project requirements for spares, depot repair projections, relevant modification kits, etc.

(20) The contractor shall support storage, repair, and maintenance of environmental equipment within and including a warehouse. The depot level repair functions shall be maintained including the development of prototype modifications and repair kits along with testing of modifications in the laboratory and on ships. Total ILS shall be provided including interface with Navy logisticians. Components will be assembled into critical/major assemblies and component assemblies returned from ships will be refurbished. The contractor shall provide recommendations on enhancements to the material condition of the environmental equipment.

(21) The contractor shall support the development of software for the development and management of databases, the design of automated data collection and processing systems; the design and fabrication of control systems, including programmable logic controls; and provide statistical analysis support.

(22) The Contractor shall provide support to training programs that demonstrate correct operation and maintenance of all types of environmental equipment. Training will be conducted on site, aboard ship or through interactive courseware.

(23) The Contractor shall provide a broad and diverse range of analytical and programmatic support as required in the areas of: photographic (still and video) support in the laboratory and aboard ship; document preparation, (e.g., technical reports, technical manuals, and environmental policy and guidance documents, instructions, test plans, journal articles, etc.).

(24) The contractor shall assess various environmental technologies as they may be applied to solve U.S. Navy environmental problems and are responsive to U.S. Navy S&T requirements. Effort will include assisting the U.S. Navy Program Managers and Technical Managers in managing S&T and RDT&E programs, compiling data and preparing summary documents, preparing calls for proposals, and coordinating, scheduling, and facilitating proposal evaluation panels.

(25) The contractor shall assist U.S. Navy Program Managers in arranging, organizing, coordinating, scheduling, and facilitating working group meetings, seminars, symposia, program reviews and other programmatic meetings at Contractor spaces or other commercial facilities

#### TASK AREA D - PROGRAM INTEGRATION, LOGISTICS SUPPORT AND REPORTING

##### BACKGROUND

The breadth and scope of the MS&T Division's research and development activities require substantial support involved with the technical backup and assistance in program coordination. This support is critical to the successful coordination of these research efforts within the Navy, and between the Navy and other Federal and State agencies, as well as academic and private sector parties including appropriate professional societies. The MS&T Division's requirements within this Task Area are described in the following subtasks:

##### REQUIREMENTS

(1) Contract Administration Support - The contractor will provide all requisite administration support required to conduct this effort. As the Government will not provide administrative support, the contractor will include the provision of on-site administrative personnel that will support this research effort.

(2) Other Administrative Support - The contractor will provide, as needed, technical support which will include, but will not be limited to: responses to interrogatories; coordination of technical review meetings and workshops; the preparation and presentation of point papers and other briefings; and will prepare fact sheets and newsletters related to the technical research conducted under this effort.

(3) Computer Support – The contractor will maintain a computer support “trouble desk” to support both technical and program management personnel assigned to all task areas. Support will be provided on an *ad hoc* basis for trouble-shooting computer or peripheral failures, installing new hardware or software, upgrading hardware or software, and trouble-shooting workstation or network problems. Assistance will be also be made available for assessing and solving problems that may arise in the areas of network administration, network security, and Y2K compliance.

(4) Travel - The contractor will provide, as needed, attendance by its staff to off-site locations which will include, but will not be limited to: professional society meetings; technical review meetings and workshops; and planning and coordination meetings. The intent here will be to enhance the near- and far-term performance of the subtasks listed under Task Areas A-C above. When unusual field conditions require it, the contractor will provide appropriate garments and equipment to work under extreme weather or hazardous environment.

(5) Data Requirements - The contractor will provide Cost and Progress Reports in the frequency, dates, and quality as required on DD Forms 1423 and 1423-1. The Cost Reports are to include, separately, labor costs, a breakdown by category (materials, travel, consultants, subcontractors, etc.) of Other Direct Costs, contractor's fee, and the total of all expenditures. The Progress Reports, though succinct, are to reflect accurately the work performed during the reporting period.



# CONTRACT DATA REQUIREMENTS LIST

(2 Data Items)

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OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 220 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503. Please DO NOT RETURN your form to either of these addresses. Send completed form to the Government Issuing Contracting Officer for the Contract/PR No. listed in Block E.

A. CONTRACT LINE ITEM NO. 0001AB	B. EXHIBIT A	C. CATEGORY: TDP _____ TM _____ OTHER <b>X</b>
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D. SYSTEM / ITEM Research	E. CONTRACT / PR NO.	F. CONTRACTOR
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1. DATA ITEM NO. A002	2. TITLE OF DATA ITEM Progress Report	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.) N/A	5. CONTRACT REFERENCE SOW, Page 11, Para (5)	6. REQUIRING OFFICE Code 6303
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7. DD 250 REQ LT	8. DIST STATEMENT REQUIRED N/A	10. FREQUENCY MTHLY	12. DATE OF FIRST SUBMISSION 45 DAC	14. DISTRIBUTION		
8. APP CODE N/A		11. AS OF DATE N/A	13. DATE OF SUBSEQUENT SUBMISSION 75 DAC	a. ADDRESSEE Code 6303	b. COPIES	
					Draft	Final
					Reg	Repro

16. REMARKS The contractor shall submit monthly progress report to reflect the work performed during the report period. The report should describe accurately results accomplished to date and any further developments. Subsequent submission shall be every 15th day of each month for the preceding month.	15. TOTAL → 0 1 0
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17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

1. DATA ITEM NO. A003	2. TITLE OF DATA ITEM Cost Report	3. SUBTITLE
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4. AUTHORITY (Data Acquisition Document No.) N/A	5. CONTRACT REFERENCE SOW, Page 11, Para (5)	6. REQUIRING OFFICE Code 6303
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7. DD 250 REQ LT	8. DIST STATEMENT REQUIRED N/A	10. FREQUENCY MTHLY	12. DATE OF FIRST SUBMISSION 45 DAC	14. DISTRIBUTION		
8. APP CODE N/A		11. AS OF DATE N/A	13. DATE OF SUBSEQUENT SUBMISSION 75 DAC	a. ADDRESSEE Code 6303	b. COPIES	
					Draft	Final
					Reg	Repro

16. REMARKS The contractor shall submit monthly cost report to include labor costs, a breakdown of other direct costs (travel, materials, consultants, subcontractors, etc), contractor's fee and the total expenditures to date. Subsequent submission shall be every 15th day of each month for the preceding month.	15. TOTAL → 0 1 0
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17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

G. PREPARED BY NRL Code 6303	H. DATE 06/16/99	I. APPROVED BY	J. DATE
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# CONTRACT DATA REQUIREMENTS LIST

(2 Data Items)

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**OMB No. 0704-0188**

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<b>A. CONTRACT LINE ITEM NO.</b> 0001AB	<b>B. EXHIBIT</b> A	<b>C. CATEGORY:</b> TDP _____ TM _____ OTHER <u>X</u>
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<b>D. SYSTEM / ITEM</b> Research	<b>E. CONTRACT / PR NO.</b>	<b>F. CONTRACTOR</b>
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<b>1. DATA ITEM NO.</b> A004	<b>2. TITLE OF DATA ITEM</b> Status of Residual Material	<b>3. SUBTITLE</b>
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<b>4. AUTHORITY (Data Acquisition Document No.)</b> N/A	<b>5. CONTRACT REFERENCE</b> SOW, Page 11, Para (5)	<b>6. REQUIRING OFFICE</b> Code 6303
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<b>7. DD 250 REQ</b> LT	<b>8. DIST STATEMENT REQUIRED</b>	<b>10. FREQUENCY</b> 1TIME	<b>12. DATE OF FIRST SUBMISSION</b> EOC	<b>14. DISTRIBUTION</b>		
<b>8. APP CODE</b> N/A	<b>9. DIST STATEMENT REQUIRED</b> N/A	<b>11. AS OF DATE</b> See Block 16	<b>13. DATE OF SUBSEQUENT SUBMISSION</b> N/A	<b>a. ADDRESSEE</b>		<b>b. COPIES</b>
						Draft
					Reg	Repro

<b>16. REMARKS</b> The contractor shall submit a status report on the accumulated excess material during the report period The report is due no later than 90 days after contract award.	<b>15. TOTAL</b> → 0 1 0
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<b>17. PRICE GROUP</b>
<b>18. ESTIMATED TOTAL PRICE</b>

<b>1. DATA ITEM NO.</b> A005	<b>2. TITLE OF DATA ITEM</b> Final Report	<b>3. SUBTITLE</b>
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<b>4. AUTHORITY (Data Acquisition Document No.)</b> N/A	<b>5. CONTRACT REFERENCE</b> SOW, Page 11, Para (5)	<b>6. REQUIRING OFFICE</b> Code 6303
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<b>7. DD 250 REQ</b> LT	<b>9. DIST STATEMENT REQUIRED</b>	<b>10. FREQUENCY</b> 1TIME	<b>12. DATE OF FIRST SUBMISSION</b> EOC	<b>14. DISTRIBUTION</b>		
<b>8. APP CODE</b> N/A	<b>9. DIST STATEMENT REQUIRED</b> N/A	<b>11. AS OF DATE</b> See Block 16	<b>13. DATE OF SUBSEQUENT SUBMISSION</b> N/A	<b>a. ADDRESSEE</b>		<b>b. COPIES</b>
						Draft
					Reg	Repro

<b>16. REMARKS</b> The contractor shall submit a final report to reflect the work performed during the reporting period. The final report is due no later than 90 days after contract completion.	<b>15. TOTAL</b> → 0 1 0
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<b>17. PRICE GROUP</b>
<b>18. ESTIMATED TOTAL PRICE</b>

<b>G. PREPARED BY</b> NRL Code 6303	<b>H. DATE</b> 06/16/99	<b>I. APPROVED BY</b>	<b>J. DATE</b>
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# CONTRACT DATA REQUIREMENTS LIST

(2 Data Items)

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<b>A. CONTRACT LINE ITEM NO.</b> 0003AB	<b>B. EXHIBIT</b> A	<b>C. CATEGORY:</b> TDP _____ TM _____ OTHER <u>X</u>
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<b>D. SYSTEM / ITEM</b> Research	<b>E. CONTRACT / PR NO.</b>	<b>F. CONTRACTOR</b>
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<b>1. DATA ITEM NO.</b> A0012	<b>2. TITLE OF DATA ITEM</b> Progress Report	<b>3. SUBTITLE</b>
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<b>4. AUTHORITY (Data Acquisition Document No.)</b> N/A	<b>5. CONTRACT REFERENCE</b> SOW, Page 11, Para (5)	<b>6. REQUIRING OFFICE</b> Code 6303
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<b>7. DD 250 REQ</b> LT	<b>8. DIST STATEMENT REQUIRED</b> N/A	<b>10. FREQUENCY</b> MTHLY	<b>12. DATE OF FIRST SUBMISSION</b> See Block 16	<b>14. DISTRIBUTION</b>			
<b>8. APP CODE</b> N/A		<b>11. AS OF DATE</b> N/A	<b>13. DATE OF SUBSEQUENT SUBMISSION</b> See Block 16	<b>a. ADDRESSEE</b> Code 6303	<b>h. COPIES</b>		
					<b>Draft</b>	<b>Final</b>	
						<b>Neg</b>	<b>Repro</b>

<b>16. REMARKS</b> The contractor shall submit monthly progress report to reflect the work performed during the report period. The report should describe accurately results accomplished to date and any further developments. First submission shall be 45 days from the effective date of the option, if exercised. Subsequent submission shall be every 15th day of each month for the preceding month.	<b>15. TOTAL</b> → 0 1 0
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<b>17. PRICE GROUP</b>
<b>18. ESTIMATED TOTAL PRICE</b>

<b>1. DATA ITEM NO.</b> A0013	<b>2. TITLE OF DATA ITEM</b> Cost Report	<b>3. SUBTITLE</b>
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<b>4. AUTHORITY (Data Acquisition Document No.)</b> N/A	<b>5. CONTRACT REFERENCE</b> SOW, Page 11, Para (5)	<b>6. REQUIRING OFFICE</b> Code 6303
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<b>7. DD 250 REQ</b> LT	<b>8. DIST STATEMENT REQUIRED</b> N/A	<b>10. FREQUENCY</b> MTHLY	<b>12. DATE OF FIRST SUBMISSION</b> See Block 16	<b>14. DISTRIBUTION</b>			
<b>8. APP CODE</b> N/A		<b>11. AS OF DATE</b> N/A	<b>13. DATE OF SUBSEQUENT SUBMISSION</b> See Block 16	<b>a. ADDRESSEE</b> Code 6303	<b>h. COPIES</b>		
					<b>Draft</b>	<b>Final</b>	
						<b>Neg</b>	<b>Repro</b>

<b>16. REMARKS</b> The contractor shall submit monthly cost report to include labor costs, a breakdown of other direct costs (travel, materials, consultants, subcontractors, etc), contractor's fee and the total expenditures to date. First submission shall be 45 days from the effective date of the option, if exercised. Subsequent submission shall be every 15th day of each month for the preceding month.	<b>15. TOTAL</b> → 0 1 0
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<b>17. PRICE GROUP</b>
<b>18. ESTIMATED TOTAL PRICE</b>

<b>G. PREPARED BY</b> NRL Code 6303	<b>H. DATE</b> 06/16/99	<b>I. APPROVED BY</b>	<b>J. DATE</b>
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# CONTRACT DATA REQUIREMENTS LIST

(2 Data Items)

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<b>A. CONTRACT LINE ITEM NO.</b> 0004AB	<b>B. EXHIBIT</b> A	<b>C. CATEGORY:</b> TDP _____ TM _____ OTHER <u>X</u>
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<b>D. SYSTEM / ITEM</b> Research	<b>E. CONTRACT / PR NO.</b>	<b>F. CONTRACTOR</b>
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<b>1. DATA ITEM NO.</b> A0019	<b>2. TITLE OF DATA ITEM</b> Status of Residual Material	<b>3. SUBTITLE</b>
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<b>4. AUTHORITY (Data Acquisition Document No.)</b> N/A	<b>5. CONTRACT REFERENCE</b> SOW, Page 11, Para (5)	<b>6. REQUIRING OFFICE</b> Code 6303
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<b>7. DD 250 REQ</b> LT	<b>8. DIST STATEMENT REQUIRED</b> N/A	<b>10. FREQUENCY</b> 1TIME	<b>12. DATE OF FIRST SUBMISSION</b> N/A	<b>14. DISTRIBUTION</b>			
<b>8. APP CODE</b> N/A		<b>11. AS OF DATE</b> See Block 16	<b>13. DATE OF SUBSEQUENT SUBMISSION</b> N/A	<b>a. ADDRESSEE</b> Code 6303	<b>b. COPIES</b>		
					<b>Draft</b>	<b>Final</b>	
						<b>Reg</b>	<b>Repro</b>

<b>16. REMARKS</b> The contractor shall submit a status report on the accumulated excess material during the report period The report is due no later than 90 days after completion of option, if exercised..	<b>15. TOTAL</b> → 0 1 0
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<b>17. PRICE GROUP</b>
<b>18. ESTIMATED TOTAL PRICE</b>

<b>1. DATA ITEM NO.</b> A0020	<b>2. TITLE OF DATA ITEM</b> Final Report	<b>3. SUBTITLE</b>
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<b>4. AUTHORITY (Data Acquisition Document No.)</b> N/A	<b>5. CONTRACT REFERENCE</b> SOW, Page 11, Para (5)	<b>6. REQUIRING OFFICE</b> Code 6303
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<b>7. DD 250 REQ</b> LT	<b>8. DIST STATEMENT REQUIRED</b> N/A	<b>10. FREQUENCY</b> 1TIME	<b>12. DATE OF FIRST SUBMISSION</b> N/A	<b>14. DISTRIBUTION</b>			
<b>8. APP CODE</b> N/A		<b>11. AS OF DATE</b> See Block 16	<b>13. DATE OF SUBSEQUENT SUBMISSION</b> N/A	<b>a. ADDRESSEE</b> Code 6303	<b>b. COPIES</b>		
					<b>Draft</b>	<b>Final</b>	
						<b>Reg</b>	<b>Repro</b>

<b>16. REMARKS</b> The contractor shall submit a final report to reflect the work performed during the reporting period. The final report is due no later than 90 days after completion of option, if exercised.	<b>15. TOTAL</b> → 0 1 0
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<b>17. PRICE GROUP</b>
<b>18. ESTIMATED TOTAL PRICE</b>

<b>G. PREPARED BY</b> NRL Code 6303	<b>H. DATE</b> 06/16/99	<b>I. APPROVED BY</b>	<b>J. DATE</b>
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**MATERIALS AND EQUIPMENT LIST**

(Representative of Needs Per Year)

<u>DESCRIPTION</u>	<u>QUANTITY</u>
Airpac Dualpac Air Conditioning system, HU060-A4D	1
Wagon cart option, AP-DUAL-WC08	1
460/3/60 vac fusible elec. Disconnect outdoor type, AP-DUAL-FD20	1
Remote thermostat, AP-DUAL-RS50	1
2-way cold air discharge plenum, 2x10" round, AP-DUAL-2WPD	1
50' length of 10" round insulated flexible duct, AP-ACFD-0425	2
Agit-cup-2, qt. DRIP Proof Option	2
Hand air spray gun	1
Fluid air needle	1
SS, fluid needle	1
SD, air cap	1
1 qt. siphon cup	1
Siphon cup, EZ 2	4
Gasket for EZ 2 cup	2
Expenda siphon cup	2
Binks, regulator, 85-211	1
Gun Lubrication 20x20 oz. bottles per case, 6-429	1
Binks Fluid Nozzle, 67VT	1
Air nozzle, 67PB	1
VT needle, #567	1
Needle, #33	1
Needle, #36	1
Dearborn solid 18awg, 1000' spool-white	2
Dearborn solid 18awg, 1000' spool-black	2
Dearborn solid 18awg, 1000' spool-red	2
Dearborn solid 18awg, 1000' spool-green	2
Deau insulating/marker strips	200
Formula 150, polyamide epoxy IV, green, 2 gal., MIL-P-24441	15
Formula 152, polyamide epoxy IV, white, 2 gal., MIL-P-24441	9
Formula 150, polyamide epoxy IV, green, 2 gal., MIL-P-24441	6
Formula 152, polyamide epoxy IV, white, 2 gal., MIL-P-24441	6
0.375" diameter rod w/150 UIN pt. 10ft section	50
0.188" diameter rod w/75 UIN pt. loose roll no polish	200
0.250" diameter rod w/100 UIN pt. 10ft section polish	50
Engineered materials handbook, 6560EH	1
Engineered materials handbook series set, 6217EH	1

Directory of Testing Laboratories 1995	1	
ASTM Publication, D5150	1	
ASTM Publication, D381	1	
Single line minute digital answering machine	5	
UA-500 power source, HP weld gun & cables w/clamp, Stud Weld System	1	
Weld chuck for 1/4" diameter studs		2
Ferrule grip for 1/4" diameter studs	2	
Weld chuck for 3/8" diameter studs	2	
Ferrule grip for 3/8" diameter studs	2	
1/4-20 x 1" stainless steel ft. arc studs	1000	
1/4-20 x 1 1/2" stainless steel PDB arc studs	1000	
3/8-16 x 1" stainless steel Ft Arc Studs	1000	
3/8-16 x 1" stainless steel PDB studs	1000	
Bulk head body, swagelok fitting, 1/2, keyed, black	12	
Bulk head body, swagelok fitting, 1/4 keyed, yellow	12	
Bulk head body, swagelok fitting, 1/4 keyed, blue	12	
Body, 1/4 male NPT, keyed, black	12	
Body, 1/4 male NPT, keyed, yellow	12	12
Body, 1/4 male NPT, keyed, red	24	
Stem, 1/4 female, NPT, keyed, black	24	
Stem, 1/4 female, NPT, keyed, yellow	24	
Stem, 1/4 female, NPT, keyed, blue	36	
Brother multi-functional center model #1950MC	2	
Network adapter for model 3C590 for PCI	1	
Sony multiscan 17sf trinitron, digital control monitor	1	
Yamaha YST-M10 powered monitor speakers	1	
Dell latitude Xpi 90mhz pentium, notebook display 8MB	1	
8MB RAM, 72 pin	1	
810MB IDE hard drive	1	
DOS 6.22, windows for workgroups 3.11, portables	1	
3 yr warranty, year 1NBD on-site, 2&3NBD parts del.	1	
Carrying case for notebooks	1	
Dell US/Canada V.34 28.8 data 14.4 fax PCMCIA modem	1	
Pistol grip needle gun system	1	
Flat needle	100	
Pointed needle	100	
Chisel Needle	100	
USN Base Instrument Pk.	1	

Carry Case	1
Printer Seiko DPU411	1
Printer paper	1
Finger tip transducer	1
Remote copy/send switch	1
Cable	1
Couplant sono trace #30 5 gal.	1
Couplant ultra gel II 1 gal.	2
Transducer 5MHZ 5" RHP Gamma series	2
Cable BNC to BNC 6'	1
14" PVC thin walled ducting 12' length	6
14" Slip PVC end caps	8
10" PVC thin walled ducting, 1 ten ft length	10
6" PVC thin walled ducting, 1 ten ft length	10
4'x8' x 1/8" PVC sheet	2
All purpose cement (12 qts. Per case)	1
PVC slow set cement (12 qts. Per case)	1
Gen. utility pipe tape, 2" width, yellow, 24/case	24
Gen. utility pipe tape, 2" width, black, 24/case	24
Joint wrap, 35 ml, 2" width, blue, 24/case	24
Primer, qt containers, 12/case	1
Primer, qt containers, 12/case	1
Chloropac ½ lb/hr mark, 1-M cell assembly	8
Return bend assembly, MK-1M	8
Porta-tank liquid storage system	1
Stress corrosion test system	1
Operating software, Sampson II	1
Environmental effects package	1
Chlorinators & portable dechlorination units training videos	1
2 x 26 – 72 pin 8MB SIMMS	6
Pentium 90 CPU cooling fan	3
Dual Parallel card	6
Pinnacle 3.5" 230 MB MO Blank disk	6
Message books, 4 per page, 400 per book	4
Small waste containers 4 ½ gal – black	1
Hewlett Packard 32sII calculator	2
Hewlett Packard 20SI calculator	3
Texas Instrument 5028 calculator	1
Pre-inked "faxed" red ink	1
Pre-inked "Confidential" - red ink	1

Pre-inked "COPY" -blue ink	1
Pre-inked "Completed " blue stamp	1
Pre-inked "Completed " blue stamp	1
Pre-inked "Priority" stamp – red ink	1
Pre-inked "FYI" stamp	1
Tray for pre-inked stamps	2
Refill ink bottle – black ink	1
Bell South 2-line cordless phone	1
D-ring binder, 4", black w/ spine label holder	6
Pre-inked stamp "return address" Key West black ink	1
Pre-inked stamp "return address" Washington DC, black ink	1
Pre-inked stamp "unclassified" - black ink #141	1
Pre-inked stamp "For Official Only" - black ink	1
Style writer II portable style writer cartridges for MAC	5
Poly-trak angle boot, women's size 7	1
Blue/gray sport hiker, mens size 11	
Blue/gray sport hiker, men's size 7 ½	1
Sport/hiker canoe moccasin, men's size 11	1
Mighty tough rubber 16" pull-over boot, ,men's size 11	1
Platinum wire, 0.254mm dia., standard grade 99.99+%	1
Platinum foil, 0.25mm thick, 50mm x 50mm square	1
Silver wire, 2.0mm dia puratonic, metal basis	1
Silver chloride puratonic, coarse powder metal basis	3
Silver wire, puratonic, 99.999%	4
Perflex pool filter extended cycle diatomite	1
Dyna-glas self priming medium head pump, ¾ HP	1
Scaffolding for ballast tank, 6' scaffold frames w/braces (1 month rental)	24
16 decks	1
24 PINS	1
Charge cord, 022-506-231	2
3M 5000 series, organic vapors/acid gas respirators	24
Ceiling mount auto ABC dry chem. extinguisher	1
QB2 quiet bank hearing protector	10
Tyvek deluxe total body coverall, medium	25
Tyvek deluxe total body coverall, large	25
Fire blanket in tote	1
Emission spectrometer analysis for 14 samples	14
Chemical analysis of 2" copper cable	1
Hollow cone-spray nozzle, 1/8" pipe size, stainless	1

Full cone spray nozzle, .69 GPM, 1/8" male pipe thread	1
Mini mist spray nozzle, .03 GPM fine mist	4
Mini mist spray nozzle, .11 GPM fine mist	4
Swivel direct fitting, 1/8" inlet/outlet, stainless steel	4
Pipe saddle nozzle connector, 1/2" pipe, 1/8" female NPT	4
Adjustable-angle high pressure nozzle, 1/8" female NPT	1
1/4" flexible drive shaft	2
1/4" x 3/8" elastomer flex coupling	2
3/8" plastic universal joint	2
Stainless steel E style retaining rings	100
Neoprene rubber sheet 1 1/2" thick, 12" x 12" sheet	12
PVC sheet 1/2" thick 48" x 96"	3
14 Truss Head philips self-tap screws, 3/4" length	5
Large OD 316SS flat washers 1/4"	5
Delrin sheet, 1/8" thick, 24x24	1
Delrin sheet, 1/4" thick, 24x24	1
Phillips pan head screws 10-24 x 1" 100 per box	3
1/4"-20 hex head nuts, 316 stainless steel	5
Rubber grommets, 17/32 ID	10
1/4" insulator washers nylon 1/4" long	5
1/4" insulator washers nylon 1/2" long	5
1/4" insulator washers nylon 1 3/4" long	5
Nylon shoulder washers, 1/4", natural	5
Nylon hex nuts, 1/4-20, natural	10
Nylon washers, 1/4"	10
USDA smooth vinyl strip 6" width, 150' roll	4
Soldering irons, screw on tips type 800 watts	2
Replacement tips for soldering irons	2
Wire straps, max bundle dia. 1.5 screw mount	4
Flexible wire duct, 1.5" x 1.5", 19.5" length	16
High temp mini torch deluxe kit	1
Oxygen-propane torch kit	1
Vacuum pressure pump	1
Brass threaded rod	1
Zip drive, parallel port connection	1
100MB removable zip disks	3
Maxtor 7000 series 1.2 GB hard drive kit	1
Microsoft access 2.0 upgrade	1
Microsoft natural keyboard	2
Drive parallel port connection	1
100MB removable zip disks	3
Maxtor 7000 series 1.2 GB hard drive kit	1
Microsoft access 2.0 upgrade	1
Microsoft natural keyboard	2
Auto cad LT	1
Auto cad LT mechanical add-on symbol library	1

Uninstaller version 3.0	1	
Adobe windows graphics bundle	1	
Drive, parallel port connection	4	
100MB removable zip disks	5	
HP Scan jet 3C scanner	1	
Auto cad LT	1	
Auto cad LT architectural add-on symbol library	2	
Auto cad LT electrical add-on symbol library	2	
Microsoft natural keyboard	1	
Auto cad LT mechanical add-on symbol library	1	
Drive, parallel port connection	1	
Full version of microsoft office 4.2	1	
AISI 316 Stainless steel plates	2	
Lab view for windows version 3.1.1 upgrade w/manuals	1	
AMP series 2 pin contacts	5	
AMP series 2 contacts, solder cup socket	5	
AMP series 1 contact, gold/Ni crimp pin	5	
AMP series 1 contact, gold/Ni crimp socket	5	
Non insulated locking terminal ¼" study size	20	
0.1 ohm Resistor, 1%, 3 watt	300	
0.1 ohm Resistor, 1%, 5 watt	200	
Magnecraft class 388 sq. base relay SPDT flange mt.	50	
Solderless terminals 12-10 awg	20	
Solderless terminals 16-14 awg	15	
Solderless terminals 22-18 awg	25	
Solderless terminals 16-14 awg	15	
5 amp alligator clips	100	
Epoxy patch, general purpose epoxy	1	
Type 33, 50 watt, 1100F heating element	1	
Awg. Stranded wire, blue 1000'	4	
Deau Terminal strips 16 circuits	25	
Deau Terminal strips 30 circuits	25	
SPC type VRTH-012A tie holders	4	
Voltrex VUVT-05M ties	1	
Sealing cap for amp connectors, shell size 17, strap	23	
Wire maker cards, 87F4610PCM133	1	
Wire maker cards, 87F4610PCM3466	1	
Wire maker cards, 87F4610PCM6799	3	
Wire maker cards, 87F4610PCM100124		3
Wire maker cards, 87F4610PCMAZ	1	
300 lbs pea rock pump mix, 15yd 1 <sup>st</sup> & 10yd 2 <sup>nd</sup>		25
12" x 16 Flood Baffle	1	

12" x 16 flood baffle –diver open	1
8 x 10 flood baffle	3
A36 carbon steel 6" x 12" x ¼" test samples	100
Mild steel sheet 1/16" thick sheared in 200 12" x 12" panels	1
Low carbon steel plate, edges chamferd, sand blasted, 6" x 12" x 1/8"	1
0706 aluminum extrusion – 1 meter length	16
88 watertight lid, die cast alum., wall mount unpainted	16
91 watertight lid, die cast alum., w/clear door , black	15
91 watertight lid, die cast alum., w/clear door , black	1
Paint extusions and lids rose blue	16
Chlorine Transmitter, 0-5ppm	2
Model 2000 controller-chlorine	1
Hydrogen transmitter 0-4%	2
Model 2000 controller-hydrogen	1
Hydrogen sulfide transmitter 0-10ppm	2
Model 2000 controller – hydrogen sulfide	1
4 slot housing, 7012031	1
Black panel, 3529946-1	1
Chlorine bottled gas cylinder, 009824-34	1
Regulator for bottled gas cylinder	1
Calibration cup for gas cylinder	1
Protective coatings level III inspector set, KIT3ELC0300	1
4000 lbs of pea rock concrete mix	12
14" PVC slip couplings, 14 3/8" O.D.	6
14" duct socket flanges	8
8" Ducting, 1 10' length	10
#20 silver mesh (0.12)	2
Canada metals ZHC-3 zinc anodes	3
Thomas oil-less diaphragm pump, 1/8 HP	1
Replacement part for Thomas Diaphragm pump	5
Siphon blaster, include siphon gun	1
Impact wrench, 15-130' pounds of torque	2
Commercial purpose emergency lighting fixtures 50w	3
General purpose transformer, 3 phase, 480V primary	1
Aleco clear cooler strip door, 4W292	1
Industrial water cooler, 3W070	1
Water filter, 2P276	2
Fantech 6" exhaust fan kit, 6C510	1
Speed control, 5C203	2

Flex ductwork 6", 5C201	4
Wall cap for 6" duct, 4C849	1
Transition duct, 5C200	1
Wall cap with damper, 2C090	1
Intergraph machines for drafting	3
Misc. drawing/drafting and computer supplies	

## ESTIMATED REQUIRED TRAVEL

<u>PURPOSE</u>	<u>FROM</u>	<u>TO</u>	<u>NO. OF DAYS</u>	<u>NO. OF TRIPS</u>	<u>NO. OF PERSONS</u>
Program Meeting	Key West, FL	Washington DC	5	2	1
*ROV Survey of A&M Hull Coatings	Key West, FL	Portsmouth, VA	4	1	1
*Ship visit and Hull Potential survey	Key West, FL	Ft. Lauderdale, FL	3	1	1
Attend basics of coating application inspection	Key West, FL	Grand Rapids, MI	6	1	1
*Inspect LORANC Tower	Washington DC	Port Clarence, AK	19	1	1
*Inspect rods at NACOMTELSTA	Washington DC	Cutler, ME	5	1	1
*Inspection of insulator rods	Washington DC	Ellsworth, ME	6	1	1
*Inspect, photograph, and remove samples from fuel systems	Washington DC	Lakehurst, NJ	3	1	1
*Work on chlorinator and anode projects	Washington DC	Key West, FL	5	1	1
*Wing teardown	Washington DC	Norfolk, VA	4	2	1
*Load cell inspection/install cable retainers	Washington DC	Jacksonville, FL	4	1	1
Technical Discussion	Washington DC	Raleigh, NC	2	1	1
Attend Tri-Service Conference	Washington DC	Dayton, OH	3	1	1
Technical Discussion	Washington DC	Blacksburg, VA	2	1	1
Tri-Service Review	Washington DC	Dayton, OH	2	1	1

<u>PURPOSE</u>	<u>FROM</u>	<u>TO</u>	<u>NO. OF DAYS</u>	<u>NO. OF TRIPS</u>	<u>NO. OF PERSONS</u>
Technical Discussion	Washington DC	Anaheim, CA	6	1	1
*Engineering Prototype fabrication efforts	Washington DC	Boston, MA	2	5	1
Coordination of prototype and research efforts	Washington DC	Key West, FL	3	5	1
Technical Review Meeting	Pittsburgh, PA	Washington DC	5	8	1
Technical Review Meeting	Pittsburgh, PA	Annapolis, MD	5	8	1
*Shipyards Visit	Pittsburgh, PA	Norfolk, VA	5	5	1
Ballast Task Inspection	Key West, FL	Groton, CT	3	1	1
Attend Brinks Spray Seminar	Key West, FL	Chicago, IL	5	1	1
Attend Navy Paint Inspection course	Key West, FL	Philadelphia, PA	7	1	1
Attend VOC Training course	Key West, FL	Research Triangle Park, NC	4	1	1
Attend Workshop on Composite Testing	Washington DC	Melbourne, FL	4	1	1
Attend TMS Meeting	Washington DC	Las Vegas, NV	6	1	1
Attend Fall TMS/ASM Meeting	Washington DC	Cleveland, OH	6	1	1
Attend AIME/ASM Winter Meeting	Washington DC	Las Vegas, NV	6	1	1
Attend Local Seminars Meetings	Washington DC	Washington DC	6	1	1
*Field Test Sites					

## **PERSONNEL QUALIFICATIONS**

The following descriptions of personnel qualifications by category and level will be needed in the various technical disciplines to carry out the successful performance of the program. In most cases, each description corresponds, approximately, to a full time staff.

### **PROGRAM MANAGER**

#### **(Key)**

Education: Ph.D. in Physics, Chemistry or Materials Science

Experience: More than twenty years experience in the management of Research and Development (R&D) programs in support of the US Navy in both the on-site (government facilities) and off-site (contractor facilities) environments. Technical knowledge of materials research, sensor technologies and shipboard systems is necessary. Contractual knowledge of Navy policies and procedures is necessary. Such knowledge should include, but not be limited to, contractual compliance, fiscal responsibility, safety and security, intellectual property and technology transfer. Record of R&D achievement and Navy contract management performance as demonstrated by technical awards and citations and successful program management must be provided.

### **Deputy Program Manager - Shipboard Systems**

#### **(Key)**

Education: Bachelors Degree in Engineering, Chemistry, Biology, or Physics (Masters Degree desirable)

Experience: Should have approximately twenty years experience in auxiliary machinery shipboard technologies. Should have at least ten years experience in shipboard environmental systems. Should have experience in solid waste, liquid waste, incinerator and plasma arc systems, and hazardous materials. Should have broad experience in shipboard auxiliary machinery, environmental systems, and general ship systems. Should have experience directing the efforts of engineering and scientific personnel engaged in RDT&E support programs.

**Senior Scientist/Engineer - Applied Mechanics  
(Key)**

Education: Ph.D. in Applied Mechanics

Experience: At least ten years experience in computer modeling of materials and structures. Recent research, development and analysis experience in continuum damage for composites, shock wave propagation in solids and structures, homogenization and finite element methods, fluid-structure interaction including acoustics modeling, smart materials, optimization methods, structural modeling, SPH methods and computational mechanics in general. Expert programming skills, especially in FORTRAN and MATLAB, and a facility with finite element modeling in ABAQUS, as well as familiarity with the fluids program FAST3D and the structural finite element code LS-DYNA3D.

**Mechanical Engineer**

Education: Bachelors Degree in Mechanical Engineering

Experience: More than five years in engineering with recent experience in the development of computational simulations, continuum damage models, and stress visualization techniques. Experience with cathodic protection models for various classes of Naval surface combatants and analysis of advanced double hull designs. Ability to program in the C, FORTRAN, and PASCAL languages and to develop finite element models using PATRAN and ABAQUS.

**Senior Scientist/Engineer - Corrosion  
(Key)**

Education: Bachelors Degree in Science or Engineering

Experience: At least ten years experience in corrosion research with broad experience in the areas of corrosion control, bio-remediation, and materials selection for seawater applications. Experience with engineering studies in the fields of cathodic protection design, electric field modeling, electrochemistry, marine materials properties, and marine coating analysis. Expertise in physical scale modeling (PSM) of impressed current cathodic protection (ICCP) systems for various classes of Naval surface ships and submarines. Experience with metallography, electrochemical impedance spectroscopy, DC electrochemical instrumentation, Instron mechanical testing, undersea remotely operated vehicle (ROV) operation, computerized data acquisition, and prototype design and fabrication.

**Senior Scientist - Environmental Effects  
(Key)**

Education: Bachelors Degree in Biology

Experience: More than ten years experience in environmental science disciplines related to the effects of antifouling systems and technologies on aquatic flora and fauna. Broad technical experience with the evaluation of current and novel shipboard seawater system antifouling technologies, including the evaluation of ship system sensing methodologies and marine pollution control devices (MPCD). Direct experience in the development and conduct of aquatic bioassay protocols including whole effluent toxicity (WET) testing based on Navy requirements for compliance with EPA and state environmental aquatic discharge criteria. Recent experience in the development and shipboard testing of seawater system antifouling devices for use aboard Navy ships.

**Scientist Engineer - Materials Science  
(Key)**

Education: Masters Degree in Materials Science

Experience: At least ten years experience in materials research and development with extensive work in the areas of fracture and failure analysis of ceramics, polymers, composites, and metals including aluminum alloys, high strength steels, and titanium alloys. Recent experience in evaluating the suitability of various composite materials for naval applications, evaluating anti-foulant coatings, and development of automated nondestructive evaluation methods for organic matrix composite sandwich structures. Experienced in the techniques of optical and electron microscopy, x-ray spectroscopy, metallography, infrared spectroscopy, differential scanning calorimetry, dielectrometry, nondestructive testing, and mechanical testing.

**Senior Technologist - Electronics**

Education: Education or training in Electronic Technology

Experience: At least ten years technical experience including 5 years experience in lithographic techniques. Experience with spinning and curing photoresist, alignment and exposure of samples using a UV mask aligner, developing, and wet and dry etching of both metals and dielectrics. Capable of performing deposition of metals in a thermal evaporator and familiar with the use of reactive ion beam etching and profilometry. Experience with clean-room environments and protocols. Recent experience in the fabrication of hybrid Hall effect devices using GaAs substrates and magnetic devices using Si substrates.

**Senior Scientist/Engineer – Sensors  
(Key)**

Education: Ph.D. in Electrical Engineering

Experience: At least ten years experience in science and engineering with five years recent experience in the design and development of sensors and sensor systems. Experience including, but not limited to: experiment design; electronic circuit and system design and fabrication, including all supporting electronics and printed circuit boards for sensor development; and software development for control and data acquisition, processing, analysis, and display. Recent experience in the design, development, maintenance, and modification of prototype or commercially available sensor systems using surface acoustic wave (SAW) technology. Specific experience in developing laser based sensors and miniaturized SAW sensors as well as other chemical sensing technologies.

**Senior Analyst - Counterproliferation  
(Key)**

Education: Bachelors Degree in Mechanical Engineering

Experience: More than ten years experience as a scientist and researcher, including environmental testing, the management of large instrumentation system development, and the operation of test facilities. Specific experience with providing verification and validation assessments for individual sensor components and combined functions for the Defense Threat Reduction Agency Counterproliferation Initiative (CP1) Sensor Program. Direct experience with the following sensor elements: Tactical Unattended Ground Sensors (TUGS), Tactical FLIR Pod Modification (TFPM), and Tactical Multi-Sensor Fusion (TMSF) System. A demonstrated ability to manage the design, development, and fabrication of test hardware with a high degree of experimental success.

**Senior Scientist - Environmental Technologies  
(Key)**

Education: Ph.D. in Engineering or Environmental Sciences

Experience: More than ten years experience in hull and machinery shipboard technologies. Should have experience in providing general direction and consulting to Program Managers and Senior Engineers/Scientists. Ten years experience providing expertise to and consulting with Navy Environmental Program Offices in the form of pollution prevention studies, environmental impact assessments, RDT&E strategies, technology assessments and technology planning. Also should have experience in developing issue papers, analysis of policy options, and assisting in preparation of high-level briefings.

**Engineer - Chlorofluorcarbons**

Education: Bachelors Degree in Engineering or Chemistry.

Experience: Familiarization with the Chlorofluorocarbon (CFC) and Halon Clearinghouse for the Navy. Should have demonstrated experience with the Clean Air Act Amendments of 1990, the Montreal Protocol on Ozone Depleting Substances, and Section 326 of the 1993 Defense Authorization Act which deals with clean air. Should have experience in Navy industrial and operational activities worldwide and in reviewing existing operations using ozone depleting substances (ODS) and alternative technologies and chemicals for CFC replacement/ elimination. At least ten years experience in shipboard systems in general, and ten years experience in environmental technologies.

**Senior Scientist/Engineer - Shipboard Systems**

**(Key)**

Education: Bachelors Degree in Engineering (Mechanical or Electrical Engineering desirable)

Experience: At least five years management experience in mechanical and electrical design of shipboard environmental equipment for both liquid and solid waste. Should have experience in assembly of prototype equipment, procurement of fabricated components, and production of technical manuals for all equipment. Demonstrated experience in selecting and training members of shipboard equipment design and support teams.

**Senior Engineer - Solid Waste**

Education: Bachelors Degree in Engineering

Experience: Experience in shipboard installations and testing of prototype solid waste equipment aboard ships, collection and interpretation of test data, preparation of technical reports, and in development and presentation of operator and maintenance seminar courses and on-site training. Should be able to perform operational checkouts of solid waste equipment and implement corrective action during ship checks. At least ten years experience with shipboard systems and ship design technology, and five years experience in testing of prototype solid waste equipment aboard ships.

**Senior Engineer - Oily Waste**

Education: Bachelors Degree in Engineering

Experience: At least three years experience in environmental system design, thermal and fluid processes, and experimental and numerical analysis. Specific knowledge of cross-flow membrane filtration systems is desirable. Should also have experience in shipboard testing, data acquisition and analysis.

**Senior Engineer - Non-Oily Waste  
(Key)**

Education: Bachelors Degree in Engineering

Experience: Expertise required in non-oily wastewater pollution abatement. Should have experience in equipment design, chemical, thermodynamic and hydraulic analysis, membrane separation technology and biological remediation. At least ten years shipboard system experience is required with at least three years environmental equipment experience.

**Senior Engineer - Filtration Systems  
(Key)**

Education: Masters Degree in Engineering

Experience: Expertise in advance membrane filtration systems and processes for wastewater treatment. At least ten years experience with shipboard systems for environmental equipment integration and four years experience with shipboard and laboratory testing of oil/water separation systems.

**Senior Scientist/Engineer - Plasma Arc  
(Key)**

Education: Ph.D. in Engineering (Mechanical Engineering Preferred)

Experience: At least ten years of experience in design, fabrication, shipboard installation and at-sea testing of prototype systems. Should have detailed knowledge of electro-mechanical systems as used in plasma arc facilities. Experience in digital control circuitry is desired.

**Senior Scientist – Combustion  
(Key)**

Education: Ph.D. in Mechanical, Chemical, or Combustion Engineering

Experience: At least ten years experience in incineration and advanced thermal treatments. Should have demonstrated expertise in thermal destruction of organic and inorganic wastes, both liquid and solid, and in building and testing prototype combustion/incineration hardware.

**Senior Engineer – Combustion  
(Key)**

Education: Masters Degree in Mechanical , Chemical, or Combustion Engineering

Experience: More than ten years experience in metal fabrication, refractory technology, air pollution control, volatile organic carbon (VOC) emission technology and process design related to liquid waste vortex incinerators.

**Analyst/Programmer**

Education: A degree at the BS or MS level

Experience: Experience in analytical methodologies, or equivalent training or experience related to decision-making analysis, program development/analysis/control, or database analysis.

**Technician**

Education: Technical training

Experience: Experience in maintenance of research equipment, test setups, field or laboratory data collection, etc.

**Technical Assistant**

Education: An associate degree in a scientific/technical discipline or equivalent training

Experience: At least two years of direct experience in making measurements, conducting tests, or carrying out procedures relevant to the Statement of Work, or appropriate administrative/clerical experience directly relevant to support scientific and engineering research efforts.