

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE _____ PAGE OF PAGES
 1 | 2

2. AMENDMENT/MODIFICATION NO. 0002 3. EFFECTIVE DATE 29 June 2004 4. REQUISITION/PURCHASE REQ. NO. _____ 5. PROJECT NO. (If applicable) _____

6. ISSUED BY _____ CODE _____ 7. ADMINISTERED BY (If other than Item 6) See Item 6 CODE _____
 USA ENGINEER DISTRICT, JACKSONVILLE
 PRUDENTIAL OFFICE BLDG
 701 SAN MARCO BLVD, ATTN: CESAJ-CT
 JACKSONVILLE, FL

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) _____
 (✓) 9A. AMENDMENT OF SOLICITATION NO. W912EP-04-R-0017
 (X) 9B. DATED (SEE ITEM 11) 28 May 2004
 10A. MODIFICATION OF CONTRACTS/ORDER NO. _____
 10B. DATED (SEE ITEM 13) _____
 CODE _____ FACILITY CODE _____

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers tended. is extended, is not ex-

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:
 (a) By completing Items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required) _____

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

- (✓) A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
- B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
- C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
- D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor is not, is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
 CANAVERAL LOCK, PAINTING AND OTHER REPAIRS, CANAVERAL HARBOR, FLORIDA
 ANY ENCLOSURES ACCOMPANYING THIS AMENDMENT SHOULD BE INSERTED INTO THE PLANS AND/OR SPECIFICATIONS AS APPLICABLE. ALL SUPERSEDED MATERIAL SHOULD BE REMOVED OR ADEQUATELY MARKED TO INDICATE THAT THEY HAVE BEEN SUPERSEDED.
 PROPOSAL DUE DATE REMAINS 15 JULY 2004
 SEE ATTACHED SF30 CONTINUATION PAGE.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
_____ (Signature of person authorized to sign)		BY _____ (Signature of Contracting Officer)	

SF 30 CONTINUATION SHEET

Canaveral Lock Painting and Other Repairs, Canaveral Harbor, Florida

DESCRIPTIVE CHANGES TO SPECIFICATIONS: The following are descriptive changes to the specifications. Specifications should be adequately marked to indicate that they have been changed.

1. Asterisks appear before and after the line or lines where revisions have been made to the text on the enclosed revised pages and pertain only to the changes made by this amendment except where the reverse side of a page has been previously amended; however, these can be identified by the amendment number opposite the page number at the bottom of each page.

2. Some specification revisions include additions with underlined text or deletions with line/cross-outs.

3. The text changes may have necessitated reformatting of subsequent text or pages. If this is the case, those pages have also been issued as amended pages but are not marked with asterisks, underlining or line/cross-outs.

SECTION 00100A:

a. **Remove** the old Section 00100A and **insert** the new Section 00100A.

SECTION 00100B:

a. **Remove** the old Section 00100B and **insert** the new Section 00100B.

SECTION 00800:

a. On page 00800-5, **delete**, in its entirety, Provision 999-215-4001, "Limitations on Substitutions for Certain Positions and/or Subcontracts".

SECTION 16407N:

a. **Remove** the old Section 16407N and **insert** the new Section 16407N.

DESCRIPTIVE CHANGES TO THE DRAWINGS: The following are descriptive changes to the drawings. Drawings should be adequately marked to indicate that they have been changed.

DRAWING 16/1:

a. **Remove** the old Drawing 16/1 and **replace** it with the new Drawing 16/1.

DRAWING 16/8:

a. **Remove** the old Drawing 16/8 and **replace** it with the new Drawing 16/8.

--End of Changes--

SECTION 00100A
INSTRUCTIONS, CONDITIONS, AND NOTICES TO OFFERORS

(TRADE-OFF)
(AWARD WITHOUT DISCUSSIONS)

PROPOSAL SUBMISSION REQUIREMENTS

INST-1 Notice. The Government intends to make award without holding discussions with offerors. Therefore, offerors are encouraged to include their best terms and conditions (both price and technical) in the initial offer. By submitting an offer in response to this solicitation, offerors are agreeing to comply with all terms and conditions contained in the solicitation. Unless the solicitation specifically invites the offeror to submit exceptions, the Contracting Officer may reject any offer that contains exceptions. If, despite the warning given in this paragraph, the offeror elects to include exceptions, the exceptions must be specifically and clearly identified on a separate page. In this solicitation, the words "offer" and "proposal" are used interchangeably. (See definition of "offer" at FAR 2.101.) Except for any portions of the offeror's proposal incorporated into the resulting contract by specific reference, the terms and conditions included in the solicitation, including any amendments, shall take precedence over the offeror's proposal.

INST-2 The Proposal. Each offeror shall submit a written proposal consisting of the following documents:

INST-2.1 Completed SF 1442 with price schedule (2 copies).

INST-2.2 Offer guarantee (or bid bond) if this solicitation includes the clause at FAR 52.228-1, Bid Guarantee.

INST-2.3 Completed representations & certifications (Section 00600 of this solicitation).

INST-2.4 Past performance information.

INST-2.4.1 Submit information for all relevant contracts and subcontracts started or completed within the past 3 years (measured from the date of this solicitation). Submit a separate Past Performance Information Collection Sheet for each project. (A copy of the sheet is attached to the solicitation.) Include past performance information regarding predecessor companies, key personnel who have relevant experience, and subcontractors that will perform major or critical aspects of the work. (For proposed subcontractors, clearly identify the work each will perform.) For each project submitted, explain why it is relevant to this project, and provide information on problems encountered and the actions taken to correct such problems. (Relevancy is defined in the DOD guide to collection and use of past performance as "information that has a logical connection with the matter under consideration and applicable time span.")

INST-2.5 A technical proposal consisting of:

SUBFACTOR	SUBMISSION REQUIREMENT (Note: To ensure the proposal adequately addresses areas the Government considers important, the offeror should review paragraph EVAL-3 in Section 00100B prior to preparing the proposal.)
<p>Demonstrated Experience of Contractor/ Subcontractor</p> <p>- Experience in successfully completing a project requiring lead based paint abatement, containment systems, high performance epoxy and vinyl tape paint systems and composite fiberglass reinforced plastic piles.</p>	<p>In responding to this subfactor, the objective should be to instill confidence that the offeror thoroughly understands the requirement and complexities of this project, has the experience required to complete the work, and accomplish the task in the required timeframe.</p> <p>This project involves Dewatering the locks, maintaining the water table level beneath the lock chamber floor to provide a dry environment for the interior of the Lock Chamber, Prepare and maintain containment for sandblasting and painting of lock gate to provide a control environment free of contaminant (Asbestos). The potential of "Asbestos" in the existing paint requires a specialized Control Environment Monitoring System to filter the contaminated air produced by the sandblasting operation to assure no contaminations to the surrounding for the preservation of the health of the personnel. The containment also provides a control environment (Temperature, Humidity) for the application of paint system required for the gates.</p> <p>Other work that requires a higher level of expertise than normal are the repairs to the replacing gate walkway, adding chamber ladders, constructing a new storage area for the dewatering truss and needles, constructing a new north chamber guide wall, replacing manatee screens and frame work, upgrading hydraulic units, replacing gate grounding wires, installing surge protector at commercial service, replacing gate switches, replacing gate wire ropes, sheaves, and frames, and incidental related work."</p> <p>Provide a narrative of past experiences showing how you successfully completed a project with emphasis on marine/splash zone structures (marine and shore facilities, waterfront structures, hydraulic structures, fresh water immersion locks and dams, and ship hulls), that required (1) lead based paint abatement within a containment system, (2) application of a high performance epoxy and vinyl-tape paint systems and (3) installation of composite fiberglass reinforced plastic piles. Items above not all-inclusive; not required to be accomplished on the same project. Discuss the type of materials applied; equipment utilized, coordination and management requirements that were needed. Also discuss special project requirements (such as safety or environmental); and, any problems encountered and corrective actions taken to ensure project completion within the required timeframe (If not applicable; state N/A). Identify project(s) used as experience in the factor when submitting information provided for the past performance factor.</p>

Management Plan and Construction Schedule	<p>In responding to this factor, the objective should be to instill confidence that the offeror thoroughly understands the requirement and complexities of this project, has the experience required to complete the work, and accomplish the task in the required time frame. The offeror shall provide a Management Plan and Construction Schedule for fulfillment of the contract that will be followed during contract execution.</p> <p>Management Plan - This plan will be in narrative format and will briefly describe the steps the prime contractor will take to oversee and accomplish the project from start to finish, with specific attention being paid to:</p> <ul style="list-style-type: none"> (1) lead based paint abatement within a containment system; (2) application of a high performance epoxy and vinyl tape paint systems (3) installation of composite fiberglass reinforced plastic piles (4) method(s) for controlling product quality; and (5) plan for responding to emergency or quick response situations <p>Construction Schedule - Provide a schedule of construction in the format of a Gantt, Pert, or similar graphical timeline, showing the start and completion dates, concurrent work, interdependence of activities and other relative scheduling factors or items of work, within the required performance period.</p>
--	---

INST-2.6 Utilization of small business concerns.

INST-2.6.1 Completed contracts. This subparagraph applies to offerors that are small business concerns (including all categories) and to offerors that are other than small business concerns. FAR 52.219-8, Utilization Of Small Business Concerns, states the Government's policy that small business (SB) concerns, veteran-owned small business (VOSB) concerns, service-disabled veteran-owned small business (SDVOSB) concerns, HUBZone small business concerns, small disadvantaged business (SDB) concerns, and women-owned small business (WOSB) concerns have the maximum practicable opportunity to participate in performing contracts. For each of the 3 most recently completed federal contracts submit one of the following: (i) if the contract required a subcontracting plan, submit the final SF 294, Subcontracting Report For Individual Contract, or (ii) if the contract did not require a subcontracting plan, complete and submit the Utilization of Small Business Concerns Information Collection Sheet (Completed Contracts). (A copy of the sheet is attached.) Offerors that are SB, VOSB, SDVOSB, HUBZone SB, SDB, or WOSB may count work performed with in-house resources toward compliance with FAR 52.219-8 in the category (or categories) to which they belong. (For example, a HUBZone SDB could count work in 3 categories: SB, HUBZone, and SDB.)

INST-2.6.2 Proposed for this contract. In accordance with FAR 15.304(c)(4), the extent of participation of small disadvantaged business (SDB) concerns shall be evaluated. Further, in accordance with DFARS 215.304(c)(i), the extent of participation of small businesses (SB) and historically black colleges or universities and minority institutions (HBCU/MI) shall be evaluated. The elements to be evaluated are:

- (1) The extent to which SDB's, SB's, and HBCU/MI's are specifically identified in the proposal. (If the successful offeror is required to submit a subcontracting plan before award, firms identified in the proposal must also be listed in the subcontracting plan.)
- (2) The extent of commitment to use such firms (for example, enforceable commitments will be weighted more heavily than non-enforceable commitments).
- (3) The complexity and variety of work such firms will perform.
- (4) The realism of the proposal.

(5) The extent of participation of such firms in terms of the total price of the proposal (including options, if applicable).

To facilitate the evaluation, the offeror shall provide the following information:

This requirement applies to offerors that are small business concerns (including all categories) and to offerors that are other than small business concerns. For this proposal, for each category (i.e., SDB, SB, and HBCU/MI) provide adequate responses to elements (1), (2), (3), and (5) above. Offerors that are SDB, SB, or HBCU/MI may count work performed with in-house resources toward compliance with this requirement; however, they must identify applicable category. (For example, if the offeror is SDB, all work to be performed with in-house resources can be used when formulating responses related to proposed SDB participation as well as SB participation. Offerors that are other than small business firms may elect to fulfill this requirement by responding as described above or by submitting a formal plan in accordance with the Small, Small Disadvantaged And Woman-Owned Small Business Subcontracting Plan clause of this solicitation.)

INST-2.7 Packaging the Proposal. The proposal shall be divided as indicated in the following table and each division shall be submitted in a separate sealed package. Each package shall be marked with the offeror's name, the solicitation number, and the package number.

Package	No. of Copies	Items
1	2	Price proposal, bond (if required), representations & certifications, and information related to utilization of small business concerns (when applicable) (Paragraphs INST-2.1, INST-2.2, INST-2.3, and INST-2.6). Each copy shall be separately bound.
2	2	Past performance information (Paragraph INST-2.4). Each copy shall be separately bound.
3	8	Technical proposal (Paragraph INST-2.5). Each copy shall be placed in a separate 3-ring binder. DO NOT INCLUDE PRICING INFORMATION IN THE TECHNICAL PROPOSAL.

INST-2.8 Proposal Format. To assist in ensuring a complete, well-organized proposal, the Government has included a proposal format at the end of this section for the offeror's use.

Source Selection Information -- See FAR 2.101 and 3.104

PROPOSAL IN RESPONSE TO SOLICITATION NO.
W912EP-04-R-0017

OFFEROR'S NAME:
OFFEROR'S ADDRESS:
OFFEROR'S POINT OF CONTACT (POC):
POC's TELEPHONE:
POC's FAX:
POC's EMAIL:

THIS OFFER IS SUBMITTED IN SEPARATE PACKAGES AS FOLLOWS:

[Offeror check each applicable item and enter NA for non-applicable items.]

___ Package one is submitted in 2 separately bound copies and contains our price proposal, bond (if required by the solicitation), representations & certifications, and information related to utilization of small business concerns (if required by the solicitation).

___ Package two is submitted in 2 separately bound copies and contains past performance information.

___ Package three is submitted in 8 separately bound copies and contains our technical proposal. There is no pricing information in this package.

Source Selection Information -- See FAR 2.101 and 3.104

SOLICITATION NO. W912EP-04-R-0017

OFFEROR:
COVER SHEET
PACKAGE ONE

This package contains the following documents: [Offeror check applicable items and mark others NA.]

- ___1. Signed price proposal (SF 1442, SF 33, or SF 1449) with line item pricing schedule.
- ___2. Bid bond.
- ___3. Representations and certifications.
- ___4. A Utilization of Small Business Concerns Information Collection Sheet (Completed Contracts) or SF294, Subcontracting Report, for each of the 3 most recently completed federal contracts.
- ___5. Information regarding proposed utilization of small business concerns on this contract.

Source Selection Information -- See FAR 2.101 and 3.104

SOLICITATION NO. W912EP-04-R-0017

OFFEROR:
COVER SHEET
PACKAGE TWO

[Offeror check applicable items]

____1. Past performance is not an evaluation factor in this solicitation; or,

____2. This package contains a Past Performance Information Collection Sheet for each relevant contract/subcontract (as defined in the solicitation). On each collection sheet, we have explained how we determined that the contract/subcontract is relevant to this project.

____3. If problems were encountered during performance of any of the referenced contracts/subcontracts, we have attached a paper to the collection sheet that fully explains the problem and details the corrective action we took to resolve the problem. If we did not check this paragraph and did not attach explanations to the collection sheets, you may assume that we consider any problems that may have occurred to be minor and insignificant.

Source Selection Information -- See FAR 2.101 and 3.104

SOLICITATION NO. W912EP-04-R-0017

OFFEROR:
COVER SHEET
PACKAGE THREE

[Offeror check applicable items]

___1. Technical merit is not an evaluation factor in this solicitation; or,

___2. This package contains a full and complete response to each technical subfactor.

___3. After carefully considering the Notice paragraph of the solicitation, we have determined that we must take exception to certain parts of the solicitation. As required by the Notice paragraph, we have included a separate page to document the exceptions. If we did not check this paragraph and did not include a separate page for exceptions, you may assume that we do not take exception to any part of the solicitation.

Source Selection Information -- See FAR 2.101 and 3.104

SOLICITATION NO. W912EP-04-R-0017
OFFEROR:
PACKAGE THREE
TECHNICAL MERIT SUBFACTOR ONE

SUBFACTOR ONE: Demonstrated Experience of Contractor/Subcontractor -
Experience in successfully completing a project requiring lead based paint abatement, containment systems, high performance epoxy and vinyl tape paint systems and composite fiberglass reinforced plastic piles.

Provide a narrative of past experiences showing how you successfully completed a project with emphasis on marine/splash zone structures (marine and shore facilities, waterfront structures, hydraulic structures, fresh water immersion locks and dams, and ship hulls), that required (1) lead based paint abatement within a containment system, (2) application of a high performance epoxy and vinyl-tape paint systems and (3) installation of composite fiberglass reinforced plastic piles. Items above not all-inclusive; not required to be accomplished on the same project. Discuss the type of materials applied; equipment utilized, coordination and management requirements that were needed. Also discuss special project requirements (such as safety or environmental); and, any problems encountered and corrective actions taken to ensure project completion within the required timeframe (If not applicable; state N/A). Identify project(s) used as experience in the factor when submitting information provided for the past performance factor.

OUR PROPOSAL: [Offeror enter complete, detailed response.]

Source Selection Information -- See FAR 2.101 and 3.104

SOLICITATION NO. W912EP-04-R-0017
OFFEROR:
PACKAGE THREE
TECHNICAL MERIT SUBFACTOR TWO

SUBFACTOR TWO: Management Plan and Construction Schedule

The offeror shall provide a Management Plan and Construction Schedule for fulfillment of the contract that will be followed during contract execution.

Management Plan - This plan will be in narrative format and will briefly describe the steps the prime contractor will take to oversee and accomplish the project from start to finish, with specific attention being paid to:

- (1) lead based paint abatement within a containment system;
- (2) application of a high performance epoxy and vinyl tape paint systems
- (3) installation of composite fiberglass reinforced plastic piles
- (4) method(s) for controlling product quality; and
- (5) plan for responding to emergency or quick response situations

Construction Schedule - Provide a schedule of construction in the format of a Gantt, Pert, or similar graphical timeline, showing the start and completion dates, concurrent work, interdependence of activities and other relative scheduling factors or items of work, within the required performance period.

OUR PROPOSAL: [Offeror enter complete, detailed response.]

PAST PERFORMANCE INFORMATION COLLECTION SHEET
(Submit this sheet with Package 2 of your proposal)

(TO BE COMPLETED BY THE OFFEROR. SUBMIT A SEPARATE SHEET FOR EACH REFERENCE.)

	1. Your firm's name:
	2. Contract number of referenced project:
	3. Description, location & relevancy of work: <i>(Note: Relevancy is defined as something that has a logical connection with the matter under consideration, e.g., similar project size and type of work. It is the offeror's responsibility to establish relevancy.)</i>
	4. Owner's name and address:
	5. Owner's point of contact (name and telephone number) <u>(NOTE: IT IS YOUR RESPONSIBILITY TO ENSURE POINTS OF CONTACT CAN BE CONTACTED BY THE GOVERNMENT'S EVALUATORS AND THAT THEY WILL COOPERATE.)</u> :
	6. Prime contractor's name and address if you were a subcontractor on this project:
	7. Your role (e.g., Prime, Member of Joint Venture, Subcontractor, etc.) and work performed by your in-house forces:
	8. Contract price:
	9. Extent and type of work you subcontracted to other firms <i>(Note: See paragraph INST-2.6 of Proposal Submission Requirements for separate requirement for information regarding utilization of small business concerns. Information submitted in response to paragraph INST-2.6 must be submitted separately in package 1 of the proposal.)</i> :

	10. Date started _____ and date completed _____. (If not completed, give percentage of completion and expected completion date.)
	11. Did you receive a written performance evaluation for this project? (Yes/No) If yes, what rating did you receive?
	12. Was your contract/subcontract terminated for default? If so, attach an explanation of the circumstances.
	13. Were liquidated damages assessed? If so, attach an explanation of the circumstances.

Utilization of Small Business Concerns Information Collection Sheet (Completed Contracts) (Submit this sheet with Package 1 of your proposal)

(TO BE COMPLETED BY THE OFFEROR. SUBMIT A SEPARATE SHEET FOR EACH REFERENCE.)

The purpose of this sheet is to collect information regarding compliance with FAR 52.219-8 in previous contracts. The categories of interest are: small business (SB), small disadvantaged business (SDB), veteran-owned small business (VOSB), service-disabled veteran-owned small business (SDVOSB), HUBZone small business, and women-owned small business (WOSB). Definitions for all terms except small business concern can be found at FAR 2.101. The definition of small business concern can be found at FAR 19.001. For this collection sheet, any concern unable to meet the definition for small business concern shall be considered a large business (LB) concern. A SB concern may also qualify in one or more of the other categories. When completing the sheet, the offeror should check all categories that apply.

1. Your firm's name:	2. Contract number of referenced project:
3. Date completed_____. (Do not submit information for an active contract.)	4. Contract price: \$_____
5. Total amount subcontracted: \$_____ Amount subcontracted to: LB: \$_____ SB (in this total include all awards to SB, SDB, HUBZone SB, VOSB, SDVOSB, and WOSB): \$_____	6. Of the total amount subcontracted to SB, how much was subcontracted to: SDB: \$_____ HUBZone SB: \$_____ VOSB: \$_____ SDVOSB: \$_____ WOSB: \$_____
7. Contracting Officer's name and telephone number:	8. In blocks below enter dollar amount for work performed by your firm and by each listed subcontractor:

Name of Firm: Offeror	CHECK EACH CATEGORY THAT APPLIES						
Phone:	LB	SB	SDB	HUBZONE SB	VOSB	SDVOSB	WOSB
Amount: \$							
Name of Firm:	CHECK EACH CATEGORY THAT APPLIES						
Phone:	LB	SB	SDB	HUBZONE SB	VOSB	SDVOSB	WOSB
Amount: \$							
Name of Firm:	CHECK EACH CATEGORY THAT APPLIES						
Phone:	LB	SB	SDB	HUBZONE SB	VOSB	SDVOSB	WOSB
Amount: \$							
Name of Firm:	CHECK EACH CATEGORY THAT APPLIES						
Phone:	LB	SB	SDB	HUBZONE SB	VOSB	SDVOSB	WOSB
Amount: \$							
Name of Firm:	CHECK EACH CATEGORY THAT APPLIES						
Phone:	LB	SB	SDB	HUBZONE SB	VOSB	SDVOSB	WOSB
Amount: \$							
Name of Firm:	CHECK EACH CATEGORY THAT APPLIES						
Phone:	LB	SB	SDB	HUBZONE SB	VOSB	SDVOSB	WOSB
Amount: \$							

SECTION 00100B
EVALUATION FACTORS FOR AWARD

(TRADE-OFF)
(AWARD WITHOUT DISCUSSIONS)

EVAL-1 Applicable Regulatory Guidance. This source selection will be conducted in accordance with procedures prescribed in FAR Part 15.

EVAL-2 Determining Best Value. The Contracting Officer will use a trade-off process to determine which offer represents the best value to the Government. This process allows the Contracting Officer to consider making award to other than the lowest priced offeror or other than the highest technically rated offeror. All evaluation factors other than price, when combined, are significantly more important than price.

EVAL-3 Evaluation Factors. The following factors and significant subfactors will be used to determine best value. The relative importance of non-price factors/subfactors is as indicated.

EVALUATION FACTORS (TRADE-OFF)		
FACTOR	SUBFACTOR	RELATIVE IMPORTANCE/OTHER INFORMATION
Price	N/A	See paragraph EVAL-2 above.
Past Performance	N/A	Past Performance is slightly more important than Technical Merit
	Generally, the Government will evaluate timely completion of work; quality of work; customer satisfaction; cost controls for additional work; and safety. However, the Government reserves the right to evaluate other areas and reserves the right to determine, on a case-by-case basis, how much emphasis to place on any given area. If a subcontractor is being utilized to demonstrate experience on any of the above subfactors, provide relevant past performance information.	
Technical Merit	N/A	Technical Merit is slightly less important than Past Performance.
	Demonstrated Experience in successfully completing a project requiring lead based paint abatement, containment systems, high performance epoxy and vinyl tape paint systems and composite fiberglass reinforced plastic piles.	Relevance - This subfactor is equal to the Management Plan and Construction Schedule subfactor in importance.
	Management Plan and Construction Schedule	Relevance - This subfactor is equal to the Demonstrated Experience subfactor in importance.
Utilization of Small Business Concerns	N/A	Relevance: The Utilization of Small Business Concerns factor is significantly less important than the Technical Merit and Past Performance factors.
	Completed Contracts	This subfactor is equal to the Proposed For This Contract subfactor.
	Proposed For This Contract	This subfactor is equal to the Completed Contracts subfactor.

EVAL-4 Rating Definitions. Following table shows ratings for each type of evaluation and gives definitions for the ratings.

PRICE/COST is not rated. It is evaluated for reasonableness.

PERFORMANCE RISK (Past Performance) ratings assess the risks associated with each offeror's likelihood of success in performing the requirements stated in the RFP based on that offeror's demonstrated performance on recent, relevant contracts. The risk assessment will be based on two components, i.e., ratings for past work and relevancy of past work to this project. Less relevant work will receive less weight. It is the offeror's responsibility to establish relevancy of past work to this project.	
RATING	DEFINITION
Outstanding	Offeror's past performance record reflects a consistent commitment to quality work and customer satisfaction with few problems, all of which were immediately corrected.
Above Average	Offeror's past performance record reflects a consistent commitment to quality work and customer satisfaction with few problems, most of which were immediately corrected.
Satisfactory	Offeror's past performance record is inconsistent—mostly good but some bad. Several problems were encountered. Most were satisfactorily resolved. Some required extra effort on the part of QA/inspection personnel to obtain resolution.
None	The offeror has no relevant performance record. A thorough search was unable to identify any past performance information.
Marginal	Offeror's past performance record is inconsistent—some good but mostly bad. Several problems were encountered. Some were satisfactorily resolved. Too many required extra effort on the part of QA/inspection personnel to obtain resolution.
Unsatisfactory	Offeror's past performance record reflects a consistent lack of commitment to quality work and customer satisfaction.
RELEVANCE	DEFINITION
Highly Relevant	Past projects bear a strong correlation to this project in size, scope, and type of work.
Moderately Relevant	Past projects correlate to this project in most but not all respects.
Slightly Relevant	Past projects correlate to this project in a few respects.
RISK	DEFINITION
Very Low Risk	Offeror received Outstanding rating for Highly Relevant past performance.
Low Risk	Offeror received either: (1) Outstanding rating for Moderately Relevant past performance, or (2) Above Average rating for Highly Relevant past performance.
Moderate Risk	Offeror received: (1) Outstanding rating for Slightly Relevant past performance, (2) Above Average rating for Moderately Relevant past performance, (3) Above Average rating for Slightly Relevant past performance, or (4) Satisfactory rating for Highly Relevant past performance .
Unknown Risk	The offeror has no relevant performance record; therefore, offeror received no rating. A thorough search was unable to identify any past performance information.
High Risk	Offeror received: (1) Satisfactory rating for Moderately Relevant past performance, (2) Satisfactory rating for Slightly Relevant past performance, or (3) Marginal rating for Highly Relevant past performance.

Very High Risk	Offeror received: (1) Marginal rating for Moderately Relevant past performance, (2) Marginal rating for Slightly Relevant past performance, (3) Unsatisfactory rating for Highly Relevant past performance, (4) Unsatisfactory rating for Moderately Relevant past performance, or (5) Unsatisfactory rating for Slightly Relevant past performance.
----------------	--

TECHNICAL MERIT ratings reflect (1) the Government's confidence in each offeror's ability, as demonstrated in its proposal, to perform the requirements stated in the RFP, and (2) the Government's assessment of performance risk associated with the proposal.	
ADJECTIVE	DEFINITION
Outstanding	Excellent in all respects; offers one or more significant advantages not offset by disadvantages; very good probability of success with overall low degree of risk in meeting the Government's requirements.
Above Average	High quality in most respects; offers one or more advantages not offset by disadvantages; good probability of success with overall low to moderate degree of risk in meeting the Government's requirements.
Satisfactory	Adequate quality; any advantages are offset by disadvantages; fair probability of success with overall moderate to high degree of risk in meeting the Government's requirements.
Marginal	Overall quality cannot be determined because of errors, omissions or deficiencies that are capable of being corrected without a major rewrite or revision of the proposal.
Unsatisfactory	A proposal that contains major errors, omissions or deficiencies, or an unacceptably high degree of risk in meeting the Government's requirements; and these conditions cannot be corrected without a major rewrite or revision of the proposal.

UTILIZATION OF SMALL BUSINESS CONCERNS ratings reflect the Government's assessment of the offeror's commitment to the policy stated in FAR 52.219-8.	
RATING	DEFINITION
Outstanding	The offeror's proposed utilization of small business concerns for this contract when considered together with the offeror's record of utilization of small business concerns in previous contracts reflects outstanding commitment to the policy stated in FAR 52.219-8. (Note: FAR 19.708 requires use of the clause at FAR 52.219-8 in almost all contracts with a value of more than \$100,000. However, if the offeror has never had a contract that included FAR 52.219-8, the rating for this factor shall be based solely on the offeror's proposed utilization of small business concerns for this contract.)
Above Average	The offeror's proposed utilization of small business concerns for this contract when considered together with the offeror's record of utilization of small business concerns in previous contracts reflects above average commitment to the policy stated in FAR 52.219-8. (Note: FAR 19.708 requires use of the clause at FAR 52.219-8 in almost all contracts with a value of more than \$100,000. However, if the offeror has never had a contract that included FAR 52.219-8, the rating for this factor shall be based solely on the offeror's proposed utilization of small business concerns for this contract.)

Satisfactory	The offeror's proposed utilization of small business concerns for this contract when considered together with the offeror's record of utilization of small business concerns in previous contracts reflects satisfactory commitment to the policy stated in FAR 52.219-8. (Note: FAR 19.708 requires use of the clause at FAR 52.219-8 in almost all contracts with a value of more than \$100,000. However, if the offeror has never had a contract that included FAR 52.219-8, the rating for this factor shall be based solely on the offeror's proposed utilization of small business concerns for this contract.)
Marginal	The offeror's proposed utilization of small business concerns for this contract when considered together with the offeror's record of utilization of small business concerns in previous contracts reflects marginal commitment to the policy stated in FAR 52.219-8. (Note: FAR 19.708 requires use of the clause at FAR 52.219-8 in almost all contracts with a value of more than \$100,000. However, if the offeror has never had a contract that included FAR 52.219-8, the rating for this factor shall be based solely on the offeror's proposed utilization of small business concerns for this contract.)
Unsatisfactory	The offeror's proposed utilization of small business concerns for this contract when considered together with the offeror's record of utilization of small business concerns in previous contracts reflects unsatisfactory commitment to the policy stated in FAR 52.219-8. (Note: FAR 19.708 requires use of the clause at FAR 52.219-8 in almost all contracts with a value of more than \$100,000. However, if the offeror has never had a contract that included FAR 52.219-8, the rating for this factor shall be based solely on the offeror's proposed utilization of small business concerns for this contract.)

EVAL-5 Proposal Evaluation. The Government intends to evaluate proposals and award a contract without discussions with offerors (except clarifications as described in FAR 15.306(a)). Therefore, the offeror's initial proposal should contain the offeror's best terms from a price and technical standpoint. The Government reserves the right to conduct discussions if the Contracting Officer later determines them to be necessary. Further, if the Contracting Officer determines that discussions are necessary and if the Contracting Officer determines that the number of proposals that would otherwise be in the competitive range exceeds the number at which an efficient competition can be conducted, the Contracting Officer may limit the number of proposals in the competitive range to the greatest number that will permit an efficient competition among the most highly rated proposals. The following table synthesizes the evaluation methodology:

ELEMENT	METHOD
General Review	Review of entire proposal to ascertain completeness and offeror's eligibility for award.
Price	Price will not be given a score. It will be reviewed for possible mistakes and eligibility for award, and evaluated for reasonableness.
Past Performance	Will be evaluated for risks associated with the proposal. Possible ratings are: Very Low, Low, Moderate, Unknown, High, and Very High. An "unknown risk" rating will have neither a favorable nor an unfavorable impact on the overall evaluation of the proposal. However, if necessary, the Contracting Officer can consider favorable or unfavorable past performance history as a tiebreaker when comparing offerors who have no past performance history with offerors who do have past performance history. For example, if all other factors are relatively equal, an offeror with a favorable past performance history may be selected over an offeror with no past performance history; or, an offeror with no past performance history may be selected over an

	offeror with an unfavorable past performance history.
Utilization of Small Business Concerns	Will be evaluated for commitment to policy stated in FAR 51.219-8. Possible ratings are: Outstanding, Above Average, Satisfactory, Marginal, and Unsatisfactory.
Source Selection Decision	Evaluators will provide results of evaluations to the Contracting Officer who will, through a trade-off process involving all evaluation factors, determine which proposal represents the best overall value to the Government.

EVAL-5.1 General Review.

EVAL-5.1.1 Offerors will be checked against the *List of Parties Excluded From Federal Procurement and Nonprocurement Programs*. Any offeror who is listed will be eliminated without further consideration.

EVAL-5.1.2 Bid bonds will be reviewed for acceptability. Any offeror whose bid bond is unacceptable, will be eliminated without further consideration unless the Contracting Officer later determines that discussions are necessary and decides that the offeror's proposal should be included in the competitive range.

EVAL-5.1.3 Proposals will be checked for minor informalities or irregularities. The Contracting Officer will follow guidance at FAR 14.405 when resolving minor informalities or irregularities. The Contracting Officer either will give the offeror an opportunity to cure any defect resulting from a minor informality or irregularity or waive the defect, whichever is to the advantage of the Government.

EVAL-5.2 Price Evaluation.

EVAL-5.2.1 Prices will be reviewed for minor or clerical errors. If necessary, offerors will be afforded an opportunity to resolve any such errors. Any exchange with offerors under this subparagraph shall be for the purpose of clarification (FAR 15.306(a)) and shall not constitute negotiations as defined at FAR 15.306(d). In the event of discrepancy between a unit price and the extended amount, the unit price shall be controlling.

EVAL-5.2.2 Prices will be reviewed for apparent mistakes. Should this review reveal any prices that seem unreasonably low, the Contracting Officer will contact the offeror and ask the offeror to confirm the questioned price. If the offeror confirms the price, no further action will be taken under this subparagraph. If, however, the offeror alleges a mistake, the offeror may modify the proposal in accordance with FAR 52.215-1(c)(6). Any modification submitted for the purpose of correcting a mistake shall include documentation explaining how the mistake was made.

EVAL-5.2.3 After resolution of minor or clerical errors and/or mistakes, prices will be reviewed for reasonableness.

EVAL-5.3 Technical Merit Evaluation.

EVAL-5.3.1 Using the Technical Merit factor and subfactors listed in paragraph EVAL-3 above, each evaluator will conduct an independent evaluation of each proposal documenting the strengths, deficiencies, significant weaknesses, and risks associated with each proposal. Upon completion of individual evaluations, the entire evaluation team will form a consensus opinion of each offeror's ability to accomplish the project work and prepare a narrative supporting the team's conclusions. In the event the team is unable to form a consensus, the team will prepare majority and minority opinions for the Contracting Officer's consideration.

EVAL-5.4 Past Performance Evaluation. The Government will consider currency and relevance of the information, source of the information, context of the data, and general trends in the offeror's performance. Information will be weighted in accordance with its relevance. The Government may use information supplied by the offeror and information obtained from other sources. The evaluation will be

conducted by telephone. If, during the course of the evaluation, the Government obtains adverse information that the offeror has not previously been made aware of, the Government will afford the offeror an opportunity to respond to the information. The Government will not disclose the names of persons who provide performance information. The evaluation will take into account past performance information regarding predecessor companies, key personnel who have relevant experience, and subcontractors that will perform major or critical aspects of the work. (Note: Although the Government may obtain past performance information from other sources, it is the offeror's responsibility to provide past performance information and explain how the information is relevant to this acquisition.)

EVAL-5.5 Utilization of Small Business Concerns. The Government will evaluate the offeror's record of compliance with FAR 52.219-8 and (if applicable) the offeror's record of execution of subcontracting plans. Additionally, the Government will evaluate the offeror's proposed utilization of small business concerns for this contract.

EVAL-5.6 Source Selection Decision. The Contracting Officer, independently exercising prudent business judgment, will make the source selection decision based on the proposal that represents the best value to the Government. The Contracting Officer will not receive a recommendation from any individual or body as to which offeror should receive the award and additionally will not receive a rank order or order of merit list pertaining to the offers being evaluated.

SECTION TABLE OF CONTENTS

DIVISION 16 - ELECTRICAL

SECTION 16407N

MARINA ELECTRICAL WORK

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 RELATED REQUIREMENTS
- 1.3 SUBMITTALS
- 1.4 QUALITY ASSURANCE
 - 1.4.1 Grounding System Tests

PART 2 PRODUCTS

- 2.1 MATERIALS AND EQUIPMENT
- 2.2 CONDUIT AND FITTINGS
 - 2.2.1 Rigid Nonmetallic Conduit
 - 2.2.2 Plastic-Coated Rigid Steel and IMC Conduit
 - 2.2.3 Fittings for Metal Conduit and Flexible Metal Conduit
 - 2.2.3.1 Fittings for Rigid Metal Conduit and IMC
 - 2.2.4 Fittings for Rigid Nonmetallic Conduit
 - 2.2.5 Expansion Joints
- 2.3 OUTLET BOXES AND COVERS
 - 2.3.1 Outlet Boxes in Hazardous Locations
- 2.4 CABINETS, JUNCTION BOXES, AND PULL BOXES
- 2.5 WIRES AND CABLES
 - 2.5.1 Conductors
 - 2.5.1.1 Minimum Conductor Sizes
 - 2.5.2 Color Coding
 - 2.5.3 Insulation
 - 2.5.4 Bonding Conductors
 - 2.5.5 Metal-Clad Cable
 - 2.5.6 Splice and Termination Components
 - 2.5.6.1 Watertight Splice Box Connectors
 - 2.5.6.2 Watertight Pin Connectors
- 2.6 DEVICE PLATES
- 2.7 DISCONNECT SWITCHES
- 2.8 RECEPTACLES
 - 2.8.1 Duplex Receptacles
 - 2.8.2 Weatherproof Receptacles
 - 2.8.3 Ground-Fault Circuit Interrupter (GFCI) Receptacles
- 2.9 PLUGS
- 2.10 ENCLOSED CIRCUIT BREAKERS
- 2.11 MOUNTING STRAPS
- 2.12 GROUNDING AND BONDING EQUIPMENT
 - 2.12.1 Ground Rod Mounting Straps
 - 2.12.2 Alligator Clips
- 2.13 WIREWAYS
- 2.14 NAMEPLATES
- 2.15 TRANSIENT VOLTAGE SURGE PROTECTION

- 2.16 LIMIT SWITCH
 - 2.16.1 Normal Operation
 - 2.16.2 Construction
 - 2.16.3 Switches
 - 2.16.4 Transducer
 - 2.16.5 Accuracy of Trip and Reset

PART 3 EXECUTION

- 3.1 INSTALLATION
 - 3.1.1 Feeders
 - 3.1.2 Wiring Methods
 - 3.1.2.1 Plastic-Coated Galvanized Rigid Steel and IMC Conduit
 - 3.1.2.2 PVC Schedule 40 and PVC Schedule 80
 - 3.1.2.3 Metal-Clad Cable
 - 3.1.2.4 Underground Conduit Other Than Service Entrance
 - 3.1.3 Conduit Installation
 - 3.1.3.1 Conduit Support
 - 3.1.3.2 Directional Changes in Conduit Runs
 - 3.1.3.3 Expansion Joints
 - 3.1.3.4 Pull Wire
 - 3.1.3.5 Locknuts and Bushings
 - 3.1.3.6 Stub-Ups
 - 3.1.3.7 Conduit and Cable Connections
 - 3.1.4 Boxes, Outlets, and Supports
 - 3.1.4.1 Boxes
 - 3.1.4.2 Pull Boxes
 - 3.1.5 Mounting Heights
 - 3.1.6 Conductor Identification
 - 3.1.7 Splices
 - 3.1.8 Covers and Device Plates
 - 3.1.9 Grounding and Bonding
 - 3.1.9.1 Resistance
 - 3.1.10 Equipment Connections
 - 3.1.11 Government-Furnished Equipment
- 3.2 REPAIR AND SERVICE OF EXISTING STRUCTURES AND EQUIPMENT
 - 3.2.1 Workmanship
 - 3.2.2 Existing Concealed Wiring to be Removed
 - 3.2.3 Existing Electrical Distribution System Removal
 - 3.2.4 Continuation of Service
- 3.3 FIELD QUALITY CONTROL
 - 3.3.1 Devices Subject to Manual Operation
 - 3.3.2 600-Volt Wiring Test
 - 3.3.3 Grounding System Test
 - 3.3.4 Cathodic Protection System
 - 3.3.4.1 Pre-Dewatering Test
 - 3.3.4.1 System Commissioning
 - 3.3.4.2 System Component Circuit Resistance Measurement
 - 3.3.4.3 Structure-To-Reference Cell Potential Measurements
 - 3.3.4.4 Rectifier Adjustment
 - 3.3.4.5 Recording of Measurements

-- End of Section Table of Contents --

SECTION 16407N

MARINA ELECTRICAL WORK

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- ASTM B 1 (1995) Hard-Drawn Copper Wire
- ASTM B 8 (1995) Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

NATIONAL ASSOCIATION OF CORROSION ENGINEERS (NACE)

- NACE RP 0169 (2002) Control of External Corrosion on Underground or Submerged Metallic Piping Systems

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

- NEMA ICS 6 (1993) Industrial Control and Systems Enclosures
- NEMA KS 1 (1996) Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum)
- NEMA RN 1 (1989) Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
- NEMA TC 2 (1990) Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80)
- NEMA TC 14 (1984; R 1986) Filament-Wound Reinforced Thermosetting Resin Conduit and Fittings
- NEMA WD 1 (1983; R 1989) Wiring Devices

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

- NFPA 70 (2002) National Electrical Code

UNDERWRITERS LABORATORIES (UL)

- UL 50 (1995; R 1997) Safety Enclosures for Electrical Equipment
- UL 83 (1998) Thermoplastic-Insulated Wires and

Cables

UL 467	(1993; Bul. 1994 R 1996) Grounding and Bonding Equipment
UL 486A	(1997; R 1998) Wire Connectors and Soldering Lugs for Use With Copper Conductors
UL 489	(1996; R 1998) Molded-Case Circuit Breakers and Circuit-Breaker Enclosures
UL 498	(1996; R 1999) Attachment Plugs and Receptacles
UL 510	(1994; R 1998) Chloride, Polyethylene, and Rubber Insulating Tape
UL 514B	(1997; R 1998) Fittings for Conduit and Outlet Boxes
UL 514C	(1996; R 1999) Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL 651	(1995; R 1998) Schedule 40 and 80 Rigid PVC Conduit
UL 870	(1995; R 1998) Wireways, Auxiliary Gutters, and Associated Fittings
UL 943	(1993; R 1998) Ground-Fault Circuit-Interrupters
UL 1569	(1995; R 1998) Metal-Clad Cables

1.2 RELATED REQUIREMENTS

Section 16050N, "Basic Electrical Materials and Methods," applies to this section with additions and modifications specified herein.

1.3 SUBMITTALS

Submit the following in accordance with Section 01330, "Submittal Procedures."

SD-02 Shop Drawings

Wireways; G|COR

SD-03 Product Data

Receptacles

Disconnect switches; G|COR

Conduit and fittings (each type)

Grounding and bonding equipment

Device plates

Wires and cables

Outlet boxes and covers

Splice and termination components

Wireways

Cabinets, junction boxes, and pull boxes

Mounting straps

Conduit support

SD-05 Design Data

Cathodic Protection Removed Component Storage Plan; G|COR

SD-06 Test Reports

Grounding system test; G|COR

Submit test results for approval in report format.

SD-07 Certificates

Corrosion Control Engineer Qualifications Certification; G|EDM

1.4 QUALITY ASSURANCE

1.4.1 Grounding System Tests

Submittal shall include written results of each test and indicate location of rods as well as resistance and soil conditions at the time measurements were made.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Materials, equipment, and devices shall, as a minimum, meet requirements of UL where UL standards are established for those items, and requirements of NFPA 70.

2.2 CONDUIT AND FITTINGS

Rigid non-metallic conduit, plastic-coated rigid steel and IMC conduit conforming to the following:

2.2.1 Rigid Nonmetallic Conduit

PVC Type EPC-80 and EPC-40 in accordance with NEMA TC 2, or fiberglass conduit in accordance with NEMA TC 14.

2.2.2 Plastic-Coated Rigid Steel and IMC Conduit

NEMA RN 1, Type 40 40 mils thick.

2.2.3 Fittings for Metal Conduit and Flexible Metal Conduit

UL 514B. Ferrous fittings shall be cadmium or zinc coated in accordance with UL 514B.

2.2.3.1 Fittings for Rigid Metal Conduit and IMC

Threaded type. Split couplings unacceptable.

2.2.4 Fittings for Rigid Nonmetallic Conduit

UL 514B and UL 651.

2.2.5 Expansion Joints

Provide conduit expansion joints having 6 inch expansion at each expansion joint in the pier and in each conduit run exceeding 250 feet. Provide expansion joints having 2 inch expansion in each conduit run of less than 250 feet.

2.3 OUTLET BOXES AND COVERS

UL 514C.

2.3.1 Outlet Boxes in Hazardous Locations

UL 886. Suitable for wet locations.

2.4 CABINETS, JUNCTION BOXES, AND PULL BOXES

Volume greater than 200 cubic inches, UL 50, NEMA 4X nonmetallic or stainless steel.

2.5 WIRES AND CABLES

Shall meet applicable requirements of NFPA 70 and UL for type of insulation, jacket, and conductor specified or indicated. Do not provide wires and cables manufactured more than 12 months prior to date of delivery to site.

2.5.1 Conductors

No. 8 AWG and larger diameter shall be stranded; No. 10 AWG and smaller shall be solid, except that conductors for remote control, alarm, and signal circuits, Classes 1, 2, and 3, shall be stranded. Conductors shall be copper. Conductor sizes and ampacities shown are based on copper.

2.5.1.1 Minimum Conductor Sizes

Minimum size for branch circuits shall be No. 12 AWG; for Class 1 remote-control and signal circuits, No. 14 AWG; for Class 2 low-energy, remote-control and signal circuits, No. 18 AWG; and for Class 3 low-energy, remote-control, alarm, and signal circuits, No. 22 AWG.

2.5.2 Color Coding

Provide for service, feeder, branch, control, and signaling circuit conductors. Color shall be green for grounding conductors and white for

neutrals; except where neutrals of more than one system are installed in same raceway or box, other neutral shall be white with colored, except green, stripe. Color of ungrounded conductors in different voltage systems shall be as follows:

- a. 120/208 volt, three phase:
 - (1) Phase A - black
 - (2) Phase B - red
 - (3) Phase C - blue
- b. 277/480 volt, three phase:
 - (1) Phase A - brown
 - (2) Phase B - orange
 - (3) Phase C - yellow
- c. 120/240 volt, single phase: red and black
- d. On three-phase, four-wire delta system, high leg shall be orange, as required by NFPA 70.

2.5.3 Insulation

Unless otherwise required by NFPA 70, power and lighting wires shall be 600-volt, Type THWN, XHHW, or RHW, except that grounding wire may be Type TW; remote-control and signal circuits shall be Type TW, THW, or TF. Conductors shall conform to UL 83. Where lighting fixtures require 90-degree C conductors, provide only conductors with 90-degree C insulation or better.

2.5.4 Bonding Conductors

ASTM B 1, solid bare copper wire for sizes No. 8 AWG and smaller diameter; ASTM B 8, Class B, stranded bare copper wire for sizes No. 6 AWG and larger diameter.

2.5.5 Metal-Clad Cable

UL 1569; NFPA 70, Type MC cable. Cable shall have a continuous impervious corrugated aluminum sheath and overall jacket of PVC or neoprene. Cable shall be rated 600 volts and 90 degrees C continuous operating temperature.

2.5.6 Splice and Termination Components

UL 486A, for wire connectors, and UL 510 for insulating tapes. Connectors for No. 10 AWG and smaller diameter wires shall be insulated, pressure type in accordance with UL 486A, twist-on splicing connector. Provide solderless terminal lugs on stranded conductors.

2.5.6.1 Watertight Splice Box Connectors

Malleable iron with protective grounding sleeve for jacketed metal-clad cable, and designed for mounting on fiberglass splice boxes.

2.5.6.2 Watertight Pin Connectors

Connectors shall be rated 600 volts, and individual pins shall have ampere rating equal to or greater than the cable to which they are joined. Connectors shall be molded-to-cable, quick-disconnect, polarized type having full male shroud so that when male and female assemblies are joined the shroud shall provide a completely sealed connection. Connector material shall be neoprene resistant to oil, dust, acids, and sunlight and shall be watertight.

2.6 DEVICE PLATES

Provide UL listed, one-piece device plates for outlets to suit the devices installed. Plates shall be nylon or lexan, minimum 0.10 inch wall thickness. Plates shall be same color as receptacle with which they are mounted. Screws shall be stainless steel machine type with countersunk heads in color to match finish of plate. Use of sectional-type device plates will not be permitted. Plates shall be gasketed and UL listed for wet locations.

2.7 DISCONNECT SWITCHES

NEMA KS 1. Switches serving as motor-disconnect means shall be horsepower rated. Provide heavy duty-type switches where indicated, where switches are rated greater than 240 volts, and for double-throw switches. Provide switches in NEMA 4X enclosure in accordance with NEMA ICS 6.

2.8 RECEPTACLES

UL 498 and NEMA WD 1, heavy-duty, grounding type. Bodies shall be of brown thermosetting plastic supported on a metal mounting strap. Provide screw type, side wired wiring terminals. Connect grounding pole to mounting strap.

2.8.1 Duplex Receptacles

Receptacles shall be 15 amperes, 125 volts, No. 5242.

2.8.2 Weatherproof Receptacles

Provide in nonmetallic box with gasketed, weatherproof, nonmetallic cover plate and gasketed cap over each receptacle opening. Provide caps with a spring-hinged flap. Provide UL listed receptacle for use in wet locations.

2.8.3 Ground-Fault Circuit Interrupter (GFCI) Receptacles

UL 943. Duplex type for mounting in standard outlet box. Device shall be capable of detecting current leak of 6 milliamperes or greater and tripping in accordance with UL 943 for Class A GFCI devices.

2.9 PLUGS

Provide heavy-duty, rubber-covered three, four, or five-wire cord of required size, install plugs thereon, and attach to equipment. Provide UL listed plugs with receptacles, complete with grounding blades. Where equipment is not available, turn in plugs and cord assemblies to the Government.

2.10 ENCLOSED CIRCUIT BREAKERS

UL 489. Individual molded case circuit breakers with short-circuit current rating of 10,000 amperes symmetrical minimum. Plug-in circuit breakers and series rated circuit breakers are not acceptable. Enclosure shall be NEMA 4X type. Provide solid neutral.

2.11 MOUNTING STRAPS

Fiberglass or PVC coated steel, two-hole type designed for rigid steel conduit support. PVC coating shall be between 20 and 40 mil thickness.

2.12 GROUNDING AND BONDING EQUIPMENT

UL 467. Ground rods shall be copper-clad steel, with minimum diameter of 3/4 inch and minimum length of 10 feet.

2.12.1 Ground Rod Mounting Straps

Provide mounting straps to support ground rods at fueling pier.

2.12.2 Alligator Clips

Copper type rated 100 amperes.

2.13 WIREWAYS

UL 870. Material shall be stainless steel, 16 gage for size 6 by 6 inches, 14 gage for sizes 8 by 8 inches. Provide in length indicated with gasketed screw cover NEMA 4X enclosure in accordance with NEMA ICS 6.

2.14 NAMEPLATES

Provide nameplates in accordance with Section 16050N, "Basic Electrical Materials and Methods."

2.15 TRANSIENT VOLTAGE SURGE PROTECTION

Transient voltage surge suppressors shall be provided as indicated. Surge suppressors shall meet the requirements of IEEE C62.41 and be UL listed and labeled as having been tested in accordance with UL 1449 category B3. Surge suppressor ratings shall be 6000 volts rms, operating voltage; 60 Hz; 3-phase; 4 wire with ground; transient suppression voltage (peak let-through voltage) of 6000 volts. Fuses shall not be used as surge suppression.

2.16 LIMIT SWITCH

2.16.1 Normal Operation

The limit switch shall operate on 120 volts AC. It shall contain all the contacts required for making and breaking all control and interlocking circuits necessary for the proper control and operation in the manner specified or required.

2.16.2 Construction

The limit switch shall be of compact and rugged construction, totally enclosed in a NEMA Type 13 case, and housed within the controller

enclosure. The cover shall be provided with cap screws or other approved means for readily breaking the cover free for removal unless the gasket is so designed that it will not stick. All parts shall be of corrosion-resisting metal or treated to render it resistant to corrosion. The switch shall permit final adjustment in the field. Tapped bosses shall be provided for making all conduit connections to the switch. A clamp-type connector bolted to the outside of the case shall be provided for making ground connections.

2.16.3 Switches

Switches shall be solid state with current rating as required and shall be assembled or combined into operating units as indicated on the plans. They shall be provided with suitable terminals for connecting the external conductors. Each terminal shall be suitably marked or tagged with the wire number shown on the contract drawings. The tripping mechanism shall be designed for fail-safe operation and shall reset the contacts when moving in the reverse direction. The switch shall have an operator lockout feature which permits programming only by authorized personnel.

2.16.4 Transducer

The electromagnetic position sensor shall be single-turn, heavy-duty enclosed in a outdoor NEMA 4 watertight enclosure. A cable connector used for the enclosure shall be provided and be suitable for No. 16 AWG shield twisted pair.

2.16.5 Accuracy of Trip and Reset

The design of the switch elements and operating mechanism of the limit switch shall provide for uniform and accurate setting.

PART 3 EXECUTION

3.1 INSTALLATION

Electrical installations shall conform to requirements of NFPA 70 and to requirements specified herein.

3.1.1 Feeders

3.1.2 Wiring Methods

Provide insulated conductors installed in rigid conduit, except where specifically indicated or specified otherwise or required by NFPA 70 to be installed otherwise. Grounding conductor shall be separate from electrical system neutral conductor. Provide insulated, green equipment grounding conductors for circuits installed in conduit and raceways. Minimum conduit size shall be 1/2 inch in diameter for low-voltage lighting and power circuits.

3.1.2.1 Plastic-Coated Galvanized Rigid Steel and IMC Conduit

3.1.2.2 PVC Schedule 40 and PVC Schedule 80

- a. Do not install PVC Schedule 40 in areas subject to physical damage.
- b. Do not install PVC Schedule 80 in areas subject to severe physical damage.

3.1.2.3 Metal-Clad Cable

Install in accordance with NFPA 70, Type MC cable.

3.1.2.4 Underground Conduit Other Than Service Entrance

PVC, Type EPC-40, plastic-coated rigid steel, plastic-coated steel IMC, or fiberglass. Convert nonmetallic conduit, other than PVC Schedule 40 or 80, to plastic-coated rigid or IMC steel conduit before rising through lock deck. Plastic coating shall extend minimum 6 inches above pier deck.

3.1.3 Conduit Installation

Run conduit exposed on side of wood and existing concrete lock structures, supported by hangers under lock structure concealed in new concrete lock structure. Install conduit parallel with or at right angles to structural members.

3.1.3.1 Conduit Support

Support conduit by nonmetallic pipe straps, wall brackets, hangers, or trapeze. Fasten by stainless steel wood screws to wood and by concrete inserts or expansion bolts on concrete. Threaded C-clamps may be provided on rigid steel conduit only. Load applied to fasteners shall not exceed one-fourth proof test load. Fasteners attached to concrete ceiling shall be vibration resistant and shock resistant. Holes cut to depth of more than 1-1/2 inches in reinforced concrete beams or to depth of more than 3/4 inch in concrete joints shall not cut main reinforcing bars. Fill unused holes.

Where conduit crosses expansion joints, provide suitable watertight expansion fitting that maintains conduit electrical continuity by bonding jumpers or other means.

3.1.3.2 Directional Changes in Conduit Runs

Make changes in direction of runs with symmetrical bends or molded fittings. Make field-made bends and offsets with conduit-bending machine suitable for type of conduit used. Do not install crushed or deformed conduits. Avoid trapped conduits. Prevent dirt or trash from lodging in conduits, boxes, fittings, and equipment during construction. Free clogged conduits of obstructions.

3.1.3.3 Expansion Joints

Install as recommended by the manufacturer for the temperature conditions at time of installation.

3.1.3.4 Pull Wire

Install in empty conduits in which wire is to be installed by others. Pull wire shall be plastic having minimum 200 pound tensile strength. Leave minimum 12 inches of slack at each end of pull wire.

3.1.3.5 Locknuts and Bushings

Fasten conduits to sheet metal boxes and cabinets with two locknuts where required by NFPA 70, where insulated bushings are provided, and where bushings cannot be brought into firm contact with the box; otherwise, provide minimum single locknut and bushing. Locknuts shall have sharp

edges for digging into wall of metal enclosures. Install bushings on ends of conduits, and provide insulating type where required by NFPA 70.

3.1.3.6 Stub-Ups

Provide conduits stubbed up through concrete structures for connection to freestanding equipment with adjustable top or coupling threaded inside for plugs, set flush with finished structure. Extend conductors to equipment in rigid conduit. Where no equipment connections are made, install screwdriver-operated threaded flush noncorroding plugs in conduit end.

3.1.3.7 Conduit and Cable Connections

Provide watertight connectors for conduit and cable connections to boxes and cabinets.

3.1.4 Boxes, Outlets, and Supports

Provide boxes in wiring or raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures. Boxes for metallic raceways shall be cast-metal, hub type, and when specifically indicated. Boxes in other locations shall be nonmetallic boxes provided with nonmetallic conduit system. Each box shall have volume required by NFPA 70 for number of conductors enclosed in a box. Provide gaskets for boxes. Provide separate boxes for flush or recessed fixtures when required by fixture terminal operating temperature. Fasten boxes and supports with wood screws on wood and with bolts and expansion shields on concrete. Threaded studs driven in by powder charge and provided with lockwashers and nuts or nail-type nylon anchors may be provided in lieu of wood screws, expansion shields, or machine screws. Support boxes directly from structure or by nonmetallic or stainless steel hangers. Where nonmetallic or stainless steel bar hangers are provided, attach bar to raceways on opposite sides of box, and support raceway with approved-type fastener maximum 24 inches from box. When penetrating reinforced concrete members, avoid cutting reinforcing steel.

3.1.4.1 Boxes

Boxes for use with raceway systems shall be minimum 1 1/2 inches deep, except where shallower boxes required by structural conditions are approved. Boxes shall be minimum 4 inches square, except that 4 by 2 inch boxes may be provided where only one raceway enters outlet.

3.1.4.2 Pull Boxes

Construct of at least minimum size required by NFPA 70 compatible with nonmetallic raceway systems, except where cast-metal boxes are required in locations specified herein. Furnish boxes with screw-fastened covers. Where several feeders pass through common pull box, tag feeders to indicate clearly electrical characteristics, circuit number, and panel designation.

3.1.5 Mounting Heights

Mount circuit breakers and disconnecting switches so maximum height of operating handle is 78 inches above finished structure. Mount receptacles a minimum of 18 inches above finished structure. Measure mounting heights of wiring devices and outlets to center of device or outlet.

3.1.6 Conductor Identification

Provide within each enclosure where tap, splice, or termination is made. For conductor sizes No. 6 AWG and smaller diameter, color coding shall be by factory-applied, color-impregnated insulation. For conductor sizes No. 4 AWG and larger diameter, color coding shall be by plastic-coated, self-sticking markers; colored nylon cable ties and plates; or heat shrink-type sleeves. Identify control circuit terminations.

3.1.7 Splices

Make splices in accessible locations. Make splices in conductor sizes No. 10 AWG and smaller diameter with insulated, pressure-type connector. Make splices in conductor sizes No. 8 AWG and larger diameter with solderless connector, and cover with insulation material equivalent to conductor insulation.

3.1.8 Covers and Device Plates

Install gasketed plates with alignment tolerance of 1/16 inch.

3.1.9 Grounding and Bonding

NFPA 70. Ground-exposed, noncurrent-carrying metallic parts of electrical equipment, metallic raceway systems, grounding conductor in metallic and nonmetallic raceways, and neutral conductor of wiring systems. Make ground connection at main service equipment, and extend grounding conductor to point of entrance of metallic water service. Make connection to water pipe by suitable ground clamp or lug connection to plugged tee. When flanged pipes are encountered, make connection with lug bolted to street side of flanged connection. Supplement metallic water service grounding system with additional made electrode in compliance with NFPA 70. Make ground connection to driven ground rods. Where ground-fault protection is employed, ensure that connection of ground and neutral does not interfere with correct operation of fault protection.

3.1.9.1 Resistance

Maximum resistance-to-ground of grounding system shall not exceed 25 ohms under dry conditions. Where resistance obtained exceeds 25 ohms, contact Contracting Officer for further instructions.

3.1.10 Equipment Connections

Provide power wiring for the connection of motors and control equipment under this section. Except as otherwise noted or specified, automatic control wiring, control devices, and protective devices within the control circuitry are not included in this section, but shall be provided under the section specifying associated equipment.

3.1.11 Government-Furnished Equipment

Contractor shall make connections to Government-furnished equipment to make equipment operate as intended, including providing miscellaneous items such as plugs, receptacles, wire, cable, conduit, and outlet boxes or fittings.

3.2 REPAIR AND SERVICE OF EXISTING STRUCTURES AND EQUIPMENT

Perform repair of existing structures and equipment, demolition, and

modification of existing electrical distribution systems as follows:

3.2.1 Workmanship

Lay out work in advance. Exercise care where cutting, channeling, chasing, or drilling of existing surfaces is necessary for proper installation, support, or anchorage of conduit, raceways, or other electrical work. Repair damage to structure, piping, and equipment using skilled craftsmen of trades involved.

3.2.2 Existing Concealed Wiring to be Removed

Disconnect from its source. Remove conductors, cut exposed conduit flush with structure, and seal openings with material to match adjacent surfaces.

3.2.3 Existing Electrical Distribution System Removal

Include removal of equipment's associated wiring, including conductors, cables, exposed conduit, boxes, fittings, anchors, supports, and other such items, back to equipment's source. Fill holes in structure where electrical equipment is removed with material to match adjacent surface. Provide unused openings in remaining boxes, fittings, and equipment with watertight nonmetallic knockout seals.

3.2.4 Continuation of Service

Maintain continuity of service to existing circuits of equipment to remain. Existing circuits of equipment shall remain energized. Circuits which are to remain but were disturbed during demolition shall have circuits wiring and power restored back to original condition.

3.3 FIELD QUALITY CONTROL

Furnish test equipment and personnel. Notify Contracting Officer 10 working days prior to each test.

3.3.1 Devices Subject to Manual Operation

Operate each device subject to manual operation at least five times, demonstrating satisfactory operation each time.

3.3.2 600-Volt Wiring Test

Test wiring rated 600 volts and less to verify that no short circuits or accidental grounds exist. Perform insulation resistance tests on wiring No. 6 AWG and larger diameter using instrument which applies voltage of approximately 500 volts to provide direct reading of resistance. Minimum resistance shall be 250,000 ohms.

3.3.3 Grounding System Test

Test grounding system to ensure continuity and resistance to ground is not excessive. Test each ground rod for resistance to ground before making connections to rod; tie grounding system together and test for resistance to ground. Make resistance measurements in dry weather, not earlier than 48 hours after rainfall.

3.3.4 Cathodic Protection System

A "corrosion expert" shall perform all testing and shall supervise all removal, storage and reinstallation work. Such a person must be accredited or certified by the National Association of Corrosion Engineers (NACE) as a NACE Accredited Corrosion Specialist or a NACE Certified CP Specialist or be a registered professional engineer who has a certification or licensing that includes education and experience in corrosion control of submerged metallic structures. Additionally the corrosion expert must have five years experience in corrosion control design. Prior to the start of work contractor shall submit to the contracting officer's representative the license professional corrosion control engineer qualification data, including a copy of the license showing the state and date of licensure and 2 references as proof that the corrosion control has been regularly engaged in corrosion control evaluation for at least five years. This submittal shall be in accordance with paragraph 1.3 "SUBMITTALS" of the specification section. Appendix "A" of this section provides the corrosion expert with reference data for the existing cathodic protection system including, anodes, rectifier, terminal cabinets, and installation instructions. Appendix "A" is for information only. The Contractor shall remove the cathodic protection system to include, but not be limited to, anodes, cabling, and conduits from each sector gate. The Contractor shall verify and provide labeling to identify cabling as required for proper reinstallation. The Contractor shall remove the system without damaging the system, components, or cabling and notify the Contracting Officer's representative of any deficiencies. The Contractor shall re-install the cathodic protection system after painting and prior to re-watering the structure. The work shall be carefully laid out in advance, and where cutting, channeling, chasing, or drilling of the gate structure or girder web, or other surfaces is necessary for the proper re-installation, support, or anchorage of the cabinets, conduit, raceways, or other electrical work, this work shall be carefully done, and any damage to the gate structure or equipment shall be repaired by skilled mechanics of the trades involved, at no additional cost to the Government. The Contractor shall submit for approval a "removed component" storage plan prior to disconnecting any cathodic protection component.

3.3.4.1 Pre-Dewatering Test

Prior to dewatering the Contractor's Corrosion Engineer shall take "structure to reference cell" potential measurements as described in paragraph "System Component Circuit Resistance Measurement". Any deficiencies shall be reported to the contracting officer's representative with prior to dewatering. Cathodic protection testing shall be conducted in accordance with National Association of Corrosion Engineers NACE RP 0169.

3.3.4.1 System Commissioning

General

The Contractor's Corrosion Expert shall perform the following system energizing and commissioning tests. All energizing and commissioning tests shall be performed in the presence of the Project Corrosion Engineer and shall be recorded and submitted to the Contracting Officer's representative within 14 days following completion of the test. The Contractor shall give the Contracting Officer's representative 30 days advance notice of the date of the test so that a representative can be present. All instruments used in conducting the tests shall have been calibrated by an

accredited testing laboratory within 1 year prior to the test. Calibration certification shall be provided to the Contracting Officer's representative for approval 14 days prior to testing.

Insulating Testing

After installation of the button anode on the gate, but prior to connection to the rectifier and submergence, an insulation test shall be made to demonstrate that no metallic contact or short circuit exists between the anode and the structure. These tests shall be made using a Megger apparatus or other device specifically designed for this purpose. Any insulation found to be shorted shall be replaced. Each button anode shall have a minimum resistance of 500,000 ohms isolation from the gate. If the button anode fails to indicate 500,000 ohms isolation, the Contractor shall make the necessary corrections and/or modifications to the anode installation to achieve the minimum reading.

3.3.4.2 System Component Circuit Resistance Measurement

Within 1 week following the filling of the lock, the resistance of each anode, reference electrode, system ground, and reference ground shall again be measured and recorded using four separate test lead wires and a Nilsson Model 400 AC impedance meter or other similar AC impedance instrument acceptable to the Contracting Officer's representative. The measurement shall be made by disconnecting the component lead at the appropriate terminal in the terminal box and connecting two of the four AC impedance test leads individually to the lead wire. The other two AC impedance test leads shall be individually connected to the structure component to which the component is mounted or connected. Should the resistance between the lead wire and the structure (anode and reference elements must be immersed in water) be less than 50% or more than 200% of the calculated (expected) resistance, the Contractor shall make the necessary corrections and/or modifications necessary to achieve the anticipated value(s).

3.3.4.3 Structure-To-Reference Cell Potential Measurements

Following completion of the installation of the cathodic protection system and prior to placing the impressed current cathodic protection system in operation, structure-to-reference cell potential measurements shall be made. The testing equipment shall be a calibrated copper-copper sulfate reference electrode with waterproof connector to insulated test lead wire suitable for immersion testing and of suitable length so that no splices are necessary in the test lead wire and a high-resistance digital voltmeter, Fluke Models 865 or 867 or equal. The copper-copper sulfate reference electrodes shall contain a saturated reagent copper sulfate in distilled water. Prior to first system energization, native "OFF" potential measurement shall be recorded using the same meter and calibrated reference electrode to be used during system energization and adjustment. These native "OFF" potentials shall be measured and recorded at all the specified locations.

3.3.4.4 Rectifier Adjustment

a. Rectifier adjustment shall be accomplished as follows:

(1) Adjust the output of the rectifier so that the gate-to-water potential measured using a reference cell indicates that the

negative potential has stabilized and is at least minus 0.85 volt and not more than minus 1.2 volts. These measurements shall be made with current applied. Corrections for IR drop shall be made.

This shall be accomplished by adjusting the rectifier to obtain the aforementioned "instant-off" potentials. This IR drop correction shall be made by interrupting the current output of the rectifier either manually or automatically using a 90% minimum "ON" and 10% maximum "OFF". If more than one rectifier is energized at the same time, all such rectifiers must be interrupted simultaneously. The "OFF" time period shall not exceed 1 second. During this "OFF" period, the Fluke 865/867 meter shall be used to automatically read the minimum DC voltage that is the polarized protective potential on the gate.

(2) Perform a complete structure-to-water potential survey of the gate leaf face.

b. Locations of Structure-to-Reference Cell for Potential Measurements

The reference cell shall be located in the water, 0.5 to 3 inches from the gate structures. The reference cell shall be connected with a waterproof screw coupled connector to a conductor on a reel. The cell shall be lowered to depths in the water as indicated below. The reference cell conductor shall be connected to the positive terminal of the digital voltmeter. A second conductor shall be connected from the gate structure to the voltmeter negative terminal. The measurement procedure shall be repeated and recorded for each measurement location. Measurements shall be made every 3 ft vertically (minimum) from normal pool elevation to the bottom of the gate. These same measurements shall be made at a minimum of five locations equidistant across the width of the gates on both the skin plate and chamber sides. All measurement positions should be permanently marked on the handrail of the gates directly above where the measurement is made.

c. Polarization Decay

(1) Polarization decay measurements are only necessary if the gate surfaces adjacent to the sill plate, quoin and miter fail to meet the above criteria of providing negative protection potential of at least minus 0.85 volts.

(2) A minimum negative (cathodic) polarization voltage shift of 100 millivolts shall be measured between the structure surface and the reference electrode cell above contacting the electrolyte. This polarization voltage shift is to be determined by interrupting the protective current and measuring the polarization decay. When the current is initially interrupted, an immediate voltage shift will occur. The second voltage reading displayed after the immediate shift shall be used as the base reading from which to measure polarization decay. Polarization measurements shall be made at minimum 10-minute intervals for a maximum of 4 hours. This measurement cannot be made until the gate has had a chance to become polarized.

(3) Location of the structure with respect to the reference cell for polarization decay measurements shall be 1 ft from the bottom gate at the quoin, miter, and at 2 ft intervals along the bottom of the gate. Measurements shall be made on each gate leaf face.

3.3.4.5 Recording of Measurements

All system component circuit resistances, structure-to-water potential measurements, including native potentials, shall be assembled in computer generated tabular form using Microsoft Excel or similar approved spreadsheet and submitted in six copies together with a copy of the data disk (3-1/2 inch floppy disks), with each location identified on the as-built drawings. The Contractor shall locate, correct, and report to the Contracting Officer's representative any unusual data or problems encountered during checkout of the installed cathodic protection system. Structure-to-water potential measurements are required on structures as necessary to affirm that protection has been achieved on all submerged surface of the lock gates. All tests shall be witnessed by the Contracting Officer's representative and the completed test measurements data shall be submitted to him for his review and approval.

-- End of Section --

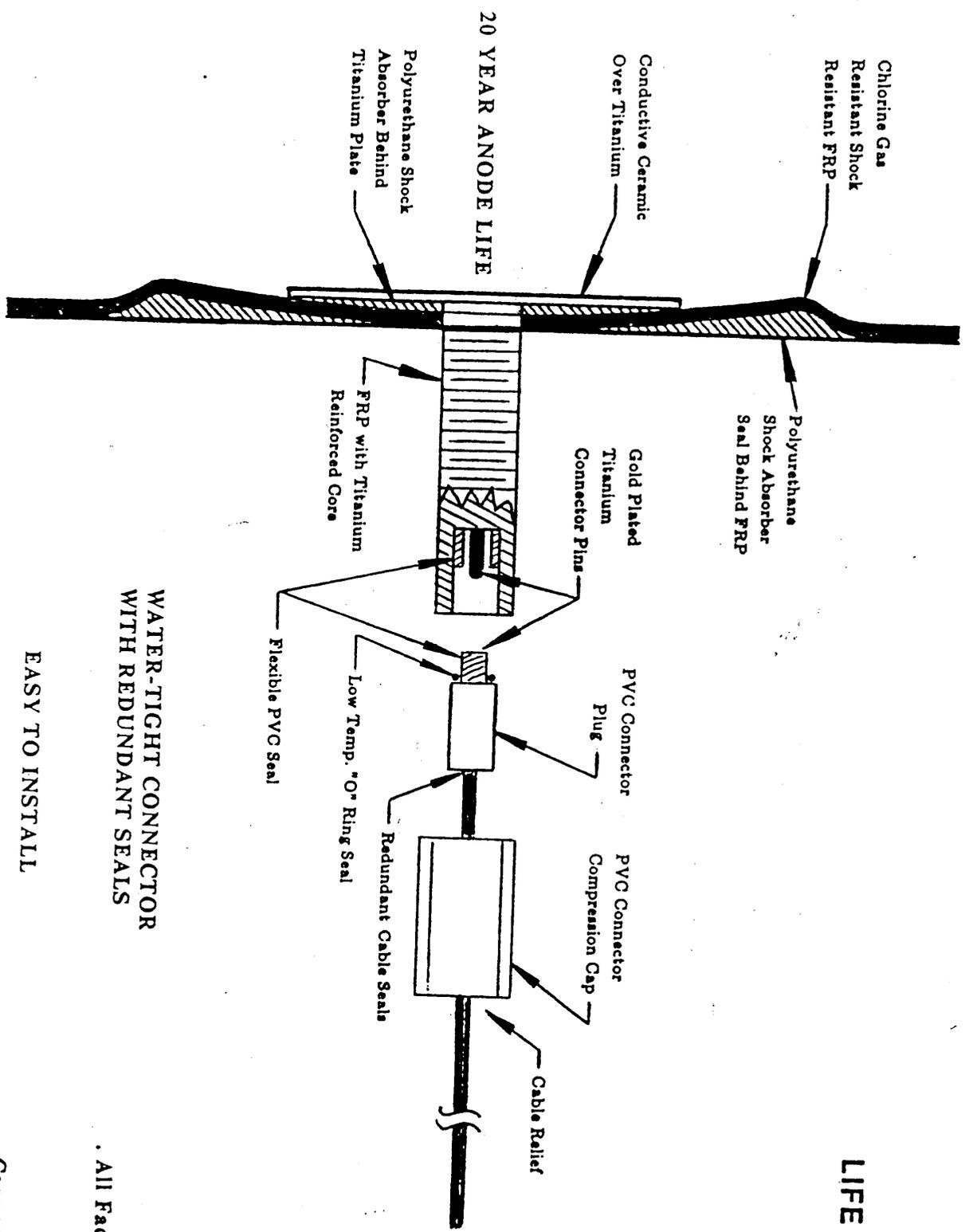
Appendix A

Table of Contents

Note: Documents in appendix A are intended to as an aid the Cathodic Protection Engineer in becoming familiar with the cathodic protection system components.

<u>Page</u>	<u>Description</u>
1,2	"Life-Saver" Anode diagram
3.	"Expand-a Rod" Anode diagram
4,5	"Life-Saver" Anode installation instructions
6,7,8,9	"Expand-a Rod" Anode installation instructions
10.	Rectifier unit- General Specification
11.	Rectifier unit- diagram (typical)
12.	Circuit Module Specification
13.	Terminal Box-General Specification

LIFE SAVER ANODE™

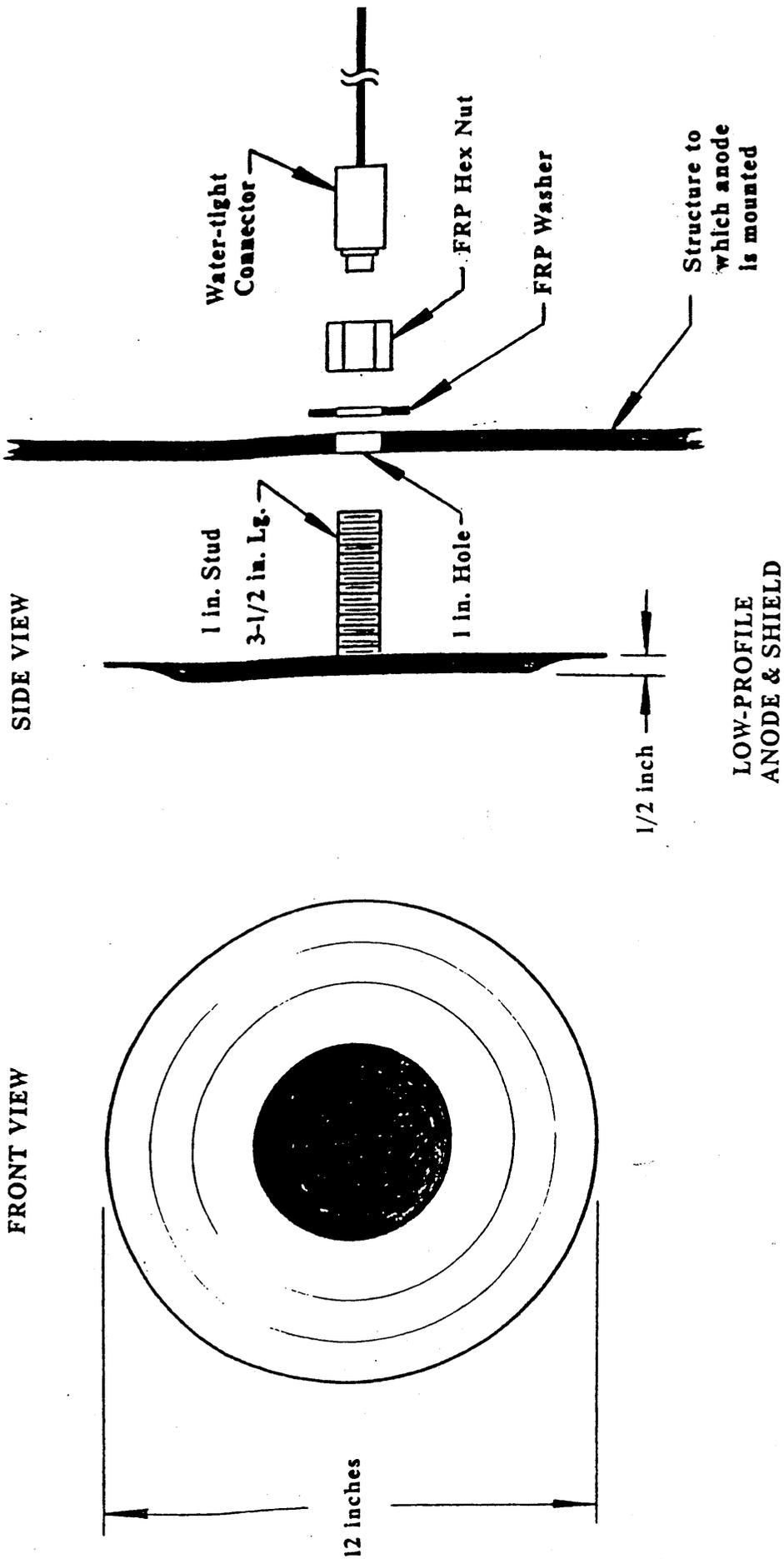


**IMPACT RESISTANT DIELECTRIC
PROTECTIVE SHIELD**

**WATER-TIGHT CONNECTOR
WITH REDUNDANT SEALS**

EASY TO INSTALL

- All Factory Connections
- Connector Tested to 100 psi

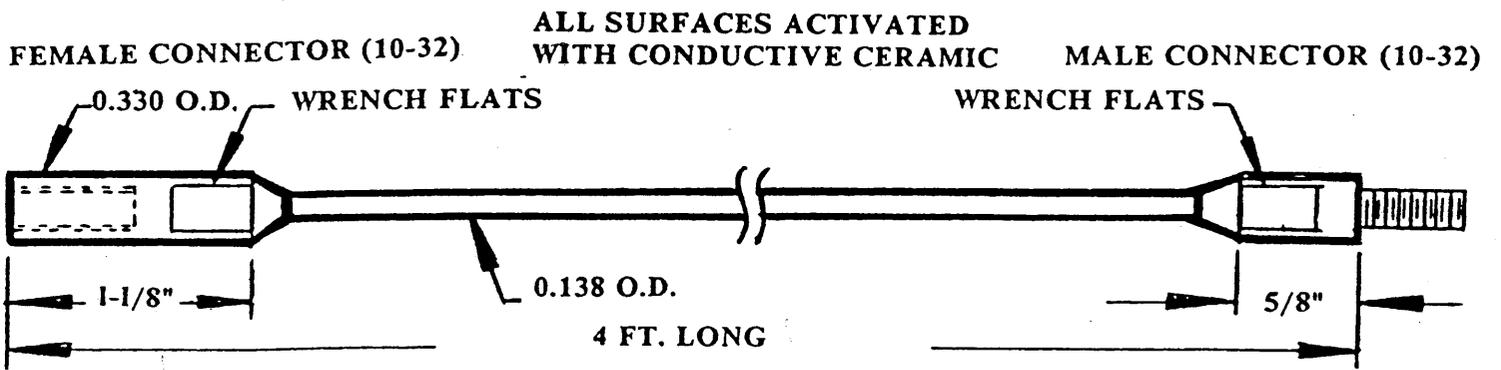


LIFE SAVER ANODE™

HOW TO INSTALL:

- (1) Insert anode into 1 in. hole as you would a bolt.
- (2) Screw on hex nut with washer.
- (3) Plug in connector cable.

EAR 4: EXPAND-A-ROD ANODEtm



LIFE SAVER ANODEtm INSTALLATION INSTRUCTION SHEET

1. UNPACKING

- a. When unpacking and handling the anodes, care should be taken not to scratch the black ceramic surface of the anode. There may be some blotches in the center of the anode and at other locations; as well as some marks caused by the automatic machinery rollers riding across the surface of the anode during production. An occasional very small scratch may also be found but none of the above will effect the anode operation.
- b. For each Life Saver Anodetm there will be shipped, usually packaged separately in the same crate, one each of a 1" FRP nut, one each of a flat FRP washer, two each purple "O"-rings, and one each connector cable. The shipment will contain a few extra "O"-ring parts to use in case one is lost during assembly.

2. INSTALLATION

a. Materials:

The only material needed besides the anodes is GE Silicon Construction Sealant #1200.

b. Tools:

The 1" FRP nut used to bolt the anode to the structure is standard in size, being 1-1/2" across the flats. If the anode is mounted with a terminal box on the backside, such that the anode bolt also holds the terminal box up against the structure, a socket wrench with a deep throat will be required. The throat should be at least 3-1/2" deep, including the thickness of the nut being installed. The socket used should be equipped with a torque wrench handle.

c. Installation Procedure:

As you have probably observed, the anode looks like a bolt with a very large diameter head. It is optional, but advised, that a 1/8" bead of silicon sealant mentioned above be applied to the backside of the anode about 1/4" from the perimeter all the way around. Only if the gate surface is very pitted and irregular should more sealant be used than a 1/8" bead. If excessive sealant is used, it may render the anode very difficult to remove if replacement is every necessary.

Once the sealant is applied, put the anode stud into the 1" hole on the structure and make sure that the anode seats properly against the structure plate surface. The sealant should not be allowed to dry before the next step is performed.

Install the junction box if one is to be used and then the washer-nut to the stud protruding from the opposite side of the plate structure. This nut should be tightened to about 45-50 foot-pounds. Over tightening may damage the FRP construction.

The final step involves installing the connector plug and connector compression cap. This is not difficult, but should be done carefully. First of all, two purple "O"-rings supplied with the anode should be placed into the hole in the end of the anode mounting stud. Put them in one at a time, making sure they seat one on top of the other at the bottom of the hole against the PVC seal.

Insert the connector plug carefully into the hole at the end of the anode stud. Note that the reduced diameter end of the connector plug must fit into the "O"-rings. A twisting motion as the plug is inserted helps to assure proper seating.

Finally, put a small amount of the construction sealant on the threads of the end where the connector compression cap screws on. Then screw on the cap hand tight (about 50 inch-pounds).

EXPAND-A-ROD ANODEtm INSTALLATION INSTRUCTIONS

(READ COMPLETELY BEFORE INSTALLATION)

1. UNPACKING:

- a. The Expand-A-Rod Anodetm system consists of two essential elements -- the Expand-A-Rod Anodestm and the Connector Cables. Optional accessories are also available.

The Expand-A-Rodstm are usually packaged separately in a long crate or tube. These rods are 4' long and are made of 0.138 OD titanium with a tough ceramic coating. They have a 10-32 female connector on one end and a male connector on the other. All of the rods are identical. Some care should be exercised not to make any sharp bends in the rods which might be difficult to straighten during installation. Also, care should be taken not to scratch the anode surface excessively. A few small scratches are of no consequence.

Connector Cables may be either female or male. Female is usually specified unless the rods to which they connect are going to be fed with power from both ends. If the latter is the case, your shipment will contain each type. The cables may vary in length to meet the specifications of your order.

There are also various optional accessories available which may or may not be with your particular shipment. These consist of: Hanger Clevises, Anchoring Clevises, Standoffs and Stabilizing Weights. All of the items, except the Expand-A-Rod Anodestm themselves may possibly be packed together in one or more crates, depending upon quantity. No special handling instructions are necessary when unpacking these.

2. INSTALLATION:

Expand-A-Rod Anodetm component availability, assembly and installation is considerably simpler than the traditional anodes on the market. Each anode string is easily assembled in the field from stock subassemblies. All anode-to-cable connections are done at the factory. The user simply screws them together. Since the anodes weigh only 2-1/2 ounces per rod, getting them to the site and positioning them into place is greatly simplified. Very few tools and additional materials are required.

a. Materials:

If any of the optional clevises or Stabilizing Weights are to be used, GE Silicone Construction Sealant No. 1200, and rope for hanging the clevises will be needed.

d. Tools:

A torque limiting wrench fitted with an open end 1/4" crowfoot attachment used in conjunction with a 1/4" open end or adjustable wrench should be used for tightening the Expand-A-Rods[™] together. (3/8" drive, 1/4" crowfoot is available from CerAnode Technologies[™].)

Two 8" adjustable wrenches or the appropriate size tongue and groove pliers (plumbers pliers) are necessary for tightening the nuts on the clevises. If weights or standoffs are used, a 15" adjustable wrench or the appropriate size tongue and groove pliers will be needed.

c. Installation Procedure:

The order in which the various parts of the Expand-A-Rod Anode[™] system are assembled depends mainly on the application. If it is being installed into a reservoir system which is filled with water, the procedure may be different than a reservoir that is empty during installation.

The following points should be remembered when deciding on an installation procedure for your particular application.

- (1) The Expand-A-Rod Anodes[™] screw together to form a string of 4' rods to make up the desired length. After the last two rods are screwed together, the rod string is screwed onto the Connector Cable for making connection to the rectifier (if power is to be fed to both ends, see Note 1 on Page 4).

The rod string should be screwed onto the Connector Cable rather than trying to screw the connector onto the rods which would cause the cable to be twisted. Excessive twisting of the cable where the cable enters the connector may weaken the water-tight seal, rendering the connector unusable underwater. Since the rod thread size is 10-32, 1/2" long, it will require approximately 16 turns to connect each rod to its respective mate and 16 turns to connect the rod to the connector.

Applying the proper amount of torque (32-34 inch-pounds) when screwing the rods together and when screwing the last rod into the connector is important. If too much torque is used, obviously there is a chance of permanent mechanical damage. If not enough torque is used, there is a chance of mechanical loosening during the many years of anode operation. A good tight connection also insures an electrical connection resistance of essentially zero. This is important for proper operation of the anode string. The fine threads (10-32) are coated with a very thin ceramic layer which provides a locking action when the rods are torqued together properly. The ceramic layer breaks away in places, leaving a metal to metal electrical connection. This assures long-term mechanical and electrical connection integrity. (See Note 2)

In many applications, the Expand-A-Rod Anode Stringtm is adequately supported by its cable and connector since each 4' rod section only weights 2-1/2 ounces. If extra support is needed see (2) below:

- (2) The Hanger Clevis is a device used for hanging the Expand-A-Rod Anodetm string when conditions demand more support than the Connector Cable was designed to carry, (i.e. when a Stabilizing Weight is attached). The Hanger Clevis should be installed on the structure before the anode string and Stabilizing Weight is lowered into position. It must be ready to support the weight of the string and Stabilizing Weight in order not to put a strain on the Connector Cable. The Hanger Clevis is 7-1/2" long and is made of 2", "U"-channel, having a Teflon insert at one end for attaching a rope. At the other end there is a simple arrangement for attachment to the anode rod at the connector. It is designed so that neither the rods nor the cable need to be fed through the clevis.

To install the Hanger Clevis onto an assembled Expand-A-Rod Anode Stringtm:

- (a) Assemble the anode string and Connector Cable per instructions in (1) above.
- (b) Attach the rope, which is to support the anode string and weight, to the Teflon clevis support at the end of the "U"-channel.
- (c) Remove the 3/8" yellow fibernut holding the slotted "U" insert into the "U"-channel and remove the slotted insert.
- (d) Place the "U"-channel around the Connector Cable (cable does not need to go under the Teflon rope support).
- (e) Slip the slots of the slotted insert over the smallest diameter of the anode rod, just below Connector Cable.
- (f) Place the slotted insert back into the "U"-channel and onto the 3/8" bolt while holding the anode rod against the bottom of the slots in the insert.
- (g) Reinstall the 3/8" yellow fibernut. The bolt to which this nut is attached should be capturing the anode string between it and the bottom of the two slots.

- (3) Sometimes Stabilizing Weights are used at the end of an anode string. Since each 4' anode rod section weighs only 2-1/2 ounces, Stabilizing Weights maintain the rod string in a somewhat vertical position in moving water or when attached to a moving structure.

A Stabilizing Weight up to 10 pounds is usually sufficient in size. Only weights manufactured for this purpose will work as permanent stabilizing weights. Since it clamps onto the end of the last rod, the weight can be attached either before or after the rods are screwed together. The only time the weight would be installed on a rod before the rods are screwed together would be in a situation where the rods are going to be screwed together as they are lowered into position. In this case the weight would be attached to the first rod, it would be hung in the water, the second rod screwed to that, and so on; lowering each section into position to the desired string length. The anode string would then be screwed onto the Connector Cable and immediately attached to the Hanger Clevis.

If the anode string is assembled previous to the installation of the weight and then lowered into position, care should be taken not to bend the rods excessively due to the weight hanging at the end. Stabilizing Weights should never be used on the end of an anode string without also using a Hanger Clevis at the connector (top) end to support the anode string. The Hanger Clevis should be in position before lowering the anode string with its Stabilizing Weights into position in order to prevent strain on the Connector Cable at the connector.

To Install the Stabilizing Weight:

- (a) Insert the blade of a screwdriver into the slot at the end of the threaded FRP stud coming out of the top of the weight.
- (b) Slip the female end of the Expand-A-Rod[™] into the hole at the end of the stud.
- (c) Remove the screwdriver.
- (d) Holding the weight, turn the nut up away from the weight until tight or flush with the top of the stud.

If you have any questions, call APS-Materials, Inc. at 513-278-6547 and ask for the CerAnode Technologies[™] Group.

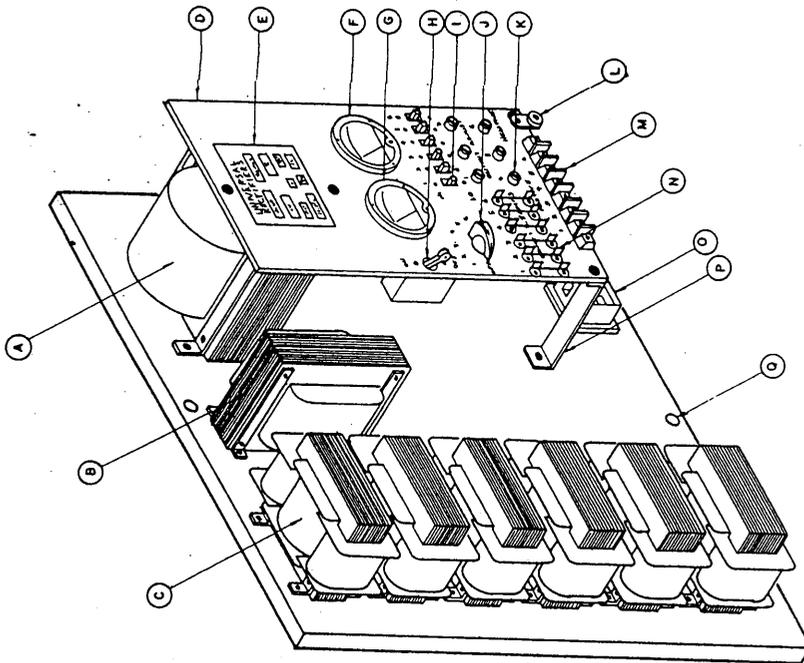
CANAVERAL LOCKS - CANAVERAL HARBOR, FLORIDA

The following rectifier specification is the rectifier requirement for one leaf of the four-leaf lock system.

Rectifier Unit - General Specification

1. The rectifier unit shall operate from a 120 VAC power source. It shall consist of eight (8) DC constant current circuit modules. Each module shall be rated at 24 volts and shall each be adjustable from 0 to 4 amps.
2. The rectifier shall be equipped with overload protection via a fully magnetic circuit breaker which will break the circuit automatically somewhere between 101-125% of the rated load. It shall also be equipped with voltage surge arrestors and lightning arrestors ahead of the overload protection.
3. This eight-module rectifier shall have one 0-25 volt analog meter and one 0-5.0 amp analog current meter, arranged with a switch to display the outputs of each of the 8 circuit modules separately. Both meters shall be 4 1/2" in size, have an accuracy of 2% and have a taut band D'Arsonval movement. Terminals shall be provided for connecting a DVM in parallel with the analog meters (the voltages at these terminals do not need to be in engineering units).
4. The rectifier shall be equipped with a phonetic control/instrument panel on which all switches, meters, DC terminals, etc. shall be mounted with the appropriate engravings to identify and adjust the above components. The DC output terminals shall be covered with a clear plastic window. The AC input terminal block shall be located behind the instrument panel and arranged in such a way so as not to cause hazard to the operators taking current and voltage readings.
5. The rectifier cabinet shall house all of the rectifier components and shall provide access to the control panel for reading, adjusting, or repairing the rectifiers by one or more hinged doors. Provision should be made for the rectifier cabinet to be mounted to a 6" diameter steel post via a "U"-channel mounting bracket welded to the back, or against a flat wall. All hinged doors should open freely in either one of these mounting configurations. The door(s) should be removable and should also be equipped with the appropriate hardware for locking the cabinet.
6. The rectifier cabinet shall be a NEMA type 3R air-cooled enclosure, ventilated per NEMA Standards Publication/25-BE-1975, including all revisions. The ventilation openings shall be equipped with easily replaceable galvanized insect screens.

LETTER	DESCRIPTION
A	4 CIRCUIT TRANSFORMER
B	2 CIRCUIT TRANSFORMER
C	REACTORS
D	PANEL
E	NAME PLATE
F	AMP METER
G	VOLT METER
H	CIRCUIT BREAKER
I	HI-LO SWITCH
J	UNIT SELECTOR SWITCH
K	OUTPUT ADJUSTMENT POT
L	NEGATIVE OUTPUT
M	POSITIVE OUTPUT
N	SHUNT
O	AC TERMINAL BLOCK
P	MOUNTING BRACKET
Q	MOUNTING HOLE FOR CASE
R	NOT SHOWN (STACKS)



UNIVERSAL RECTIFIERS, INC.
ROSENBERG, TEXAS 77471

SCHEMATIC	N.T.S.	DESIGNED BY	
DATE	4/29/86	DRAWN BY	M.A.L.
		REVISED	
		BY	R. M. SPECK
MULTIPLE CIRCUIT CONSTANT CURRENT RECTIFIER			
DRAWING NUMBER			8604

The rectifier cabinet shall be made of 11 gauge steel, hot dipped galvanized, acid etched in phosphoric acid solution, primed with Sherwin Williams #P60G2 phosphatized primer, followed by two coats of DuPont Imron #57704-U gray polyurethane coating (or equivalent), conforming to ANSI 61.

Specification for Each of the Eight Circuit Modules

1. Each circuit Module shall incorporate an isolation type step down transformer with electrostatic shielding between windings. The copper conductors and their insulation, as well as other varnish used in the transformer shall be capable of 155°C per IEEE class F test procedures. At full power rating, the transformer shall not exceed 85°C internally and shall be at least 95% efficient. It shall conform to NEMA ST1. The dielectric qualities and application of all insulating materials shall result in the transformer being able to sustain 2000 volts RMS or greater when applied for 1 minute between the windings and core. These insulating materials should not soften during a 24 hour immersion in styrene polyester, butyl acetate, mild acids, acetone, trichloroethylene, ethyl alcohol, naphtha, or toluene.
2. Each circuit module shall incorporate full-wave non-aging selenium bridges capable of high current density rated at 33 volts RMS with less than 1 volt RMS forward voltage drop at 0.355 amps per inch square. Reverse leakage at the same voltage must be less than 0.0032 amps per square inch and shall have NEMA Grade C type corrosion resistant anti-fungicide finish.
3. Each circuit module shall have the capability to operate continuously at temperatures up to 45°C over its entire voltage and current range and shall be settable via a 10 turn environmentally sealed current adjustment to any current level between 0 and 4 amps. It shall maintain its constant current setting + 5% regardless of circuit resistance over its entire voltage range of 0-24 volts.
4. Each circuit module shall have the ability to be adjusted totally independent of the other circuit modules and shall be electrically isolated from the other circuit modules unless connected in series or parallel purposefully.
5. Each circuit module shall have the ability to be connected in series or parallel with another circuit module for the purpose of doubling the voltage or current as needed.

CATHODIC PROTECTION SYSTEM

TERMINAL BOX SPECIFICATIONS

CANAVERAL LOCKS - CANAVERAL HARBOR, FLORIDA

The following terminal box specification is the terminal box requirement for one leaf of the four-leaf lock system.

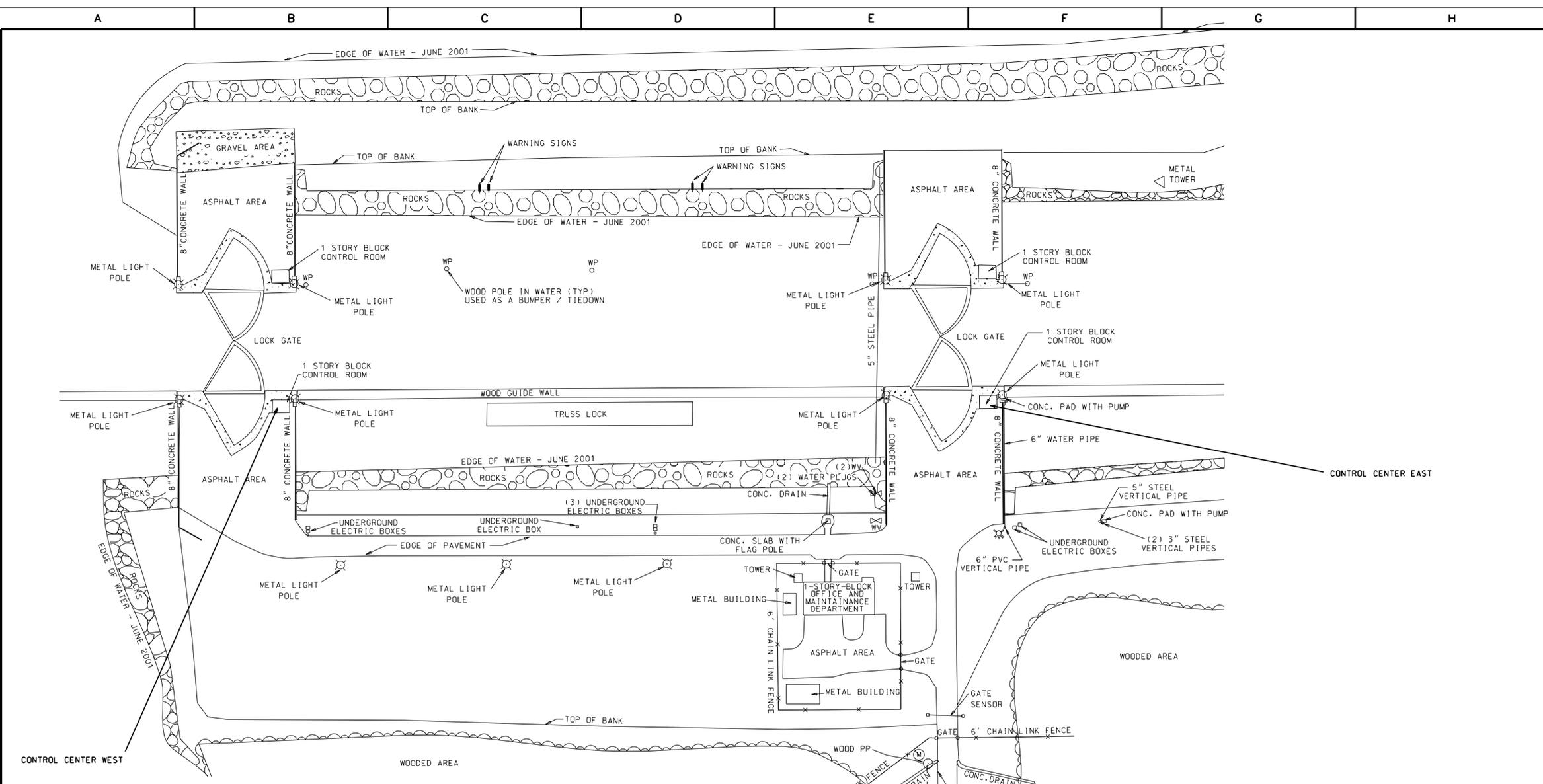
Terminal Box - General Specification

1. This terminal box shall be capable of terminating 20 #14 AWG anode leads and reducing them to 8 #8 AWG feeders which shall go to the rectifier unit. Anodes #1-5 shall be combined to go to one rectifier feeder, Anodes #6-10 shall go to another rectifier feeder, Anodes #11, #12, and #13 shall each go to separate rectifier feeders, Anodes #14 and #15 shall be combined to go to one rectifier feeder, Anodes #16 and #17 shall also be combined to go to another rectifier feeder, and Anodes #18 and #19 will combine go to the last rectifier feeder. Anode terminal #20 is a spare.

2. The current to each anode lead shall pass through a shunt wired in series with the anode lead. Momentary toggle switches connected across each of the shunts will connect a meter momentarily to each shunt for reading the current through each individual anode. The current meter shall have 2 scales -- one scale being 0-1 amp, the other scale being 0-2 amps. The appropriate scale will be chosen via a range switch. The switches used shall have non-oxidizing contacts capable of switching low currents when seldom used. The meter shall be 4-1/2" in size and have a 2% D'Arsonval taut band movement. The bus bars used in the terminal box shall have removable links in order to rearrange the anode groupings feeding the rectifier feeders if necessary.

3. The terminal box case shall be made of a weather resistant ultra violet resistant Grylyn and shall be grey or white in color. It shall be water tight and have a hinged cover with latches. The box should have a two-channel frame and mount at the back for mounting the terminal box to a fence. The terminal box should not extend from the fence more than 8". There must be sufficient space in the bottom of the box for bringing three 1-1/2" PVC conduits into the box via PVC conduit hubs. The terminal box must be equipped with the appropriate hardware for locking.

--End of Appendix "A"--



GENERAL NOTES:

1. THIS DRAWING PROVIDES GENERAL INFORMATION RELATING TO ELECTRICAL SITE PLAN AND SYMBOL LIST USED IN THIS CONTRACT.
2. SUMMARY OF ELECTRICAL WORK TO BE DONE UNDER THIS CONTRACT IS AS FOLLOWS:
 - A. REPLACE ALL LIMIT SWITCHES ON GATES AS SHOWN ON DEG. NO. 16/3.
 - B. PROVIDE SURGE PROTECTION OF ELECTRICAL SERVICE AT CCM.
 - C. THE IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM (CPS) FOR EACH GATE CONSISTS OF 18 ANODES, 10 "LIFESAVER" ANODES ON THE SKIN SIDE AND 8 "ROD" TYPE ANODES ON THE SECTOR SIDE. THE CPS AT EACH GATE HAS A DEDICATED RECTIFIER THAT POWERS 8 CIRCUITS THROUGH A TERMINAL BOX MOUNTED ON THE SECTOR GATE HANDRAILS ABOVE THE WATER LINE. SKIN SIDE LIFESAVER ANODES ARE POWERED VIA A CONDUIT/JUNCTION BOX SYSTEM. THE "EXPAND A ROD" ANODES ARE SUSPENDED BETWEEN HANGING AND ANCHORING CLEAVISES ON THE TIMBER SIDE OF THE SECTOR GATE AND WEIGHTED WITH 10 - POUND ANCHOR WEIGHTS FOR STABILITY.
 ALL ANODES, JUNCTION BOXES, CONDUCTORS, AND ASSOCIATED FASTENERS SHALL BE REMOVED AFTER DEWATERING OF THE LOCK AND PRIOR TO SANDBLASTING. THE CONDUITS SHALL REMAIN IN PLACE AND BE PROTECTED FROM SANDBLASTING. ANODES SHALL BE REINSTALLED IN THEIR ORIGINAL POSITION. JUNCTION BOXES SHALL BE REPLACED IN KIND AND ASSOCIATED FASTENERS REINSTALLED AFTER PAINTING AND BEFORE REWATERING. ALL CIRCUIT CONDUCTORS SHALL BE TERMINATED TO PRECISELY THE TERMINAL AND DEVICES THEY ORIGINALLY SERVED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF REMOVAL AND REINSTALLATION OF ANODES AND ASSOCIATED CONDUCTORS SO THAT NO DELAY OCCURS IN THE WORK SCHEDULE ASSOCIATED WITH THE SANDBLASTING AND PAINTING.
 CONTRACTOR SHALL REMOVE ANY AND ALL SACRIFICIAL ANODE STUDS PRIOR TO SANDBLASTING. THESE STUDS SHALL NOT BE REINSTALLED.

 THE CONTRACTOR SHALL BE REQUIRED TO VERIFY THE EXISTING CPS AND BECOME FAMILIAR WITH THE CPS, INCLUDING BUT NOT LIMITED TO ANODES, RECTIFIERS, TERMINAL CABINET, ANODE LAYOUT AND CONNECTIONS PRIOR TO DEWATERING AND REMOVAL OF THE ANODES. THE CONTRACTOR SHALL TEST THE CPS PRIOR TO DEWATERING AND DOCUMENT THE RESULTS AS TO THE CONDITION OF THE ANODES, ANODE CABLES, AMPERAGE AND VOLTAGE OF EACH RECTIFIER CIRCUIT AND EACH INDIVIDUAL ANODE CIRCUIT FROM THE TERMINAL BOX. ALL WORK ON THE CPS, INCLUDING INITIAL TESTING AND DOCUMENTATION, REMOVAL OF COMPONENTS, REINSTALLATION AND POST REWATERING TESTING, MEASUREMENT, CALIBRATION AND ADJUSTMENT SHALL BE PERFORMED BY A CORROSION EXPERT IN ACCORDANCE WITH SECTION 16407N PARAGRAPH 3.3.4 OF CONTRACT SPECIFICATIONS.
 - D. REPLACE LIGHTING, LIGHT SWITCHING AND CONDUIT IN MACHINERY PIT. SEE DETAIL SHEET 16/4. PROVIDED BONDING OF HANDRAILS AND REPLACE GATE GROUNDING CABLES.

3. CONTRACTOR SHALL UTILIZE THE "GRAPHIC SCALE" IN ANALYSIS OF "AS BUILT" DRAWINGS.
4. ALL ELECTRICAL WORK SHALL BE PERFORMED BY A LICENSED ELECTRICAL CONTRACTOR.
5. ALL ELECTRICAL WORK AND MATERIALS SHALL CONFORM TO THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE AND THE REQUIREMENTS OF THE FLORIDA STATE AND LOCAL AUTHORITIES HAVING JURISDICTION.
6. ALL CONDUITS ABOVE GROUND SHALL BE PVC COATED RIGID GALVANIZED STEEL AND ALL CONDUITS BELOW GRADE SHALL BE SCHEDULE 80 PVC UNLESS OTHERWISE NOTED. CONTRACTOR SHALL REPLACE ANY RIGID GALVANIZED STEEL CONDUIT HAVING A DAMAGED OR PENETRATED OR OTHERWISE DISCONTINUOUS PVC COATING.
7. ALL POWER AND CONTROL CIRCUITS SHALL BE COPPER WITH XHHW-2 OR EPR INSULATION UNLESS OTHERWISE NOTED.
8. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR VISITING THE CONSTRUCTION SITE TO VERIFY EXISTING CONDITIONS PRIOR TO BID DATE.
9. WHERE CONCENTRIC RING KNOCKOUTS ARE BEING UTILIZED, PROVIDE BONDING JUMPERS FROM BUSHING TO ENCLOSURE.
10. CONTRACTOR SHALL PERFORM LOCKOUT TAGOUT DURING ELECTRICAL WORK.
11. MANATEE PROTECTION SYSTEM (MPS) SHALL BE REMOVED PRIOR TO THE BEGINNING OF SANDBLASTING BY HARBOR BRANCH OCEANOGRAPHIC INSTITUTE (HBOI). CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH HBOI TO INSURE THAT NO DELAY OCCURS IN THE WORK SCHEDULE ASSOCIATED WITH THE SANDBLASTING AND PAINTING OR MPS REMOVAL/REINSTALLATION.

ABBREVIATIONS:

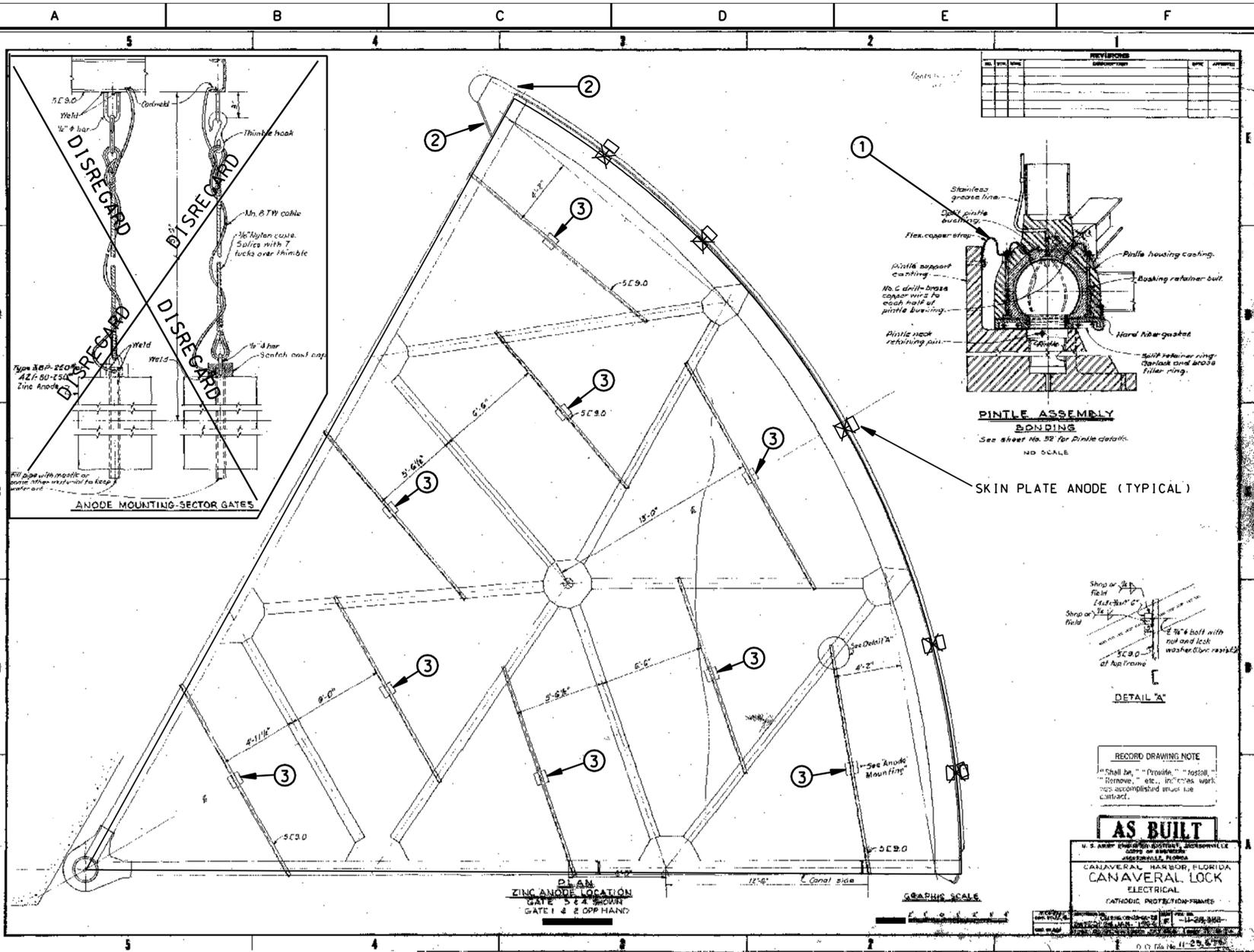
AWG	AMERICAN WIRE GAUGE
C	CONDUIT
CU	COPPER
GRC	GALVANIZED RIGID STEEL
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
PVC	POLYVINYLCHLORIDE



US Army Corps of Engineers
Jacksonville District

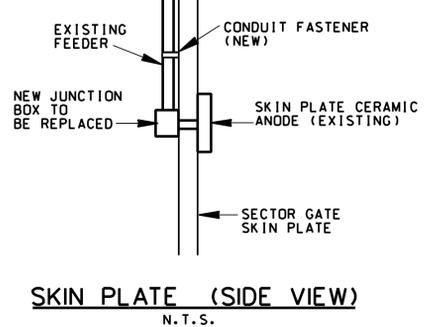
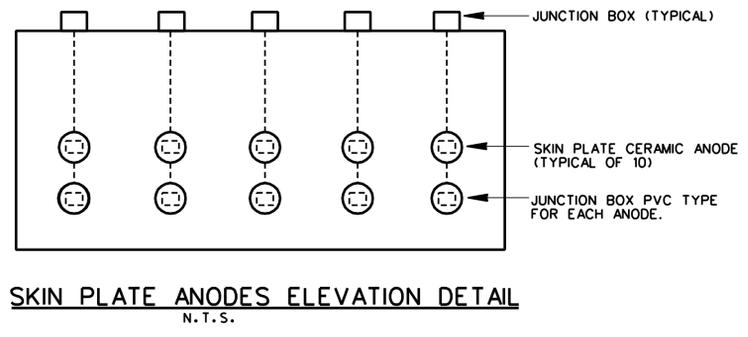
SAFETY ON THIS JOB DEPENDS ON YOU

<p>DEPARTMENT OF THE ARMY CORPS OF ENGINEERS JACKSONVILLE, FLORIDA</p>	<p>1 2A 3 4 5 6</p> <p>NO. SYMBOL ZONE</p> <p>REVISOR TO ACCOMPANY AMENDMENT NO.0002</p> <p>DATE</p> <p>DESCRIPTION</p> <p>APPROVED</p>
<p>DESIGNED BY: [Signature]</p> <p>CHECKED BY: [Signature]</p> <p>DATE: [Date]</p> <p>SCALE: AS SHOWN</p> <p>DATE: [Date]</p> <p>FILE NO. 90C-38.319</p>	<p>CONTRACT NO. [Number]</p> <p>PROJECT NAME: CANAVERAL LOCK CANAVERAL LOCK PAINTING AND OTHER REPAIRS</p> <p>ELECTRICAL SITE PLAN</p> <p>DRAWING NO. 16/1</p>



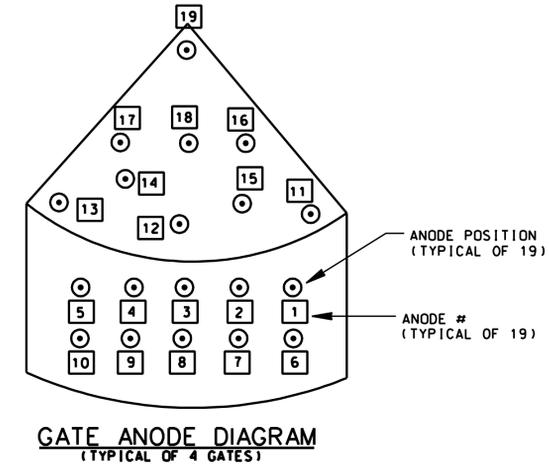
- KEYED NOTES:**
- 1 FLEXIBLE COPPER STRAP SHALL BE PROTECTED DURING SANDBLASTING. CONTRACTOR SHALL REPLACE ANY STRAP DAMAGED BY SANDBLASTING. CONTRACTOR SHALL INSPECT WITH THE CONTRACTING OFFICER, EACH STRAP PRIOR TO BEGINNING WORK. TYPICAL OF 4.
 - 2 MANATEE PROTECTION SENSOR ARRAY TO BE REMOVED BY OTHERS (TYPICAL OF 8).
 - 3 CERAMIC "ROD TYPE" ANODE. (SEE SPECIFICATION SECTION 16407N, APPENDIX A) TYPICAL OF 9 PER GATE.

- GENERAL NOTES:**
1. EACH GATE SECTION HAS NINE ANODE RODS HANGING VERTICALLY AND SKIN PLATE HAS TWO ROWS OF ANODES WITH FIVE ANODES PER ROW. CONTRACTOR SHALL NOTIFY THE CONTRACTING OFFICER IMMEDIATELY UPON REMOVAL OF THE SKINPLATE ANODES TO PREVENT ANY DELAYS FOR THE SANDBLASTING AND PAINTING, ETC..
 2. THIS AS BUILT DRAWING INDICATES TYPICAL PLAN AND ELEVATION VIEW OF CONDUIT SYSTEM ON EACH GATE FOR IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM. CONTRACTOR SHALL PROTECT THE CONDUIT SYSTEM DURING SANDBLASTING AND PAINTING OPERATION. CONTRACTOR SHALL REMOVE THE CONDUIT FASTENERS, ETC., TO MOVE THE CONDUIT AS NEEDED TO SANDBLAST AND PAINT THE METAL BEHIND/UNDER THE CONDUIT. CONTRACTOR SHALL PROVIDE NEW FASTENERS, ETC., AND REINSTALL THE CONDUIT IN PLACE. SEE GENERAL NOTE, THIS DRAWING.
 3. EXISTING CERAMIC ANODES ARE MANUFACTURED BY APS MATERIALS (POC PHIL CHITTY, 904 - 278-6547.)
 4. REMOVAL AND REINSTALLATION INSTRUCTIONS:
CONDUCTORS SHALL BE LABELED WITH IDENTIFICATION TAGS ON BOTH ENDS PRIOR TO REMOVAL. IDENTIFICATION TAGS SHALL BE MADE OF ULTRA VIOLET LIGHT RESISTANT POLYURETHANE AND CLEARLY MARKED AS TO TERMINAL BOX CIRCUIT NUMBER AND NUMBER OF THE ANODE SERVED IN ACCORDANCE WITH THE GATE ANODE DIAGRAM DETAIL. THIS SHEET OF THE CONTRACT DRAWINGS. ANODES SHALL BE REMOVED CAREFULLY AND THE RELATIVE POSITION ON THE ON THE GATE SHALL BE CLEARLY MARKED (1 THROUGH 19) IN ACCORDANCE WITH THE GATE ANODE DIAGRAM DETAIL. THIS SHEET. CONDUITS SHALL REMAIN IN PLACE AND BE PROTECTED FROM SANDBLASTING. ALL ANODES, ASSOCIATED EQUIPMENT, AND CONDUCTORS SHALL BE STORED IN SUCH A MANNER AS TO AVOID WATER, CHEMICAL, SUNLIGHT, MECHANICAL DAMAGE AND/OR DEGRADATION. CONTRACTOR SHALL SUBMIT A CATHODIC PROTECTION "REMOVED COMPONENT" STORAGE PLAN TO THE CONTRACTING OFFICER'S REPRESENTATIVE FOR APPROVAL PRIOR TO DISCONNECTION OF ANY PORTION OF THE CATHODIC PROTECTION SYSTEM.
THE CONTRACTOR SHALL, UPON COMPLETION OF THE PAINTING WORK AND PRIOR TO REWATERING, REINSTALL THE CATHODIC PROTECTION SYSTEM.
NOTE: EACH ANODE AND ASSOCIATED CONDUCTOR SHALL BE REINSTALLED IN PRECISELY IT'S ORIGINAL LOCATION AND TERMINATED TO PRECISELY IT'S ORIGINAL TERMINAL. ANY COMPONENTS OF THE CATHODIC PROTECTION SYSTEM THAT IS DAMAGED DURING THE CONTRACT PERIOD SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.



RECTIFIER CKT	GATE ANODE POSITION #
1	1,2,3,6,7,8
2	4,5,9,10
3	11
4	12
5	13
6	14,15
7	16,17
8	18,19

TERMINAL CABINET CONNECTIONS



US Army Corps of Engineers
Jacksonville District
SAFETY ON THIS JOB DEPENDS ON YOU

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

DESIGNED BY: []
CHECKED BY: []
DATE: []

SCALE: AS SHOWN

DATE: MAR 2003
D. O. FILE NO. 90C-38.319

CANAVERAL HARBOR, FLORIDA
CANAVERAL LOCK
PAINTING AND OTHER REPAIRS
ELECTRICAL
CATHODIC PROTECTION

DRAWING NO. 16/8
A