A-E
PERFORMANCE SPECIFICATION

PROJECT FILE NO. 021052

OU 7-10 GLOVEBOX EXCAVATOR METHOD PROJECT

Retrieval Confinement Structure

Prepared for:
U.S. Department of Energy
Idaho Operations Office
Idaho Falls, Idaho

INEEL
Idaho National Engineering
and Environmental Laboratory
# DOCUMENT MANAGEMENT CONTROL SYSTEM (DMCS)

## DOCUMENT APPROVAL SHEET

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### REVIEW AND APPROVAL SIGNATURES

Denote R for review concurrence, A for approval, as appropriate.

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### RECORDS MANAGEMENT

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- 519891 A-3 Views
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- 519894 A-6 Roof Plan, Details and Legend
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APPENDIX C – Penetrations, Attachments, and Interfaces for RCS and Related Structures

APPENDIX D – Fire Protection Piping Layout Drawings (For Information Only)
  - FP-4 WES Lower
  - FP-8 RCS Plan

APPENDIX E – Proposed Lighting Fixture Vendor Cut Sheets and Layout Drawing

APPENDIX F – Retrieval Confinement Structure Analysis and Loading Criteria (For Information Only)

APPENDIX G – Form 540.04, Certificate of Conformance
1. SCOPE

1.1 General

The work includes design, fabrication, inspection, testing, shipping, handling, and erection supervision of a complete modular panel retrieval confinement structure (RCS) for the OU7-10 Glovebox Excavator Method Project, as shown on the attached drawings. Included are design and fabrication of personnel doors, windows, portholes, interface elements, and all associated hardware, seals, and gaskets. Also included are all accessories and items necessary for the scope and intended use and as specified herein. Unless specifically noted otherwise in this specification the acronym RCS will refer to the group of areas shown on the drawings as (RCS, transfer vestibule overburden area, personnel access areas, and personnel monitoring area)

1.2 Work Included

1.2.1 Design Phase

The design of the RCS includes, but is not limited to, the preparation of calculations and drawings.

The deliverables required at the end of the design phase include but are not limited to “D” size shop drawings including electronic files for the drawings, approved design calculations, erection instructions, and peer review certification as described in the "Submittals" section below.

The design phase will be considered complete when all the vendor data items listed in the Section 4, Submittals, have received a "work may proceed" disposition.

1.2.2 Fabrication Phase

The RCS shall be fabricated upon completion of the design phase and shipped to the INEEL for erection. In-plant inspection of the fabrication process shall be made by Bechtel BWXT (BBWI) quality representatives and design engineers, in addition to the inspections performed by the Supplier.

1.2.3 Installation Phases

On-site Supplier support shall be provided for a period of two to three weeks on two separate occasions, separated by approximately six months. First, the confinement Supplier shall provide a full-time installation consultant for a period of approximately three weeks to oversee the erection of the confinement structure. The INEEL Site Stabilization Agreement requires site construction to be done by construction trades with workers supplied by the local trade unions. Therefore, the building will be assembled by local union ironworkers.
Second, the confinement Supplier shall provide a full-time installation consultant for a period of approximately two weeks to oversee the sealing of joints and penetrations. The consultant shall also be present to observe the testing phase following the sealing of the joints and penetrations.

1.3 Work Not Included

1.3.1 Erection

The erection of the RCS is not included in the scope of work included in this specification.

1.3.2 Final Structure Testing

BBWI will be responsible for carrying out the final structure testing. This testing will have at least four phases.

First, the structure shall be pressurized to -0.5 in. water column and subjected to a bubble test (use “Snoop” or equal) at all the panel joints and penetration perimeters. Additional caulk and tape shall be applied as necessary to meet acceptance criteria as follows: No observed bubble of 1 mm diameter or greater in any 10 second period.

Second, a structural and joint seal integrity pressure test up to a maximum negative pressure of 4.0 inches, water column, shall be conducted for the RCS (excludes the transfer vestibule overburden, personnel access, and personnel monitoring areas).

Third, the first pressure test shall be repeated and the impact of the second test on joint seal integrity shall be evaluated.

Fourth, the RCS panel joints and penetration perimeters (excluding the transfer vestibule overburden, personnel access, and personnel monitoring areas) shall be tested with a “smoke pencil” under a positive pressure of 0.5 inch, water column. Additional caulk and tape shall be applied as necessary to meet acceptance criteria as follows: No smoke applied at a joint or penetration is observed as moving under a pressure differential from the inside of the confinement to the outside.

2. QUALIFICATIONS

2.1 General

Supplier shall be regularly engaged in the design and fabrication of modular panel confinement type structures. The confinement supplier shall have at least twelve years experience in designing, manufacturing, and field servicing pre-engineered, modular panel confinements for use in radiological contamination areas. All design work shall be accomplished under the responsible charge of a Professional Engineer registered in the State of Idaho to
practice civil or structural engineering with at least 5 years experience in the design of this type of structure. All drawings shall be compatible with the latest version of AutoCad and prepared by experienced drafters with at least 2 years experience working on this type of structure. Erection consultation will be performed by a person with at least 10 years experience installing structures of this type.

3. APPLICABLE CODES, PROCEDURES, AND REFERENCES

3.1 National Design Codes and Material Specifications

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC (ASD) Specification for Structural Steel for Buildings--Allowable Stress Design (ASD)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A 6 General Requirements For Rolled Steel Plates, Shapes, Sheet Piling, and Bars For Structural Use.
A 36 Structural Steel
A 167 Stainless Steel and Heat Resisting Chromium Nickel Steel Plate, Sheet, and Strip
A 240 Heat-Resisting Steel Plate, Sheet, and Strip For Fusion Welded Unfired Pressure Vessels
A 276 Stainless Steel Bars and Shapes
A 307 Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
A 500 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
A 529 Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality
A 563 Carbon and Alloy Steel Nuts
A 992 Steel for Structural Shapes for Use in Building Framing

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7-98 Minimum Design Loads for Buildings and Other Structures
3.2 Drawings

See drawings attached as Appendix B.

4. SUBMITTALS

4.1 General

General Procedures: Vendor data, whether prepared by the Supplier or Supplier’s subtier shall be submitted as instruments of the Supplier. Therefore, prior to submittal, the Supplier shall ascertain that material and equipment covered by the submittal and the contents of the submittal itself, meet all the requirements of the subcontract specifications, drawings, or other contract documents.

Each submittal shall contain identification for each separable and separate piece of material or equipment, and literature with respect to the information provided in the specification and on the Vendor Data Schedule. Submittals shall be numbered consecutively for each different submittal.

Vendor Data Schedule: Vendor Data required by this specification or the drawings to support design, construction, and operation of the project is identified on the Vendor Data Schedule included in Appendix A. The Vendor Data Schedule provides a tabular listing by item number, drawing or specification reference, and description of the item or service. The type of submittal is identified by a “Vendor Data Code”, and the time required to submit the item is identified by a “When to Submit” code. An “Approval” code specifies whether the submittal is for Mandatory Approval or for Information Only. One copy of routine paper or electronic file submittals are required; additional copies may be required by the Vendor Data Schedule. Electronic file submittals are preferred.
Construction Vendor Data Transmittal and Disposition Form: All vendor data shall be submitted to the Contractor using the Construction Vendor Data Transmittal and Disposition Form. The form provides the Supplier a convenient method to submit vendor data and provides the Contractor a means of dispositioning the submittal. The Supplier shall list the Vendor Data Schedule item number, a Vendor Data Transmittal tracking number (if applicable), the drawing or specification number reference, a Tag Number (if applicable), the submittal status (e.g., Mandatory Approval, Information Only, Re-submittal, or Or-equal), the Revision Level, and the item Description. The description should include the heat or lot number for items requiring Certified Mill Test Reports.

Disposition by the Contractor: The Contractor’s comments and required action by the Supplier will be indicated by a disposition code on the submittal. The disposition codes will be classed as follows:

(A) “Work May Proceed.” Submittals so noted will generally be classed as data that appears to be satisfactory without corrections.

(B) “Work May Proceed with Comments Incorporated. Revise Affected Sections and Resubmit.” This category will cover data that, with the correction of comments noted or marked on the submittal, appear to be satisfactory and require no further review by the Contractor prior to construction. Revised drawings shall be provided upon request.

(C) “Work May NOT Proceed. Revise and Resubmit.” Submittals so dispositioned will require a corrected resubmittal for one of the following reasons:

1) Submittal requires corrections, per comments, prior to final review.
2) Submittal data incomplete and requires more detailed information prior to final review.
3) Submittal data does not meet Subcontract document requirements.

(D) “Accepted for Use. Information Only Submittal.” Submittals so dispositioned will generally be classified as Information Only for as-specified material and equipment.

Mandatory Approval coded vendor data will be reviewed by the Contractor and receive an A, B, or C disposition. Information Only submittals without comments will receive a D disposition. A, B, and C coded dispositioned submittals will be returned to the Supplier. D dispositioned submittals will not be returned to the Supplier. The Contractor may provide internal review of Information Only submittals. In the event that comments are generated on an Information Only submittal, the submittal may be dispositioned B or C and returned to the Supplier for appropriate action. Acknowledgment of receipt of dispositioned vendor data by the Supplier will not be required.
The Contractor will return dispositioned submittals with reasonable promptness. The Supplier shall note that a prompt review is dependent on timely and complete submittals in strict accordance with these instructions.

All Vendor Data must be dispositioned A or D before the subcontract can be considered complete.

### 4.2 Qualifications

Submit a letter certifying that the Supplier qualifications listed under Section 2.1 will be met and maintained during the performance of this specification.

### 4.3 Design Calculations

Design calculations documenting the detailed design of the confinement structure shall be submitted. Design loads and load combinations considered shall be clearly addressed. Each component of the structure shall be shown to be adequate for all applicable loads. All final submittals of calculations shall be provided in a loose-leaf binder and shall include the title and purpose of the calculation, a table of contents or index, complete list of references, design basis and complete list of assumptions (if any), methodology, and sufficient information to allow independent verification of the calculation. Where computer software is used the following shall be documented: 1) program name, 2) program version number, 3) reference to program's verification and validation information, 4) description of the model, including where appropriate, plots showing the overall model and plots showing specific details of complex or unusual features and their modeling, 5) discussion of program options and/or solution methods, 6) inputs and outputs, 7) discussion of results obtained, including appropriate plots and/or comparison tables. All calculations shall be performed under the responsible charge of a Professional Engineer registered in the State of Idaho to practice civil or structural engineering. The calculations shall be stamped by this same professional engineer. The calculation report shall also include an indication that the calculations have gone through a detailed review or check.

### 4.4 Peer Review of Design Calculations

Submit a letter from an independent engineer certifying that all aspects of the seismic design have been peer reviewed and that resulting comments have been satisfactorily resolved and incorporated into the design calculations. The review should include design philosophy, structural system, construction materials, design criteria used, and other factors pertinent to the seismic capacity of the facility. The review need not provide a detailed check but rather an overview to help identify oversights, errors, conceptual deficiencies, and other potential problems that might affect facility performance during an earthquake. The peer review is to be performed by independent, qualified personnel. If the peer reviewer is from the same company/organization as the designer/evaluator, he must not be part of the same program where he could be influenced by cost and schedule considerations. Individuals performing peer reviews must be degreed civil/structural engineers with 5 or more years of experience in seismic
evaluations. A resume listing experience details shall be attached to the submitted letter of certification.

### 4.5 Shop Drawings

Submit "D" size shop drawings showing layouts, member sizes, panel thickness, weld details, rivet size, type, and spacing details, and other fabrication details (including penetration framing details) to be used by the fabricator in making the modular panels. A method for identifying “structural welds” per AWS D1.1 shall be devised and clearly shown on the shop drawings. All drawings shall be prepared under the responsible charge of and stamped by a Professional Engineer registered in the State of Idaho to practice civil or structural engineering.

### 4.6 Erection Drawings

Submit erection drawings showing complete erection layouts, erection details (including foundation attachment and sealing), and any special rigging diagrams.

### 4.7 Erection Instructions

Submit complete installation instructions, special rigging procedures, recommended erection tools, and foundation attachment details. The confinement may be subjected to wind loads during erection. Erection instructions shall include recommendations for the application and removal of temporary bracing. Information relating to recommended cleaning procedures, joint caulking methods, and joint tape sealing techniques (i.e. off-set layers, double layers) shall be included. All drawings shall be stamped by a Professional Engineer registered in the State of Idaho to practice civil or structural engineering.

### 4.8 Welder Qualifications

Submit welder qualifications for approval prior to performance of any welding.

### 4.9 Weld Procedures

Submit welding procedure specifications and procedure qualification records. These procedures shall be referenced on the shop drawings.

### 4.10 Nondestructive Examination Procedures

Submit nondestructive examination procedures that establish detailed inspection procedures and acceptance criteria for the nondestructive examination required in accordance with the requirements specified in Section 7, Quality Assurance.
4.11 Inspector Qualifications

Submit Supplier's nondestructive examination personnel qualification records. The Supplier’s nondestructive examination (including visual examination) personnel shall be qualified for the applicable nondestructive testing method in accordance with the requirements of ASNT SNT-TC-1A for Levels I, II, or III as applicable. Qualification as an AWS Certified Weld Inspector is an acceptable alternative for visual examinations of welds.

4.12 Certificates of Conformance

The Supplier shall obtain and furnish certifications from its suppliers that the following items conform to the material requirements specified herein and in the each supplier’s engineering documents: stainless steel panels, structural framing members, bolts, nuts, rivets, doors, Lexan™, sealing tape, and sealing gaskets. Supplier certification shall be documented utilizing Contractor Form 540.04, Certificate of Conformance, as included in Appendix G. Certification shall be complete, accurate, legible, and reproducible. Incomplete or inaccurate certifications will be refused.

4.13 Spares and Replacement Parts

The Supplier shall submit a Recommended Spare and Replacement Parts List(s). The list shall provide the name and address of the original supplier of each spare and/or replacement part, the part's drawing and/or specification identity and QA data, and the part's estimated procurement lead time.

4.14 Manufacturing, Inspection, and Test Plan

The Supplier shall submit a manufacturing, inspection, and test plan. The plan shall detail the fabrication, assembly, installation, inspections, and/or tests to be performed (for inspections and test plan portion see requirements outlined in Section 5.9, Special Inspection and Test Plan). The plan shall be submitted prior to Supplier initiation of any manufacturing, inspection, or test activity for incorporation of Contractor source inspection points.

4.15 Inspection Report

The Supplier shall submit an inspection report detailing the results of the nondestructive inspections completed prior to delivery on-site and as outlined in Section 7, Quality Assurance.

4.16 Mockup Study Report

The Supplier shall submit a study report detailing the results and lessons learned from the mockup study including structural/joint seal integrity test, system leakage tests, and “smoke pencil” test as outlined in Section 1.3.2, Final Structure Testing. Report should include recommendations for joint and penetration design details that will facilitate meeting the acceptance criteria for the final structure.
4.17 Packaging, Handling and Shipping Instructions

Submit any special packaging, handling or shipping instructions prior to shipping of any components. Any procedures necessary for safe handling of components should be noted in the instructions.

4.18 Material Safety Data Sheets

Supplier shall submit a list of hazardous chemicals and substances in accordance with the General Conditions.

4.19 Operation And Maintenance (O&M) Manuals

Submit operation and maintenance manuals for coiling door and motor. O&M manuals for manufacturer’s standard items shall, unless otherwise specified, be the standard publication issued for the product by the manufacturer.

5. DESIGN

5.1 General Design Criteria

The structure shall be designed in accordance with recognized building code standards using methodology and loading combinations from the International Building Code (IBC). Loading combinations to be used in design are further clarified in Appendix F. Structural members shall not be designed in excess of their allowable stress limits (allowable stress design) for the design loads given below. Appropriate safety factors to yield and ultimate must be maintained.

5.2 Mockup Study

Prior to fabrication, a mockup study shall be conducted by the RCS Supplier. The mockup study shall include the required manufacturing and assembly of a structure representative of the final structure. Dimensions shall be 12 feet square x 8 feet high (nominal) and include at least one personnel door (with Lexan™ viewing window), at least one 4 ft x 8 ft Lexan™ observation window (with two integrated glove ports), and at least one 2 ft x 2 ft Lexan™ observation window. The confinement shall also include piping penetrations through reinforced panels that are representative of those to be placed in the final structure. Also, the mockup structure shall be caulked and taped at the joints in a manner that represents the method to be used in the final structure. Application of pressure and evaluation techniques for leakage of the mockup structure are the same as outlined in Section 1.3.2, Final Structure Testing, except that the quality assurance requirements per the specification are not applicable.
5.3 Dimensions and Layout

The RCS structure itself (excluding the transfer vestibule overburden, personnel access, and personnel monitoring areas) shall have the following nominal interior dimensions. See drawings in Appendix B for more detailed information.

- Overall Width: 27 ft.
- Overall Length: 52 ft
- Overall Height: 24 ft

Dimensions of other areas are as shown on the drawings in Appendix B.

5.4 Seismic

Seismic loads shall be determined and applied in accordance with the IBC with parameters as follows: $S_1$, period acceleration $= 0.3578$, 1-sec acceleration, $S_1 = 0.131g$, Site Class C, Seismic Importance Factor $= 1.5$ for structures and components, and Seismic Use Group III.

5.5 Roof Loads

At a minimum, the structure shall be capable of supporting a roof live load (construction/maintenance type loads) of 20 pounds per square foot applied to the framing, and any probable arrangement of loading resulting in the highest stress in the framing members. Framing members shall also be capable of supporting a minimum concentrated load of 250 lbs applied to the framing at any probable arrangement of loading resulting in the highest stress in a framing member.

5.6 Collateral Loads

The RCS shall be capable of supporting all additional dead loads, other than the weight of the building system, such as fire sprinklers, cameras, electrical conduit, mechanical HVAC systems, and electrical systems. Alternatively, a collateral load of 6 pounds per square foot shall be applied to the RCS walls and roof.

5.7 Internal Pressure Load

The assembled RCS confinement itself (excluding the transfer vestibule overburden, personnel access, and personnel monitoring areas) shall be designed to be structurally adequate to withstand a negative pressure of 4.0 inches, water column (abnormal event). The 4.0 inch negative internal pressure load is not required to be considered concurrently with seismic load combinations. The personnel access areas shall be designed to be structurally adequate to withstand a negative pressure of 1.0 inch, water column (operating condition). The transfer vestibule overburden and personnel monitoring areas shall be structurally adequate to withstand a negative pressure of 0.5 inch, water column (operating condition).
5.8 Additional Design Criteria

The modular panels shall be designed for rapid field erection. Panel interchange shall allow contiguous panels to be positioned horizontally and vertically in the same plane.

Doors into the RCS confinement itself (excluding the transfer vestibule overburden, personnel access, and personnel monitoring areas) will be specially designed to be air tight under a test pressure of 0.5 in, water column. A removable threshold will be required at the double door to facilitate subsequent removal of overburden through this opening. The threshold will then require replacement and the door re-sealed prior to waste removal operations.

Catwalk type planking layout with attached safety handrail shall be designed by the RCS Supplier. Arrangement shall be as contiguous as possible and accessible from an appropriate roof edge. Further, the layout must be such that each light fixture and camera can be safely maintained from the catwalk planking members. RCS Supplier shall provide planking, handrail, and all attachment hardware. Handrail design shall conform to CFR 1910 as applicable.

Anchorage studs with appropriate sealing washers and nuts shall be designed and provided by the RCS Supplier at appropriate locations for attachment of fire sprinkler piping on the interior of the RCS. See Appendix D for sizes and layout of fire sprinkler piping within the RCS. Positional tolerance of piping as shown in Appendix D shall be + or – 6 inches. Actual attachment hardware and installation of piping shall be by others.

Lighting and camera mounting brackets, attachment method, and attachment hardware shall be designed and provided by the RCS Supplier. Information required for the design of brackets is shown in Appendix E and on the drawings. Lighting fixtures are not required to be supplied by the RCS Supplier. Approximate locations of Life Safety equipment is also shown on the drawing in Appendix E. RCS Supplier shall ensure that framing members, as needed for attachment of this equipment, are provided in appropriate locations.

5.9 Special Inspection and Test Plan

As required by the IBC, the design of the seismic restraint system and its members or elements shall include a special inspection and test plan prepared by a registered design professional. The plan shall identify the following: 1) the designated systems or elements that are subject to the plan, 2) the special inspection and testing to be provided, including the applicable reference standards and codes, 3) the type and frequency of testing required, 4) type and frequency of special inspections required, 5) the structural observations to be performed during erection or assembly.

The design of the pressure resisting system and its members or elements (including, but not limited to, rivets, panels, doors and windows) shall also include a special inspection and test plan prepared by a registered design professional. The plan shall identify the same items as listed above, as applicable.
As a minimum, inspection and test plans shall include inspections as required by the IBC and by AWS D1.1

6. MANUFACTURING AND ASSEMBLY

6.1 General

All materials used in the structure shall be new, without defects, and free of repairs. Quantities of materials to be provided for erection and assembly shall be sufficient considering an appropriate waste factor. Modular panels shall be pre-assembled to the maximum extent possible prior to delivery on-site. BBWI will notify Supplier no less than one month prior to start of the second installation phase described in Section 1.2.3. Joint and penetration sealing materials (including silicone and joint sealing tape) shall be shipped to the project site two weeks prior to the second installation phase.

6.2 Materials

6.2.1 Stainless Steel Panels Including Sheet and Strip Material

ASTM A 167 or ASTM A 240, 300 series stainless steel, cold-rolled, annealed, and pickled with No. 2B finish on the outside surface. Inside surface is to receive a No. 4 finish. Stainless steel types 304L and 316L may be substituted for types 304 or 316. Thickness shall be 22 gauge, minimum.

6.2.2 Shapes and Bars for Frames and Structural Members

Shapes and bars shall be of ASTM A 36 structural quality carbon steel or ASTM A 992 steel shapes. Rolled steel plates, bars, and shapes shall be defined in ASTM A 6.

6.2.3 Personnel and Overburden Transfer Doors and Door Hardware

Doors for personnel access shall be pre-hung with the modular panel. Doors shall be one piece honeycomb construction fabricated from 20 gauge steel and 16 gauge cold rolled steel frame work (minimum). Doors to have viewing windows in accordance with Section 6.2.6. Doors to be finished as specified in section 6.3.2. Doors shall have integral thresholds unless otherwise specified herein or on the drawings. Provide simple pull and push plate egress hardware on all doors with the exception of doors leading to and from the RCS confinement itself (excludes the transfer vestibule overburden, personnel access, and personnel monitoring areas) which shall be provided with lock sets (lockable from exterior) as specified below. All door hardware shall conform to the requirements of NFPA 101.

Provide lock sets and cylinders compatible with Government-furnished and installed Medeco High Security Locks “KeyMark” 7-pin interchangeable cores and Medeco High Security cams.
6.2.4 Coiling Door

Painted carbon steel slats. Electric 120/208 volt, single phase or three phase. Do not supply 240 volt motor.

6.2.5 Windows and Portholes in Confinement Walls or Roof

Lexan™ MR-AC as manufactured by General Electric. Sizes and locations as indicated on the drawings.

6.2.6 Windows in Personnel Doors

Lexan™ MR-AC as manufactured by General Electric. Sizes and locations as indicated on the drawings.

6.2.7 Joint Tape

Joint tape shall be flame-retardant polyethylene, 5 in wide minimum, gray in color with rubber based pressure sensitive adhesive. Adhesion to steel shall be 30 oz. per inch width, minimum.

6.2.8 Silicone Sealant

100% silicone sealant (white) for interior applications.

6.2.9 Sealing Gaskets

Gasketing material must be compatible with chlorinated solvents (such as flouroelastomer (Viton) or flourosilicone sponge rubber (closed cell). Notably, chloroprene (Neoprene) and synthetic rubber are not acceptable for use unless the gasket will be completely isolated from potential exposure to chlorinated solvents which may be present due to excavation operations within the RCS proper.

6.2.10 Panel Attachment Rivets

Rivets shall be 3/16” Stavex Lo-Profile Head rivets, as manufactured by Avdel Cherry Textron Inc.

6.2.11 Bolts, Nuts, Studs, and Washers for Attachments and Accessories

ASTM A 307, commercial grade. Standard bolts shall be regular hexagon head type. Nuts shall be plain hexagon type.

6.2.12 High Strength Bolts, Nuts, and Washers for Structural Framing Members

ASTM A 325, Type 1, commercial grade, including heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers. High strength bolts shall exhibit grade marks and
and fasteners without headmarkings, or with headmarkings identified on the United States Department of Energy (DOE) Headmark List, are prohibited.

6.3 Fabrication

6.3.1 Welding

The Supplier shall establish and qualify Weld Procedure Specifications (WPS) for any off-site welding performed during this subcontract in accordance with the requirements of AWS B2.1, D1.1 or D1.6 as applicable. Off-site welding shall be performed by welders or operators qualified in accordance with AWS B2.1, D1.1 or D1.6 as applicable.

6.3.2 Painting

Carbon steel components shall be coated with the standard factory coating (Supplier’s standard blue or green), to resist rusting and mild acidic or caustic washing. Fabricated structural steel elements, or any pre-finished components that have undergone welding or other processes that would compromise the original manufactures finish shall be finished as follows:

Exposed steel shall be prepared in accordance with Steel Structures Painting Council (SSPC) specification SP-3, Power Tool Cleaning to remove all loose rust, loose mill scale, or residual paint.

After surface preparation, the steel shall be washed with a liquid phosphate high-pressure spray system prior to application of the finish coating.

After washing, the steel shall be primed and finish painted with a single part urethane coating. Painting shall be done in accordance with the manufactures recommended application instruction.

6.3.3 Panels and Joints

Interior panel joints and seams must be able to be readily sealed subsequent to building assembly. Additionally, the application method of caulking and taping at joints must be such that a seal is not compromised upon application of a negative pressure of 4.0 inches, water column.

Each stainless steel sheet on a panel shall have the edges set back slightly from the edge of the steel frame. This will preclude the sheathing from exposing raised/sharp edges.

Each stainless steel sheet panel shall have a crossbuck crease. This crossbuck creasing feature will increase the rigidity of the sheet metal and reduce the possibility of an "oil canning" effect.
6.3.4 Fabrication Process Control

Shop travelers or other work controlling documents, drawings, and specifications will be controlled to ensure only approved documents are used during material procurement and fabrication of the RCS. The controls placed on the work document shall include specific identification of each document, date of release, and approval signature(s).

6.3.5 Material Traceability

The Supplier’s material controls shall include identification to parts of the assembly, and traceability of materials to Certificates of Conformance.

7. QUALITY ASSURANCE

7.1 General

The RCS shall be designed, fabricated, erected, and tested per the requirements of this specification.

7.2 Nondestructive Examinations

The Supplier shall conform to the approved special inspection and test plan as outlined in Section 5.9, Special Inspection and Test Plan. As a minimum, nondestructive examination by the Supplier will consist of visual inspection of all “structural welds” as identified on the approved shop drawings. Visual inspection procedure and acceptance criteria shall conform to requirements of AWS D1.1.

7.3 Procurement Document Control

Supplier’s procurement documents shall identify appropriate test, inspection, and acceptance criteria for determining acceptability of the item or service. Copies of all procurement documents and material certifications shall be made available for review by BBWI the representative.

7.4 Document Control

The Supplier shall control all changes made to shop travelers, drawings, inspection or welding procedures or other design/fabrication documents using revision controls.

7.5 Measuring and Test Equipment

The fabricator and inspection subcontractors must ensure that any measuring and test equipment (calipers, torque wrenches, flow meter, etc.) are calibrated if used to verify critical characteristics of the design or fabrication. For example, torque wrenches to torque high-
strength fasteners must be calibrated. Calibration records shall be available for inspection by the BBWI representative.

7.6 Inspection Status

The fabricator must maintain status of items awaiting inspection or testing. The statusing process will ensure that items that are awaiting inspection or testing are clearly identified on the items or in documents traceable to the item (for example: travelers). The inspection subcontractor must authorize removal of the status tags, if used.

7.7 Nonconforming Items/ Corrective Actions

Items that do not conform to specified design requirements shall be controlled to prevent inadvertent installation or use. Those items shall be identified and segregated in a designated hold area until dispositioned or disposed. Non-conformances will be documented and approved by the engineer-of-record and submitted to BBWI on Supplier Interface Document (Form 540.16).

The Supplier shall determine and document the cause of and the corrective action for the nonconformance(s). BBWI shall be notified of corrective actions taken to prevent recurrence.

7.8 Quality Assurance Records

The Supplier must protect all design, fabrication, testing, and material documentation from loss, deterioration, or damage prior to submittal to BBWI per the Vendor Data Schedule.

8. PACKAGING AND SHIPPING

8.1 Piece Marking and Identification

All individual parts or bundles of packages of identical parts are to be clearly marked for identification or otherwise identified by clear installation procedures. Bolts and fasteners shall be packaged according to type, size, and length. Loose nuts and washers shall be packaged according to size and type. The shipping documents shall include a shipping list showing the description, quantity, and piece mark of the various parts, components, and elements.

8.2 Packaging

Parts shall be packaged to protect from damage during transportation to the job site and during erection.

8.3 Material Delivery

The building system materials shall be delivered to the project site between the hours of 7 a.m. to 4 p.m Monday through Thursday. Unloading will be accomplished by a construction
contractor with union labor. Supplier shall include documentation that describes the recommended method of off-loading with all items in each shipment. Supplier shall also include any special off-loading devices (e.g. special slings) as recommended.

8.4 Handling

At no time shall materials be dropped, thrown, or dragged over the transport equipment or the ground. Materials shall be protected at all times from standing water. Supplier shall include instructions for proper storage.
Appendix A
Vendor Data Schedule
**Vendor Data Schedule**

**Project Title**: OU 7-10 GLOVEBOX EXCAVATOR METHOD PROJECT RETRIEVAL CONFINEMENT STRUCTURE

**System Engineer/Project Manager**: JENSEN SCOTT A  
**Date**: 02-APR-02  
**Rev.**: 1

**Vendor Data Coordinator Address**: POOLE M ANNETTE, TSB-1WH201, MS: 3930

### Vendor Data Codes

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<th>Code Description</th>
<th>Code Description</th>
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<td>A. As-Built Details</td>
<td>B. Assembly Drawings</td>
<td>C. Attendance Record</td>
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<tr>
<td>D. Blasting Plan</td>
<td>E. Catalog Data</td>
<td>F. Chem &amp; Physical Analysis</td>
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<td>G. Concrete Mix Design</td>
<td>H. Control System Diagram</td>
<td>I. Design Calculations</td>
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<td>M. Parts List</td>
<td>N. Piping Drawing</td>
<td>O. Process/Instructions</td>
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<td>Q. Personnel Qualifications</td>
<td>R. Red_line Drawings</td>
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<td>S. RSF &amp; Maintenance Log</td>
<td>T. Sample(Color, Texture, etc.)</td>
<td>U. Shop Drawings</td>
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<td>V. Survey Records</td>
<td>W. Test Procedure</td>
<td>X. Special Processes</td>
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<td>Z. Test Reports</td>
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<td>AF. Hardware Schedule</td>
<td>AG. Specification</td>
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<td>AI. Test Certification</td>
<td>AJ. Recommended Spares</td>
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<td>AK. Special Tools List</td>
<td>AL. Certificate of Conformance</td>
<td>AM. Certificate of Disposal or Destruction</td>
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### When to Submit

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**Purchase Order/Work Order/Subcontract No.**: 021052

**TS - Time of Shipment**: WP - With Proposal

**http://thomar2.inel.gov/pls/vds/vdcs_reports.vdcs_schedule?swp_identifier=21003**

**4/4/2002**
## Vendor Data Schedule

### Instructions:
1. Refer to subcontract documents for instructions on submittals.
2. Electronic submittals in lieu of paper documents are acceptable and encouraged.
3. The normal number of copies required is ONE. If more are required, the number will be shown here.
4. THE INEEL WILL SCAN ALL SUBMITTED VENDOR DATA INTO A SYSTEM THAT IS ACCESSIBLE TO ALL INEEL EMPLOYEES UNLESS THE SUPPLIER/SUBCONTRACTOR IDENTIFIES SUBMITTED INFORMATION AS PROPRIETARY.

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Appendix B

Drawings
Appendix C
Penetrations, Attachments, and Interfaces for RCS and Related Structures
## PENETRATIONS, ATTACHMENTS and INTERFACES

for RCS and RELATED STRUCTURES

<table>
<thead>
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<th>I.D. No.</th>
<th>SYSTEM</th>
<th>STRUCTURE</th>
<th>PENETRATION SIZE</th>
<th>LOCATION</th>
<th>PHYSICAL WEIGHT in lb.</th>
<th>POWER REQUIREMENT</th>
<th>CRITICAL DESIGN CONSIDERATIONS SIGNIFICANT CHARACTERISTICS</th>
<th>STRUCTURAL SUPPORT REQUIRED</th>
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<tr>
<td>PERS MON 1</td>
<td>Insulated, Overhead Coiling Equipment door</td>
<td>Through WES wall as noted on drawings</td>
<td>nom 14&quot; x 12&quot; opening</td>
<td>North of center of the west facing wall of WES.</td>
<td>Skirt around opening</td>
<td>Exterior mount, vertically supported. Provide opening for door to be mounted on exterior of weatherproof enclosure structure</td>
<td>No special requirements</td>
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<tr>
<td>TRANS/VEST 2</td>
<td>Insulated, Overhead Coiling Equipment door</td>
<td>Through Transfer Vestible wall as noted on drawings</td>
<td>10'-0&quot; x 10'-0&quot; opening</td>
<td>North end of Transfer Vestible into the WES.</td>
<td>Provide power operated OH door, shipping wt 1535 lb</td>
<td>Exterior mount, to WES side, vertically supported. Provide adequate structural support for selected door assembly</td>
<td>Vertically supported No special requirements</td>
<td></td>
<td></td>
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<tr>
<td>TRANS/VEST 3</td>
<td>Personnel Door</td>
<td>Through WES wall as noted on drawings</td>
<td>3'-0&quot; x 7'-0&quot; aff</td>
<td>Towards north end of the west facing wall of WES.</td>
<td></td>
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<td>PERS MON 4</td>
<td>Personnel Door</td>
<td>From WES into personnel monitoring area</td>
<td>3'-0&quot; x 7'-0&quot; aff</td>
<td>Through common wall between WES and Personnel Monitoring</td>
<td>Provide 2'x2' viewing life in personnel door.</td>
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<td>PERS MON 5</td>
<td>Personnel Door</td>
<td>From personnel monitoring area into Transfer Vestible</td>
<td>3'-0&quot; x 7'-0&quot; aff</td>
<td>Through common wall between the Personnel Monitoring Area and Transfer Vestible.</td>
<td>Provide 2'x2' viewing life in personnel door.</td>
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<tr>
<td>RCS 6</td>
<td>Personnel Door</td>
<td>From RCS to Personnel Access</td>
<td>3'-0&quot; x 7'-0&quot; aff</td>
<td>Through common wall between the RCS into Personnel Access</td>
<td>To accommodate protected personnel entry for unique activities. Provide 2'x2' viewing life in personnel door.</td>
<td>Tight seal critical to maintenance of negative air pressure.</td>
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<td>RCS 7</td>
<td>Personnel Door</td>
<td>From Personnel Access to Monitoring</td>
<td>3'-0&quot; x 7'-0&quot; aff</td>
<td>Through common wall between the Personnel Access and Personnel Monitoring Area</td>
<td>To provide change area and airtight for personnel entry to a contaminated area. Provide 2'x2' viewing life in personnel door.</td>
<td>Tight seal critical to maintenance of negative air pressure.</td>
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<tr>
<td>RCS 8</td>
<td>Pair of 3'-0&quot; x 7'-0&quot; Personnel Door</td>
<td>Through RCS wall as noted on drawings</td>
<td>6'-0&quot; x 7'-0&quot; aff</td>
<td>From RCS to Transfer Vestible</td>
<td>Accommodate movement of soil sacks prior to process operations. Provide 2'x2' viewing life in each door panel.</td>
<td>Tight seal critical to maintenance of negative air pressure.</td>
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<td>RCS 9</td>
<td>Personnel Door</td>
<td>From vestibule as shown on drawings</td>
<td>3'-0&quot; x 7'-0&quot; aff</td>
<td>Towards south end of the west facing wall</td>
<td>Emergency only, personnel exit door. Provide 2'x2' viewing life in personnel door.</td>
<td>Tight seal critical to maintenance of negative air pressure.</td>
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<td>RCS 10</td>
<td>Personnel Door</td>
<td>From vestibule into WES area as shown on drawings</td>
<td>3'-0&quot; x 7'-0&quot; aff</td>
<td>Vestibule located towards southwest end of the RCS.</td>
<td>Emergency only, personnel exit door from vestibule. Provide 2'x2' viewing life in personnel door.</td>
<td>Tight seal critical to maintenance of negative air pressure.</td>
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<tr>
<td>RCS 11</td>
<td>(6) ea Lexan Windows</td>
<td>Northeast RCS wall</td>
<td>2'-0&quot; x 2'-0&quot; ea</td>
<td>Locate Lexan windows for viewing and cameras through RCS wall where shown on drawings</td>
<td>60 lb ea</td>
<td>All windows shall be sealed to withstand the negative air pressure required in the process area.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCS 12</td>
<td>(4) ea Lexan Windows</td>
<td>East RCS wall</td>
<td>2'-0&quot; x 2'-0&quot; ea</td>
<td>Locate Lexan windows through RCS wall where shown on drawings</td>
<td>60 lb ea</td>
<td>All windows shall be sealed to withstand the negative air pressure required in the process area.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCS 13</td>
<td>(3) ea Lexan Windows</td>
<td>Southeast RCS wall</td>
<td>2'-0&quot; x 2'-0&quot; ea</td>
<td>Locate Lexan windows through RCS wall where shown on drawings</td>
<td>60 lb ea</td>
<td>All windows shall be sealed to withstand the negative air pressure required in the process area.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** List all penetrations through the WES, FFS, RCS and Gloveboxes. *Specific Structure affected*
<table>
<thead>
<tr>
<th>I.D. NO.</th>
<th>SYSTEM</th>
<th>STRUCTURE</th>
<th>PENETRATION SIZE</th>
<th>LOCATION</th>
<th>PHYSICAL WEIGHT in lb. POWER REQUIREMENT</th>
<th>CRITICAL DESIGN CONSIDERATIONS SIGNIFICANT CHARACTERISTICS</th>
<th>STRUCTURAL SUPPORT REQUIRED</th>
<th>SEALS TYPE &amp; DESIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCS 14</td>
<td>(5) ea Lexan Windows</td>
<td>West RCS wall</td>
<td>8'-0&quot; x 4'-0&quot;</td>
<td>Locate Lexan windows around excavator through RCS wall where shown on drawings</td>
<td></td>
<td></td>
<td></td>
<td>All windows shall be sealed to withstand the negative air pressure required in the process area</td>
</tr>
<tr>
<td>RCS 15</td>
<td>(23) ea Lexan Windows</td>
<td>RCS ceiling</td>
<td>2'-0&quot; x 2'-0&quot; ea</td>
<td>Locate Lexan windows to accommodate lighting and video camera, layout shown on drawings</td>
<td>60 lb ea</td>
<td>Locate support for 60 lb light adjacent to each window</td>
<td></td>
<td>All windows shall be sealed to withstand the negative air pressure required in the process area</td>
</tr>
<tr>
<td>WES/ RCS 16</td>
<td>(2) ea Lexan Windows</td>
<td>Personnel Access Ceiling</td>
<td>2'-0&quot; x 2'-0&quot; ea</td>
<td>Locate Lexan windows in Personnel Access Ceiling to accommodate lighting layout shown on drawings</td>
<td>60 lb ea</td>
<td>Locate support for 60 lb light adjacent to each window</td>
<td></td>
<td>All windows shall be sealed to withstand the negative air pressure required in the process area</td>
</tr>
<tr>
<td>FFS RCS 17</td>
<td>Deluge Fire Water Supply to RCS (Monitor Nozzle System)</td>
<td>Through the Facility Floor Structure steel perimeter &amp; intermediate framing members to RCS</td>
<td>2-1/4&quot; dia pipe</td>
<td>Install through perimeter steel web on north side of WES floor and through intermediate webs from south side of WES and penetrate up through the RCS floor</td>
<td>Downward thrust of XXX psi operating force at RCS nozzle, will need to provide adequate bracing to stabilize</td>
<td>Through RCS floor, southeast corner bolted flange in XXX seal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FFS RCS 18</td>
<td>Deluge Fire Water Supply to RCS (Monitor Nozzle System)</td>
<td>Through the Facility Floor Structure steel perimeter &amp; intermediate framing members to RCS</td>
<td>2-1/2&quot; dia pipe</td>
<td>Install through perimeter steel web on north side of WES floor and through intermediate webs from north side of WES and penetrate up through the RCS floor</td>
<td>Downward thrust of XX psi operating force at RCS nozzle, will need to provide adequate bracing to floor of RCS to stabilize</td>
<td>Through RCS floor, northeast corner bolted flange in XXX seal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FFS RCS 19</td>
<td>Dry Pipe Supply to RCS, (Overhead System)</td>
<td>Through the Facility Floor Structure steel perimeter &amp; intermediate framing members to RCS</td>
<td>4&quot; dia pipe</td>
<td>Install through perimeter steel web on north side of WES floor and through intermediate webs from north side of WES and penetrate up through the RCS floor</td>
<td>Additional collateral loads</td>
<td>Structural supports across RCS ceiling</td>
<td>Seal where pipe enters through RCS floor next to north wall of the RCS</td>
<td></td>
</tr>
<tr>
<td>TRANS VEST 20</td>
<td>Fire Alarm (MFA) From WES into transfer vestibule area</td>
<td>1/2&quot; conduit</td>
<td>Penetrate through ceiling at personnel door for MFA</td>
<td>MFA, 1 lb</td>
<td></td>
<td></td>
<td></td>
<td>SST</td>
</tr>
<tr>
<td>RCS 21</td>
<td>Dust Suppression/ Fog and Spray System From WES into RCS above PGS No. 1</td>
<td>(2) ea 2&quot; flexible conduit</td>
<td>Penetrate approximately 20'-6&quot; aff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCS 22</td>
<td>Dust Suppression, Fog and Spray System From WES into RCS above PGS No. 2</td>
<td>(2) ea 1&quot; dia pipe</td>
<td>Penetrate approximately 20'-0&quot; aff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCS 23</td>
<td>Dust Suppression, Fog and Spray System From WES into RCS above PGS No. 3</td>
<td>(2) ea 1&quot; dia pipe</td>
<td>Penetrate approximately 19'-6&quot; aff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PERS MON 24</td>
<td>Fire Water Sprinkler Piping From Personnel Monitoring Area into Personnel Access Area</td>
<td>1&quot; dia pipe</td>
<td>Penetrate through the middle of the wall 8&quot; below ceiling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** List all penetrations through the WES, FFS, RCS and Gloveboxes.

* Specific Structure affected
## Penetrations, Attachments, and Interfaces

**For RCS and Related Structures**

<table>
<thead>
<tr>
<th>I.D. No.</th>
<th>System</th>
<th>Structure</th>
<th>Penetration Size</th>
<th>Location</th>
<th>Physical Weight in lb</th>
<th>Support Required</th>
<th>Structural Support Required</th>
<th>Seals Type &amp; Design</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRANS VEST/PERS MON</strong> 25</td>
<td>Fire Water Sprinkler Piping</td>
<td>From Transfer Vestibule into Personnel Monitoring Area</td>
<td>1-1/4&quot; dia pipe</td>
<td>Penetrate south of personnel door 8&quot; below ceiling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TRANS VEST/Roof</strong> 26</td>
<td>Fire Water Sprinkler Piping</td>
<td>Through Transfer Vestibule Roof</td>
<td>4&quot; dia pipe</td>
<td>Penetrate through the roof 15'-7-1/2&quot; south and 3'-8-1/2&quot; east of northwest corner</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCS 27</td>
<td>Dust Suppression/Fog and Spray System</td>
<td>Through RCS west wall</td>
<td>(6) ea. 2&quot; flexible conduit</td>
<td>(6) pipe penetrations through RCS south end of west wall</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WES/TRANS VEST 28</td>
<td>Power</td>
<td>From WES into transfer vestibule area</td>
<td>1&quot; conduit</td>
<td>Power for Miscellaneous Receptacles and Motors (including fan and door operators)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WES/TRANS VEST 29</td>
<td>Lighting</td>
<td>From WES into transfer vestibule area</td>
<td>1&quot; conduit</td>
<td>Power for lighting</td>
<td>Light 16 lb each</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PERS ACCESS to RCS 30</td>
<td>Power</td>
<td>From Personnel Access into RCS area</td>
<td>(2) 1&quot; conduit</td>
<td>Power for Receptacles and exit lights</td>
<td>Light 16 lb each</td>
<td>Support light above door and duplex receptacle on wall</td>
<td>SST conduit with seal around all wires</td>
<td></td>
</tr>
<tr>
<td>PERS MON to PERS ACCESS 31</td>
<td>Power</td>
<td>From Personnel Monitoring to Personnel Access area</td>
<td>(2) 1&quot; conduit</td>
<td>Power for Receptacles and Lights</td>
<td>Light 16 lb each</td>
<td>Support light on ceiling and Conduit through wall</td>
<td>SST conduit with seal around all wires</td>
<td></td>
</tr>
<tr>
<td>PERS MON to RCS 32</td>
<td>Power</td>
<td>From Personnel Access area into RCS</td>
<td>1&quot; dia</td>
<td>Power to Exit/Emergency Light over personnel door into personnel access</td>
<td></td>
<td>Conduit through wall</td>
<td>SST conduit with seal around all wires</td>
<td></td>
</tr>
<tr>
<td>RCS 33</td>
<td>Video Camera</td>
<td>Mount to outside of RCS roof to RCS</td>
<td>10 lb including mounting bracket</td>
<td>Mount outside of RCS roof to RCS</td>
<td>10 lb including mounting bracket</td>
<td>Attach mounting bracket to RCS exoskeleton, viewing through 2' x 2' Lexan window. Provide shroud over camera. Standard &quot;Off-the-Shelf&quot;, no long lead time.</td>
<td>Mounting brackets on RCS exoskeleton. Support cable tray and conduit</td>
<td></td>
</tr>
<tr>
<td>RCS 34</td>
<td>Video Camera</td>
<td>Mount to outside of RCS wall at window</td>
<td>10 lb including mounting bracket</td>
<td>Mount outside of northeast wall of RCS above PGS 1</td>
<td>10 lb including mounting bracket</td>
<td>Attach mounting bracket to RCS exoskeleton, viewing through 2' x 2' Lexan window. Provide shroud over camera. Standard &quot;Off-the-Shelf&quot;, no long lead time.</td>
<td>Mounting brackets on RCS exoskeleton. Support cable tray and conduit</td>
<td></td>
</tr>
<tr>
<td>RCS 35</td>
<td>Video Camera</td>
<td>Mount to outside of RCS wall at window</td>
<td>10 lb including mounting bracket</td>
<td>Mount outside of east wall of RCS above PGS 2</td>
<td>10 lb including mounting bracket</td>
<td>Attach mounting bracket to RCS exoskeleton, viewing through 2' x 2' Lexan window. Provide shroud over camera. Standard &quot;Off-the-Shelf&quot;, no long lead time.</td>
<td>Mounting brackets on RCS exoskeleton. Support cable tray and conduit</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** List all penetrations through the WES, FFS, RCS and Gloveboxes.

* Specific Structure affected
<table>
<thead>
<tr>
<th>I.D. NO.</th>
<th>IDENTIFICATION</th>
<th>PENETRATION SIZE</th>
<th>LOCATION</th>
<th>PHYSICAL WEIGHT in lb. POWER REQUIREMT</th>
<th>CRITICAL DESIGN CONSIDERATIONS</th>
<th>STRUCTURAL SUPPORT REQUIRED</th>
<th>SEALS TYPE &amp; DESIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCS 36</td>
<td>Video Camera</td>
<td>Mount to outside of RCS wall @ window</td>
<td>Mount outside of south wall of RCS above mech HEPA filter bank</td>
<td>10 lb including mounting bracket</td>
<td>Attach mounting bracket to RCS exoskeleton, viewing through 3&quot; x 2&quot; Lexan window. Provide shroud over camera. Standard “Off-the-Shelf”, no long lead time.</td>
<td>Mounting brackets on RCS exoskeleton. Support cable tray and conduit</td>
<td></td>
</tr>
<tr>
<td>RCS 37</td>
<td>PGS No. 1 interface with the RCS</td>
<td>Through the RCS panel to match the entrance to the PGS</td>
<td>Penetration size 50.75 x 50.75 inches</td>
<td>The three PGS locations</td>
<td>The RCS panel attaching to the PGS will be 6 feet wide instead of the standard 4 feet</td>
<td>A gasket will be installed between the PGS and the RCS at the penetration.</td>
<td></td>
</tr>
<tr>
<td>RCS 38</td>
<td>PGS No. 2 interface with the RCS</td>
<td>Through the RCS panel to match the entrance to the PGS</td>
<td>Penetration size 50.75 x 50.75 inches</td>
<td>The three PGS locations</td>
<td>The RCS panel attaching to the PGS will be 6 feet wide instead of the standard 4 feet</td>
<td>A gasket will be installed between the PGS and the RCS at the penetration.</td>
<td></td>
</tr>
<tr>
<td>RCS 39</td>
<td>PGS No. 3 interface with the RCS</td>
<td>Through the RCS panel to match the entrance to the PGS</td>
<td>Penetration size 50.75 x 50.75 inches</td>
<td>The three PGS locations</td>
<td>The RCS panel attaching to the PGS will be 6 feet wide instead of the standard 4 feet</td>
<td>A gasket will be installed between the PGS and the RCS at the penetration.</td>
<td></td>
</tr>
<tr>
<td>RCS 40</td>
<td>Glove Ports for Backhoe Hydraulic End Effector Connection and Core Sample Retrieval</td>
<td>Through an RCS Lexan window located within the alcove for the glove ports and bag out station</td>
<td>15.2&quot; x 9.2&quot; oval positioned 15 degrees off the vertical axis at 16.5&quot; separation from center</td>
<td>Locate in the north lower 8 x 4 Lexan window</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCS 41</td>
<td>Bag Out Port for Underburden Core Samples</td>
<td>Through an RCS Lexan window located within the alcove for the glove ports and bag out station</td>
<td>15.2&quot; x 9.2&quot; oval positioned 90 degrees off the vertical axis</td>
<td>Locate in the north lower 8 x 4 Lexan window</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WES/ RCS 42</td>
<td>Air Sampling Ports</td>
<td>North of Glove Ports</td>
<td>(2) 4&quot; dia</td>
<td>Locate (1) at 1'-0&quot; aff and locate (1) at 4'-0&quot; aff</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PERS ACCES to RCS 43</td>
<td>Power Receptacle</td>
<td>Sealed Wall Plate</td>
<td></td>
<td></td>
<td>Common wall between the Personnel Access and RCS.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCS 44</td>
<td>Backhoe Boom and Stick Penetration into the RCS</td>
<td>Through a rectangular hole in the RCS.</td>
<td>6&quot; Horizontal x 4.7&quot; Vertical</td>
<td>Centerline of hole is located 26&quot; away from the southwest RCS wall and ends at the floor</td>
<td>Bottom framing of the backhoe penetration is not necessary.</td>
<td>3x3x3/16 angle iron</td>
<td></td>
</tr>
<tr>
<td>RCS 45</td>
<td>Breathing Air System (3.6.6)</td>
<td>Through RCS structure</td>
<td>2&quot; H x 3&quot; Vertical</td>
<td>Slot is located south side of double door frame leading into the RCS, approximately 4'-0&quot; aff.</td>
<td>Pass-thru to allow for passage of breathing air hoses while the door remains shut.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCS 46</td>
<td>Ventilation</td>
<td>Penetration through common wall of Personnel Monitoring / Pers Access Wall</td>
<td>24&quot; x 24&quot;</td>
<td>North wall east side, 6&quot; below ceiling</td>
<td>Air transfer grille</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCS 47</td>
<td>Ventilation</td>
<td>Penetration through Transfer Vestibule &amp; WES wall to north</td>
<td>24&quot; x 24&quot;</td>
<td>North wall, west side, 6&quot; below ceiling</td>
<td>Air transfer grille</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** List all penetrations through the WES, FFS, RCS and Gloveboxes.  
* Specific Structure affected
## PENETRATIONS, ATTACHMENTS and INTERFACES
for RCS and RELATED STRUCTURES

<table>
<thead>
<tr>
<th>I.D. NO.</th>
<th>IDENTIFICATION</th>
<th>PENETRATION SIZE</th>
<th>LOCATION</th>
<th>PHYSICAL WEIGHT in lb. POWER REQUIREMT</th>
<th>CRITICAL DESIGN CONSIDERATIONS SIGNIFICANT CHARACTERISTICS</th>
<th>STRUCTURAL SUPPORT REQUIRED</th>
<th>SEALS TYPE &amp; DESIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCS 48</td>
<td>Ventilation</td>
<td>RCS inlet air</td>
<td>12&quot; dia.</td>
<td></td>
<td>RCS inlet air filter and damper</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCS 49</td>
<td>Ventilation</td>
<td>RCS inlet air</td>
<td>30&quot; dia.</td>
<td></td>
<td>RCS inlet air filter and damper</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCS 50</td>
<td>Ventilation</td>
<td>Penetration through Transfer Vestibule and WES, north wall.</td>
<td>14&quot; x 14&quot;</td>
<td>North wall of Transfer Vestibule and WES, 10'-0&quot; AFF</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCS 51</td>
<td>Ventilation</td>
<td>Penetration through RCS</td>
<td>18&quot; x 7'-6&quot;</td>
<td>South wall of RCS to the east end</td>
<td>100 lb</td>
<td>Transfer Vestibule supply air fan</td>
<td></td>
</tr>
<tr>
<td>RCS 52</td>
<td>Grouting Pipe</td>
<td>Pipe through west wall south of double doors</td>
<td>8&quot; dia</td>
<td>Sched 40 grout transfer pipe through RCS, capped for future use</td>
<td>Pipe: 12'-0&quot; long, 5&quot; end each side of wall Ends threaded and capped and sealed with silicone.</td>
<td>Provide support for pipe</td>
<td>Seal weld around pipe</td>
</tr>
<tr>
<td>RCS 53</td>
<td>CO Monitoring System</td>
<td>Through roof of RCS (2) places</td>
<td>(2) 1/2&quot; dia tube</td>
<td>Along west side of RCS roof (1) towards the north and (1) towards the south. Provide bulkhead fittings or welded nipple, TBD</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** List all penetrations through the WES, FFS, RCS and Gloveboxes.

* Specific Structure affected
Appendix D

Fire Protection Piping Layout Drawings

(For Information Only)
RCS DRY AND MANUAL DELUGE FIRE PROTECTION SYSTEMS PLAN

NOTES

1. DELUGE SYSTEM FOR THE RETENTION CONFINEMENT STRUCTURE SHALL
   SHALL BE CLASSIFIED AS EXTRA HAZARD OCCUPANCY GROUP 1 PER
   NFPA.

X-REF DRAWING
516784-B-fig
516786-B-fig
Appendix E

Proposed Lighting Fixture Vendor Cut Sheets

and Layout Drawing
DESCRIPTION

The Lumark Nighthawk III utilizes a soft-cornered aerodynamic design to provide excellent EPA ratings and an aesthetically pleasing appearance. Dark bronze polyester powder coat finish assures corrosion resistance and long-lasting aesthetics. U.L. 1572 listed and labeled for wet locations. CSA certified.

APPLICATION

The Nighthawk III uses an innovative die-cut optical design which delivers maximum beam control for storage areas, rail yards, loading docks and building perimeters.

SPECIFICATION FEATURES

A - Latches
Formed aluminum flush draw-action latches offer easy access to lamp compartment without tools and maintain integrity of seal when closed.

B - Housing
Aerodynamically designed die-cast aluminum housing has low EPA rating.

C - Door
Diecast aluminum with integral cast hinges for removal without tools.

D - Lens
Heat- and impact-resistant tempered glass. Lens is mounted flush with door surface to reduce wind drag and prevent dirt or moisture from accumulating.

E - Reflector
Computer designed die-cut reflector system delivers superior beam control and efficiency.

F - Gasket
Door gasket is foam-in-place silicone, providing maximum protection of interior components from the elements.

G - Ballast
Ballast components are hard mounted to fixture housing for maximum heat dissipation and extended component and lamp life.

H - Mounting
Die-cast aluminum integral slipfitter mounts on nominal 2 3/4" or 3" O.D. tenons. A degree-marked quadrant is cast in for easy and accurate aiming.

ENERGY DATA

Hi-Resistance Ballast Input Watts
150W MH HPF (190 Watts)
Reactor Ballast Input Watts
150W MH HPF (185 Watts)
CWA Ballast Input Watts
250W HPS HPF (300 Watts)
CWA Ballast Input Watts
175W MH HPF (210 Watts)
200W HPS HPF (250 Watts)
200W MP HPF (232 Watts)
250W MH HPF (295 Watts)
320W MP HPF (385 Watts)
350W MP HPF (395 Watts)
400W MH HPF (445 Watts)
400W HPS HPF (445 Watts)
400W MP HPF (448 Watts)
1000W MP HPF (656 Watts)
750W HPS HPF (638 Watts)
750W MP HPF (625 Watts)
1000W MH HPF (1083 Watts)
1000W HPS HPF (1100 Watts)

1000W LAMP PLACEMENT

COOPER LIGHTING
### Footcandle Table

Select mounting height and read across for footcandle values of each isofootcandle line. Distance in units of mounting height.

<table>
<thead>
<tr>
<th>Mounting Height</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>20'</td>
<td>10.00</td>
<td>5.00</td>
<td>2.22</td>
<td>0.89</td>
<td>0.44</td>
</tr>
<tr>
<td>35'</td>
<td>3.27</td>
<td>1.85</td>
<td>0.65</td>
<td>0.33</td>
<td>0.16</td>
</tr>
<tr>
<td>40'</td>
<td>2.50</td>
<td>1.25</td>
<td>0.50</td>
<td>0.25</td>
<td>0.13</td>
</tr>
</tbody>
</table>

### Floodlight Summary

- **Maximum Candlepower:** 25981 CD
- **Maximum Candlepower Vertical Angle:** 0 Degrees
- **Maximum Candlepower Horizon Angle:** 0 Degrees
- **Beam Flux—10% of Max.:** 34125 Lumens
- **Beam Efficiency—10% of Max.:** 86.3 Percent
- **Total Flux:** 35290 Lumens
- **Total Efficiency:** 70.5 Percent

### Ordering Information

**Sample Number:** HPNKL-76-400

- **Lamp Type:** High Pressure Sodium
- **Mounting Type:** 3-Slipfitter
- **Beam Spread:** 76° ±10°
- **Lamp Wattage:** 36,000 Lumen Clear Lamp

**Options (add as suffix):**
- PRR=NEMA Twistlock Photocell
- RVR=Pulse
- F1=Single Side Visor
- F2=Double Fused
- Q=Quartz Reflector
- F3=Face Mount
- F4=Photocell Control
- M=Delay Relay
- N=Remote Quick Disconnect
- R=Removable Quick Disconnect
- S=Single Side Visor
- T=Vandal Shield
- V=Vandal Shield
- W=Wandal Shield
- X=Lamp Included

**EPA Ratings: Slipfitter Mounting**

<table>
<thead>
<tr>
<th>Angle</th>
<th>Fixture Type</th>
<th>Wind Direction (sq. ft.)</th>
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<tr>
<td>45°</td>
<td>Front</td>
<td>2.7</td>
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<tr>
<td>90°</td>
<td>Front</td>
<td>4.2</td>
</tr>
<tr>
<td>180°</td>
<td>Front</td>
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**Series:** N-K-NightHawk III

---

**Catalog Number**

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<tr>
<th>Lamp Type</th>
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<th>Lamp Wattage</th>
<th>Ballast Type/Power Factor</th>
<th>Voltage</th>
<th>Beam Spread</th>
<th>Mounting Type</th>
<th>Net Wt. (lbs.)</th>
<th>Shipping Volume (cu.ft.)</th>
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<tbody>
<tr>
<td>HPNKL-76-150-MT</td>
<td>HPS/Maguy</td>
<td>150</td>
<td>HLB/HYP</td>
<td>120V</td>
<td>Single</td>
<td>Slipfitter</td>
<td>1.2</td>
<td>3.6</td>
</tr>
<tr>
<td>HPNKL-76-250-MT</td>
<td>HPS/Maguy</td>
<td>250</td>
<td>CWH/HPF</td>
<td>120V</td>
<td>Multi-Tap</td>
<td>Slipfitter</td>
<td>2.8</td>
<td>3.6</td>
</tr>
<tr>
<td>HPNKL-76-350-MT</td>
<td>HPS/Maguy</td>
<td>350</td>
<td>CWH/HPF</td>
<td>220V</td>
<td>Multi-Tap</td>
<td>Slipfitter</td>
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<tr>
<td>HPNKL-76-400-MT</td>
<td>HPS/Maguy</td>
<td>400</td>
<td>CWH/HPF</td>
<td>220V</td>
<td>Multi-Tap</td>
<td>Slipfitter</td>
<td>3.4</td>
<td>3.6</td>
</tr>
<tr>
<td>HPNKL-76-450-MT</td>
<td>HPS/Maguy</td>
<td>450</td>
<td>CWH/HPF</td>
<td>480V</td>
<td>Single</td>
<td>Slipfitter</td>
<td>2.6</td>
<td>3.6</td>
</tr>
<tr>
<td>HPNKL-76-500-MT</td>
<td>HPS/Maguy</td>
<td>500</td>
<td>CWH/HPF</td>
<td>480V</td>
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<td>Slipfitter</td>
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<tr>
<td>HPNKL-76-750-MT</td>
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<td>CWH/HPF</td>
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<td>3.6</td>
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<td>HPNKL-76-1000-MT</td>
<td>HPS/Maguy</td>
<td>1000</td>
<td>CWH/HPF</td>
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<td>MNHNK-76-175-MT</td>
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<td>CWH/HPF</td>
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<td>3.6</td>
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<tr>
<td>MNHNK-76-250-MT</td>
<td>MH/Maguy</td>
<td>250</td>
<td>CWH/HPF</td>
<td>480V</td>
<td>Multi-Tap</td>
<td>Slipfitter</td>
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<td>3.6</td>
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<td>MNHNK-76-350-MT</td>
<td>MH/Maguy</td>
<td>350</td>
<td>CWH/HPF</td>
<td>480V</td>
<td>Multi-Tap</td>
<td>Slipfitter</td>
<td>3.2</td>
<td>3.6</td>
</tr>
<tr>
<td>MNHNK-76-400-MT</td>
<td>MH/Maguy</td>
<td>400</td>
<td>CWH/HPF</td>
<td>480V</td>
<td>Multi-Tap</td>
<td>Slipfitter</td>
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<tr>
<td>MNHNK-76-500-MT</td>
<td>MH/Maguy</td>
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<td>CWH/HPF</td>
<td>480V</td>
<td>Multi-Tap</td>
<td>Slipfitter</td>
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<td>3.6</td>
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<tr>
<td>MNHNK-76-750-MT</td>
<td>MH/Maguy</td>
<td>750</td>
<td>CWH/HPF</td>
<td>480V</td>
<td>Multi-Tap</td>
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<td>MNHNK-76-1000-MT</td>
<td>MH/Maguy</td>
<td>1000</td>
<td>CWH/HPF</td>
<td>480V</td>
<td>Multi-Tap</td>
<td>Slipfitter</td>
<td>4.4</td>
<td>3.6</td>
</tr>
</tbody>
</table>

**Notes:**

- Options: PRR=NEMA Twistlock Photocell
- RVR=Pulse
- F1=Single Side Visor
- F2=Double Fused
- Q=Quartz Reflector
- F3=Face Mount
- F4=Photocell Control
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- S=Single Side Visor
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- V=Vandal Shield
- W=Wandal Shield
- X=Lamp Included

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**COOPER Lighting**

Visit our web site at www.cooperlighting.com

Customer First Center 1212 Highway 74 South Peachtree City, GA 30269 770.486.4800 FAX 770.486.4801 ADH091213
BRACKETS
Brackets for Rooftop or Wall Mounting

PARAPET BRACKET

STEEL ANGLE BRACKET

RIGHT ANGLE BRACKET

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Tenon Size (In.)</th>
<th>Fixture Configuration</th>
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<tbody>
<tr>
<td>PAR1</td>
<td>3 O.D.</td>
<td>Single Parapet Mount</td>
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NOTES: Standard finish is hot dip galvanized. Mounting hardware not included.

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Tenon Size (In.)</th>
<th>Bracket Length (In.)</th>
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<tr>
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<td>RABV</td>
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<td>RABX</td>
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<td>RABX-14</td>
<td>2 3/8 O.D.</td>
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</tr>
</tbody>
</table>

NOTES: Standard finish is primed. Add suffix "G" for hot dip galvanized. Mounting hardware not included. *Steel pole mounting.

NOTE: Specifications and dimensions subject to change without notice.

COOPER LIGHTING
The VT2 Series is an energy efficient industrial vaportite fixture that features rugged and durable construction. The VT2 incorporates a full metal fixture housing channel inside a reinforced fiberglass housing with a high impact diffuser and positive cam latching. This Vaportite series is suitable for interior and exterior applications and can be surface or chain mounted. The VT2 Series has been designed for maximum performance in commercial, institutional and industrial environments where weathering, humidity and dust or corrosive fumes are present.

### Dimensions

<table>
<thead>
<tr>
<th>Nominal Length</th>
<th>A (in)</th>
<th>B (in)</th>
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<tbody>
<tr>
<td>2', 4', 8'</td>
<td>7'</td>
<td>5'</td>
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<tr>
<td>4', 8' (HO)</td>
<td>7'</td>
<td>5.75'</td>
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### Ordering Information

**Sample Number:** VT2-232DR-120V-EB81-WL-U

**Catalog Lamp Nominal Shipping Weight:**
- VT2-117 DR-WL 1F17: 8 lbs. (3.6 kg)
- VT2-117 DR-WL 2F17: 16 lbs. (7.2 kg)
- VT2-217 DR-WL 1F17: 8 lbs. (3.6 kg)
- VT2-217 DR-WL 2F17: 16 lbs. (7.2 kg)
- VT2-18X40 DR-WL 1BX40: 31 lbs. (13.9 kg)
- VT2-18X40 DR-WL 2BX40: 62 lbs. (28 kg)
- VT2-18X50 DR-WL 1BX50: 8 lbs. (3.6 kg)
- VT2-18X50 DR-WL 2BX50: 16 lbs. (7.2 kg)
- VT2-132 DR-WL 1F32: 16 lbs. (7.2 kg)
- VT2-132 DR-WL 2F32: 32 lbs. (14.5 kg)
- VT2-232 DR-WL 1F32: 8 lbs. (3.6 kg)
- VT2-232 DR-WL 2F32: 16 lbs. (7.2 kg)
- VT2-248 DR-WL 1F48: 16 lbs. (7.2 kg)
- VT2-248 DR-WL 2F48: 32 lbs. (14.5 kg)
- VT2-296T8 DR-WL 1F96T8: 16 lbs. (7.2 kg)
- VT2-296T8 DR-WL 2F96T8: 32 lbs. (14.5 kg)
- VT2-148 DR-WL 1F84: 16 lbs. (7.2 kg)
- VT2-148 DR-WL 2F84: 32 lbs. (14.5 kg)
- VT2-196T8HO DR-WL 1F96T8HO: 20 lbs. (9 kg)
- VT2-196T8HO DR-WL 2F96T8HO: 40 lbs. (18 kg)

**Notes:**
- Standard ballast (Non-LE3; Products also available in non-US voltages and frequencies for international markets. For complete product data, reference METALUX® website.)
- U.L. Listed, CSA Certification Available
- Die formed galvanized steel mounting brackets (Standard)
- Baked white enamel finish internal channel/high reflectance
- No holes required for surface/chain mounting
- Unitized internal/external brass mounting stud for structural integrity and continuity of ground
- U.L. Listed for wet locations (standard)
- Luminaire Efficacy Rating LER=73

**Sample Number:** VT2-232DR-120V-EB81-WL-U

**Catalog Number:**
- VT2-117 DR-WL 1F17: 8 lbs. (3.6 kg)
- VT2-117 DR-WL 2F17: 16 lbs. (7.2 kg)
- VT2-217 DR-WL 1F17: 8 lbs. (3.6 kg)
- VT2-217 DR-WL 2F17: 16 lbs. (7.2 kg)
- VT2-18X40 DR-WL 1BX40: 31 lbs. (13.9 kg)
- VT2-18X40 DR-WL 2BX40: 62 lbs. (28 kg)
- VT2-18X50 DR-WL 1BX50: 8 lbs. (3.6 kg)
- VT2-18X50 DR-WL 2BX50: 16 lbs. (7.2 kg)
- VT2-132 DR-WL 1F32: 16 lbs. (7.2 kg)
- VT2-132 DR-WL 2F32: 32 lbs. (14.5 kg)
- VT2-232 DR-WL 1F32: 8 lbs. (3.6 kg)
- VT2-232 DR-WL 2F32: 16 lbs. (7.2 kg)
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- VT2-248 DR-WL 2F48: 32 lbs. (14.5 kg)
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- VT2-296T8 DR-WL 2F96T8: 32 lbs. (14.5 kg)
- VT2-148 DR-WL 1F84: 16 lbs. (7.2 kg)
- VT2-148 DR-WL 2F84: 32 lbs. (14.5 kg)
- VT2-196T8HO DR-WL 1F96T8HO: 20 lbs. (9 kg)
- VT2-196T8HO DR-WL 2F96T8HO: 40 lbs. (18 kg)
Appendix F

Retrieval Confinement Structure Analysis and Loading Criteria

This appendix is for information only. It is not to be considered as part of the specification requirements. If a conflict exists between this Appendix and the body of this specification, the specification will control.
5. **Summary:**

This EDF documents the structural design and loading requirements for the Retrieval Confinement Structure (RCS) for the OU 7-10 Glovebox Excavator Method Project.

It also gives preliminary estimates of the RCS weight and seismic base shear.

6. **Review (R) and Approval (A) and Acceptance (Ac) Signatures:**

(See instructions for definitions of terms and significance of signatures.)

<table>
<thead>
<tr>
<th>R/A</th>
<th>Typed Name/Organization</th>
<th>Signature</th>
<th>Date</th>
</tr>
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<tr>
<td>A</td>
<td>Scott A. Jensen P.E.</td>
<td></td>
<td>3/25/02</td>
</tr>
<tr>
<td>R</td>
<td>Stephanie Austad P.E.</td>
<td></td>
<td>3/25/02</td>
</tr>
<tr>
<td>A</td>
<td>Patrick Bragassa P.E.</td>
<td></td>
<td>3/25/02</td>
</tr>
<tr>
<td>A</td>
<td>S.A. Davies / Project Engineering</td>
<td></td>
<td>4/04/02</td>
</tr>
</tbody>
</table>

7. **Distribution:**

Hard copy distribution to: S.A. Davies (MS 3650), M.B. Pratt (MS 3950), OU 7-10 Glovebox Excavator Method Records Management (MS 3920), Scott Jensen, David Stephens. Electronic copy distribution to: B.R. Helm (MS 3765, bxh@inel.gov), OU 7-10 Glovebox Excavator Method Records Management (MS 3920, snarl@inel.gov), Scott Jensen.

8. **Records Management Uniform File Code (UFC):** 6400

Disposition Authority: ENV1-k-2-b

Retention Period: End of Project + 25 years

EDF pertains to NRC licensed facility or INEEL SNF program: Yes □ No □

9. Registered Professional Engineer's Stamp (if required)
Purpose
This EDF documents the structural design and loading requirements for the Retrieval Confinement Structure (RCS) for the OU 7-10 Glovebox Excavator Method Project.

Scope
This EDF provides information necessary for the structural analysis and design of the RCS.

Background
The Glovebox Excavator Method Project objective is to demonstrate the safe retrieval of TRU waste from a specific and preselected area (OU 7-10) of Pit 9 in the Subsurface Disposal Area (SDA) at the Radioactive Waste Management Complex (RWMC, part of the INEEL’s Waste Area Group (WAG) 7.

The RCS is the confinement structure enclosing the excavation area for this demonstration project.

Safety Category
The RCS is safety significant. It is Performance Category 2 (PC-2) regarding earthquake loading. It is protected from the effects of wind, snow, rain and flood by other structures.

Assumptions
A structural steel framework supports the RCS.
A weather enclosure and other features at the RWMC protect the RCS from the effects of wind, snow, rain and flood.

Acceptance Criteria
The provisions of the International Building Code (IBC) 2000 shall govern the structural design and analysis of the RCS unless otherwise noted herein. The following chapters are particularly applicable to the RCS design:

- Chapter 16 Structural Design
- Chapter 17 Structural Tests and Special Inspections
- Chapter 22 Steel
- Chapter 24 Glass and Glazing
- Chapter 26 Plastic

Analysis and Design Requirements and Criteria
General. The RCS may be designed and constructed in accordance with any of the design methods and conventional construction methods permitted by the IBC.

Strength. Refer to IBC 1604.2 for requirements.

Serviceability. Refer to IBC 1604.3 for requirements. The drift limits applicable to earthquake loading may be exceeded if adequately justified.

The RCS interfaces with three glovebox structures and an excavator. Flexible connections shall be provided at the interfaces to limit the load transfer between the RCS and these components. The RCS deflections at the connection points shall be limited to a maximum of 3/8 of an inch in any direction.

Analysis. Refer to IBC 1604.4.
Importance Factors. The seismic load importance factor for the RCS shall be 1.5. The snow load and wind load importance factors are not applicable to the RCS design.

Load Combinations. Refer to IBC 1605. Normal operating pressure acting on the RCS shall be considered a live load and shall be included in appropriate load combinations. The normal operating pressure need not be included in load combinations that also include construction or erection live loads. It needs to be included with operational or maintenance live loads.

An additional load combination that includes dead loads and the maximum design pressure on the RCS shall also be used in the design and analysis.

Dead Loads. Refer to IBC 1606. The RCS roof dead load includes selfweight (framing and steel panels, guardrails, etc.), the weight of a camera, the lighting system, and a fire sprinkler system. The minimum assumed dead load from the camera, lights and sprinkler system for the RCS roof shall be the greater of the loads as shown on the drawings or 6 pounds per square foot (psf).

Live Loads. During normal operation the only live load imposed on the RCS is the negative pressure (inward pressure) imposed by the ventilation system. The design value for the normal negative pressure shall be 1 inch of water (5.2 psf).

The live load on the RCS roof shall include a concentrated load of at least 250 lbs. This load is provided to accommodate maintenance of the lights and camera located on the roof. The load may occur at any single location on the RCS roof.

Live loads on the RCS roof shall also include any loading on guardrails or other fall restraint features provided for the RCS erection or maintenance of the lighting and camera.

Live loads shall include loads imposed by normal construction or erection procedures.

Maximum Design Pressure. The maximum negative pressure on the RCS shall be 4 inches of water (20.8 psf).

Snow Loads and Wind Loads. Snow and wind loading are not applicable to the RCS.

The weather enclosure will protect the RCS from snow and wind loading during operations. Snow or wind loading of the RCS may occur during erection. However, temporary bracing can accommodate these loads. The snow or wind loading, during construction activities on individual components, can be assumed to be less than the maximum design pressure (20.8 psf) for those components.

Soil Lateral Load, Rain Loads and Flood Loads. Soil lateral load, rain loads and flood loads are not applicable to the RCS.

Earthquake Loads. Refer to IBC 1613 through 1622. The following criteria shall be used for the RCS.

Short period acceleration, Ss - 0.357 g's
1-sec acceleration, S1 - 0.131 g's
Site Class - C
Seismic Importance Factor:
   Ie - 1.5 for structures
   Ip - 1.5 for components
Seismic Use Group - III.
References
International Building Code 2000

Calculations
See the attached calculations for an estimate of the RCS weight and calculations for earthquake loading for the main framework and components.

Conclusions
The preliminary calculation for the weight of the RCS is 39,500 pounds.

The preliminary calculation for the total base shear from earthquake loading of the RCS is 4,230 pounds.

The horizontal design force used for design of anchorage of components mounted on the roof of the RCS shall be at least 0.41 g’s (0.41 times the component weight).

Attachments
Loading Calculations – 6 pages
Purpose

The purpose of these calculations is to determine a preliminary estimate of the weight and earthquake loading of the RCS.

Scope

These calculations are limited to the previously stated purpose.

Assumptions/Criteria

Refer to RCS preliminary drawings for information on the RCS configuration.

RCS dimensions:

\[
L := 52\text{-ft} \quad B := 27\text{-ft} \quad H := 24\text{-ft} \quad B1 := 15\text{-ft} \quad B2 := 12\text{-ft}
\]

\[
L1 := \sqrt{2 \cdot B1^2} \quad L1 = 21.21\text{ft} \quad L2 := L - 2 \cdot B1 \quad L2 = 22.00\text{ft}
\]

Steel unit weight:

\[
\gamma_s := 490\text{-pcf}
\]

Earthquake load criteria:

\[
S_S := 0.357 \quad S_1 := 0.131 \quad I_p := 1.5 \quad I_e := 1.5
\]

Site Class C

Seismic Use Group - III

Acceptance Criteria

Not applicable to these calculations.
Weight Calculations

Calculate ceiling/roof area
\[ A_{ceil} \equiv L \cdot B - B l^2 \]
\[ A_{ceil} = 1179 \text{ ft}^2 \]

Calculate wall areas
\[ A1 \equiv L \cdot H \]
\[ A1 = 1248 \text{ ft}^2 \]
\[ A2 \equiv B2 \cdot H \]
\[ A2 = 288 \text{ ft}^2 \]
\[ A3 \equiv A2 \]
\[ A4 \equiv L1 \cdot H \]
\[ A4 = 509 \text{ ft}^2 \]
\[ A5 \equiv A4 \]
\[ A6 \equiv L2 \cdot H \]
\[ A6 = 528 \text{ ft}^2 \]

\[ A_{wall} \equiv A1 + A2 + A3 + A4 + A5 + A6 \]
\[ A_{wall} = 3370 \text{ ft}^2 \]

Estimate the RCS Wall Panel Framing

Panel width
\[ Bp := 4.\text{ ft} \]

Unit weight of water
\[ \gamma_w := 62.4 \text{pcf} \]

Load
\[ w_w := 4\text{-in} \cdot \gamma_w \cdot Bp \]
\[ w_w = 83.20 \text{plf} \]

Assume allowable stress
\[ F_b := 6.36 \text{-ksi} \]
\[ F_b = 21.60 \text{ksi} \]

\[ M_{max} := \frac{w_w \cdot H^2}{8} \]
\[ M_{max} = 71.88 \text{kip}\cdot\text{in} \]
\[ S_x := \frac{M_{max}}{F_b} \]
\[ S_x = 3.33 \text{in}^3 \]
\[ S_x = 1.66 \text{in}^3 \]

\[ \Delta := \frac{H}{120} \]
\[ \Delta = 2.40 \text{in} \]
\[ E := 29000 \text{ksi} \]
\[ I_x := \frac{5 \cdot w_w \cdot H^4}{384 \cdot \Delta \cdot E} \]
\[ I_x = 8.92 \text{in}^4 \]

Try C4x7.25
\[ S_x := 2.29 \text{-in}^3 \]
\[ I_x := 4.59 \text{-in}^4 \]

\[ \frac{I_x}{2} = 4.46 \text{-in}^4 \]

\[ f_b := \frac{M_{max}}{2 \cdot S_x} \]
\[ f_b = 15.70 \text{ksi} \]
\[ \Delta_{max} := \frac{5 \cdot w_w \cdot H^4}{384 \cdot E \cdot 2 \cdot I_x} \]
\[ \Delta_{max} = 2.33 \text{in} \]

Try C5x6.7
\[ S_x := 3 \text{-in}^3 \]
\[ I_x := 7.49 \text{-in}^4 \]

\[ f_b := \frac{M_{max}}{2 \cdot S_x} \]
\[ f_b = 11.98 \text{ksi} \]
\[ \Delta_{max} := \frac{5 \cdot w_w \cdot H^4}{384 \cdot E \cdot 2 \cdot I_x} \]
\[ \Delta_{max} = 1.43 \text{in} \]

Estimate the RCS Roof Panel Framing

Roof panel span
\[ L_r := 27 \text{-ft} \]
\[ w := w_w + 2 \cdot \text{psf} \cdot Bp \]
\[ w = 91.20 \text{plf} \]
\[
M_{\text{max}} := \frac{w \cdot L_r^2}{8} \quad S_x := \frac{M_{\text{max}}}{F_b} \quad S_x = 4.62 \text{ in}^3 \quad \frac{S_x}{2} = 2.31 \text{ in}^3
\]

\[
\Delta := \frac{L_r}{120} \quad \Delta = 2.70 \text{ in} \quad E := 29000\text{ksi} \quad I_x := \frac{5 \cdot w \cdot L_r^4}{384 \cdot \Delta \cdot E} \quad I_x = 13.93 \text{ in}^4
\]

\[
M_{\text{max}} = 99.73 \text{ kip-in} \quad \text{Try C5x6.7}
\]

\[
f_b := \frac{M_{\text{max}}}{2 \cdot S_x} \quad f_b = 10.80\text{ksi} \quad \Delta_{\text{max}} := \frac{5 \cdot w \cdot w \cdot L_r^4}{384 \cdot E \cdot 2 \cdot I_x} \quad \Delta_{\text{max}} = 1.23 \text{ in}
\]

Estimate weight per square foot of RCS panels

Assumed panel area \( A_p := 4\text{-ft-H} \quad A_p = 96.00 \text{ ft}^2 \)

Thickness of panel sheet \( t_s := 0.0598\text{ in} \quad \text{Assumes 16 gage or lighter} \quad w_s := t_s \cdot \gamma_s \quad w_s = 2.44 \text{ psf} \)

Length of angle framing per panel \( L_{\text{ap1}} := 6.4\text{-ft} \quad L_{\text{ap1}} = 24.0\text{ ft} \)

\( L_{\text{ap2}} := 2.4\text{-H + 2.4-ft} \quad L_{\text{ap2}} = 56.0\text{ ft} \)

Framing weight per foot \( w_{\text{ap1}} := 3.07\text{-plf} \quad \text{Assumes 3x2x3/16 angles} \)

\( w_{\text{ap2}} := 6.7\text{-plf} \quad \text{Assumes C5x6.7} \)

\( W_a := w_{\text{ap1}} \cdot L_{\text{ap1}} + w_{\text{ap2}} \cdot L_{\text{ap2}} \quad W_a = 448.88 \text{ lbf} \)

Total weight of panel \( W_{\text{panel}} := W_a + A_p \cdot w_s \quad W_{\text{panel}} = 683.30 \text{ lbf} \)

Weight per square foot of panels \( w_{\text{p}} := \frac{W_{\text{panel}}}{A_p} \quad w_{\text{p}} = 7.12 \text{ psf} \)

Estimate weight of lights and fire sprinkler system

\( \text{Lights} \quad \frac{2260 \text{-lbf}}{\text{Aceil}} = 1.12 \text{ psf} \)

Assume 4 psf for the sprinkler system \( w_{\text{co}} := 6\text{-psf} \)

Ceiling weight \( W_{\text{ceil}} := \text{Aceil} \cdot (w_{\text{p}} + w_{\text{co}}) \quad W_{\text{ceil}} = 15.47 \text{ kip} \)

Wall weight \( W_{\text{wall}} := A_{\text{wall}} \cdot w_{\text{p}} \quad W_{\text{wall}} = 23.99 \text{ kip} \)

\( W_{w1} := A_1 \cdot w_{\text{p}} \quad W_{w2} := A_2 \cdot w_{\text{p}} \quad W_{w3} := A_3 \cdot w_{\text{p}} \quad W_{w4} := A_4 \cdot w_{\text{p}} \quad W_{w5} := A_5 \cdot w_{\text{p}} \quad W_{w6} := A_6 \cdot w_{\text{p}} \)

\( W_{w1} + W_{w2} + W_{w3} + W_{w4} + W_{w5} + W_{w6} = 23.99 \text{ kip} \)
RCS Structure Earthquake Loading Calculations

\[ \text{Ss} = 0.36 \quad \text{S}1 = 0.13 \quad \text{Fa} := 1.2 \quad \text{See IBC Table 1615.1.2(1)} \]
\[ \text{Fv} := 1.67 \quad \text{See IBC Table 1615.1.2(2)} \]

Equation 16-16
\[ \text{Sm} := \text{Fa} \cdot \text{Ss} \quad \text{Sms} = 0.43 \]

Equation 16-17
\[ \text{Sml} := \text{Fv} \cdot \text{S}1 \quad \text{Sml} = 0.22 \]

Equation 16-18
\[ \text{Sds} := \frac{2}{3} \cdot \text{Sms} \quad \text{Sds} = 0.29 \quad \text{Equate to Seismic Design Category D} \]

Equation 16-19
\[ \text{Sdl} := \frac{2}{3} \cdot \text{Sml} \quad \text{Sdl} = 0.15 \quad \text{See Table 1616.3} \]

\[ \text{Ct} := 0.020 \quad \text{Equation 16-39} \quad \text{Ta} := \text{Ct} \left( \frac{H}{4} \right) \quad \text{Ta} = 0.22 \]

\[ \text{R} := 4 \quad \text{See Table 1617.6} \quad \text{Bearing Wall System - Ordinary steel braced frames} \]

\[ \text{Cs}1 := \frac{\text{Sds}}{\left( \frac{\text{R}}{\text{Le}} \right)} \quad \text{Equation 16-35} \quad \text{Cs}1 = 0.11 \]

\[ \text{Cmin} := 0.044 \cdot \text{Sds} \cdot \text{Le} \quad \text{Equation 16-37} \]

\[ \text{Cmax} := \frac{\text{Sdl}}{\left( \frac{\text{R}}{\text{Le}} \right) \cdot \text{Ta}} \quad \text{Equation 16-36} \quad \text{Cmax} = 0.25 \]

\[ \text{Cs} := \text{if}(\text{Cs}1 < \text{Cmin}, \text{Cmin}, \text{if}(\text{Cs}1 > \text{Cmax}, \text{Cmax}, \text{Cs}1)) \quad \text{Cs} = 0.11 \]

Seismic Base Shear (Equation 16-34)
\[ V := \text{Cs} \cdot (\text{Wwall} + \text{Wceil}) \quad V = 4.23 \text{ kip} \]

\[ \text{Vceil} := \text{Cs} \cdot \text{Wceil} \]
\[ \text{Vwall} := \text{Cs} \cdot \text{Wwall} \]
\[ \text{Vw}2 := \text{Cs} \cdot \text{Ww}2 \]
\[ \text{Vw}3 := \text{Cs} \cdot \text{Ww}3 \]
\[ \text{Vw}4 := \text{Cs} \cdot \text{Ww}4 \]
\[ \text{Vw}5 := \text{Cs} \cdot \text{Ww}5 \]
\[ \text{Vw}6 := \text{Cs} \cdot \text{Ww}6 \]

\[ \text{Vceil} + \text{Vw}1 + \text{Vw}2 + \text{Vw}3 + \text{Vw}4 + \text{Vw}5 + \text{Vw}6 = 4.23 \text{ kip} \quad \text{Vceil} = 1.66 \text{ kip} \]

Estimate the distribution of the seismic base shear

Direction parallel to RCS length
\[ \text{ycel} := \text{B} - \frac{\text{B} \cdot (2 \cdot \text{L} + \text{L}^2)}{3 \cdot (\text{L} + \text{L}^2)} \quad \text{ycel} = 11.68 \text{ ft} \]

\[ \text{yw}2 := \frac{\text{B}^2}{2} \quad \text{yw}2 = 6.00 \text{ ft} \]
\[ \text{yw}4 := \text{B} + \frac{\text{B}1}{2} \quad \text{yw}4 = 19.50 \text{ ft} \]

\[ \text{yc} := \frac{\text{ycel} \cdot \text{Vceil} + \text{Vw}2 \cdot \text{yw}2 + \text{Vw}3 \cdot \text{yw}2 + \text{Vw}4 \cdot \text{yw}4 + \text{Vw}5 \cdot \text{yw}4 + \text{Vw}6 \cdot \text{B}}{V} \quad \text{yc} = 11.35 \text{ ft} \]
Force on Wall 1

\[ F_{x1} := \frac{V \cdot (B - y_c)}{B} \]

\[ F_{x1} = 2.45 \text{ kip} \]

\[ F_{x1\text{ceil}} := \frac{V_{\text{ceil}} \cdot (B - y_{\text{ceil}})}{B} \]

\[ F_{x1\text{ceil}} = 0.94 \text{ kip} \]

\[ F_{x1\text{w}} := F_{x1} - F_{x1\text{ceil}} \]

Moment on Wall 1

\[ M_{x1} := F_{x1\text{ceil}} \cdot H + F_{x1\text{w}} \cdot \frac{H}{2} \]

\[ M_{x1} = 40.66 \text{ kip-ft} \]

Wall 1 base maximum base pressure

\[ p_{w1} := \frac{6 \cdot M_{x1}}{L^2} \]

\[ p_{w1} = 90 \text{ plf} \]

Maximum vertical force (use the greater of)

\[ \frac{M_{x1}}{L} = 0.78 \text{ kip} \]

\[ F_{x1} = 2.45 \text{ kip} \]

Force on Wall 6

\[ F_{x6} := \frac{V \cdot y_c}{B} \]

\[ F_{x6} = 1.78 \text{ kip} \]

\[ F_{x6\text{ceil}} := \frac{V_{\text{ceil}} \cdot y_{\text{ceil}}}{B} \]

\[ F_{x6\text{ceil}} = 0.72 \text{ kip} \]

\[ F_{x6\text{w}} := F_{x6} - F_{x6\text{ceil}} \]

Moment on Wall 6

\[ M_{x6} := F_{x6\text{ceil}} \cdot H + F_{x6\text{w}} \cdot \frac{H}{2} \]

\[ M_{x6} = 29.92 \text{ kip-ft} \]

Wall 6 base maximum base pressure

\[ p_{w6} := \frac{6 \cdot M_{x6}}{L^2} \]

\[ p_{w6} = 371 \text{ plf} \]

Maximum vertical force (use the greater of)

\[ \frac{M_{x6}}{L} = 1.36 \text{ kip} \]

\[ F_{x6} = 1.78 \text{ kip} \]

Checks

\[ F_{x1} + F_{x6} = 4.23 \text{ kip} \]

\[ V = 4.23 \text{ kip} \]

\[ V_{\text{wall}} := V - V_{\text{ceil}} \]

\[ F_{x1\text{ceil}} + F_{x6\text{ceil}} = 1.66 \text{ kip} \]

\[ V_{\text{ceil}} = 1.66 \text{ kip} \]

\[ F_{x1\text{w}} + F_{x6\text{w}} = 2.57 \text{ kip} \]

\[ V_{\text{wall}} = 2.57 \text{ kip} \]

Direction perpendicular to RCS length

\[ x_c := \frac{L}{2} \]

\[ x_c = 26.00 \text{ ft} \]

Force on Wall 2 or 3

\[ F_{y2} := \frac{V \cdot x_c}{L} \]

\[ F_{y2} = 2.11 \text{ kip} \]

\[ V = 2.11 \text{ kip} \]

\[ F_{y\text{ceil}} := \frac{V_{\text{ceil}}}{2} \]

\[ F_{y\text{ceil}} = 0.83 \text{ kip} \]

\[ F_{y\text{w}} := \frac{V_{\text{wall}}}{2} \]

\[ F_{y\text{w}} = 1.28 \text{ kip} \]

Moment on Wall 2 or 3

\[ M_y := F_{y\text{ceil}} \cdot H + F_{y\text{w}} \cdot \frac{H}{2} \]

\[ M_y = 35.29 \text{ kip-ft} \]
Wall 2 or 3 base maximum base pressure
\[ pw_2 := \frac{6 \cdot My}{B^2} \]
\[ pw_2 = 1470 \text{ plf} \]

Maximum vertical force (use the greater of)
\[ \frac{My}{B^2} = 2.94 \text{ kip} \]
\[ Fy_2 = 2.11 \text{ kip} \]

**RCS Structure Wall Out-Of-Plane Earthquake Loading Calculations**

\[ Fp := 0.40 \cdot Ie \cdot Sds \cdot wpa \]
Equation 16-63
\[ Fp = 1.22 \text{ psf} \]

0.40-Ie-Sds = 0.17
Uniform force on a panel assuming 4 foot wide panel

\[ Fp1 := Fp \cdot 4 \cdot ft \]
\[ Fp1 = 4.88 \text{ plf} \]

Total seismic force per panel
\[ Fp1 \cdot H = 117.09 \text{ lbf} \]

**RCS Earthquake Loading Calculations for Components Supported by the Ceiling**

\[ ap := 1.0 \]
\[ Rp := 1.25 \]
\[ z := H \]

\[ Fpfl := \frac{0.4 \cdot ap \cdot Sds \cdot Wp}{Rp \cdot Ip} \left( 1 + 2 \cdot \frac{z}{H} \right) \]
\[ Fpfl = 0.41 \times \text{weight} \]
Equation 16-67

\[ Fpmax := 1.6 \cdot Sds \cdot Ip \]
\[ Fpmax = 0.69 \]
Equation 16-68

\[ Fpmin := 0.3 \cdot Sds \cdot Ip \]
\[ Fpmin = 0.13 \]
Equation 16-69

\[ Fp := \text{if}(Fpfl < Fpmin, Fpmin, \text{if}(Fpfl > Fpmax, Fpmax, Fpfl)) \]
\[ Fp = 0.41 \times \text{weight} \]

**Conclusions**

Total weight of the RCS is approximately
\[ W_{\text{ceil}} + W_{\text{wall}} = 39.45 \text{ kip} \]

Seismic base shear for the RCS is approximately
\[ V = 4.23 \text{ kip} \]

Total out-of-plane force on a typical wall panel is
\[ Fp1 \cdot H = 117 \text{ lbf} \]

The maximum g force for attachment of lighting and piping to the RCS is
\[ Fp = 0.41 \]

See the base shear distribution estimates for forces on the FFS for earthquake loading. The maximum vertical force from the earthquake load is approximately 3 kips. That is less than the design wheel load for the FFS floor of 3.2 kips.
Appendix G

Form 540.04 Certificate of Conformance
CERTIFICATE OF CONFORMANCE

NOTE: Prior to completing this certification, the Supplier shall review and comply with the attached form instructions.

A. A. Purchase Order/Contract Data

<p>| | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1. PO No.:</td>
<td>2. PO Rev No.:</td>
<td>3. PO Line Item:</td>
</tr>
<tr>
<td>4. Contract No.:</td>
<td>5. Contract Amendment No.:</td>
<td></td>
</tr>
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</table>

B. Supplier/Source Information

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<tr>
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<tbody>
<tr>
<td>6. Supplier:</td>
<td>7. Supplier Address (Street/City/State):</td>
</tr>
</tbody>
</table>

8. Source of Origin:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Street:</td>
<td>City:</td>
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<tr>
<td>Country:</td>
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</table>

CAUTION:
The suppliers shall take all necessary actions and precautions to assure that this Certificate of Conformance (C of C) is accurate, complete, and true, regardless of the actual source of origin.

C. Applicable Requirements

<p>| | |</p>
<table>
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<tr>
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<tbody>
<tr>
<td>9. Code/Standard No.:</td>
<td>Revisions/Editions/Addendum:</td>
</tr>
<tr>
<td>10. Specification No.:</td>
<td>Revision/Editions:</td>
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<tr>
<td>11. Technical Drawings/Diagrams:</td>
<td>Revision:</td>
</tr>
<tr>
<td>12. Other:</td>
<td>Revisions/Editions/Addendum:</td>
</tr>
</tbody>
</table>

D. Approved Changes/Deviations/Waivers/Substitutions/Nonconformances:

E. Nonconformance(s): Unless otherwise directed in writing by the Procurement Agent, Do NOT deliver/ship materials/items/equipment if there are any changes, deviations, substitutions, or nonconforming conditions that have not been previously submitted and approved utilizing Contractor Form 540.16, Interface Document.

F. Certification Statement

(Supplier), hereby certifies that the materials/items/equipment identified in Section A above, and all required documentation, conforms in all respects to the stated Purchase Order/Contract requirements and that all exceptions, waivers, deviations, and/or nonconforming conditions are identified in Section D. Furthermore, information provided is accurate, complete, and true pursuant to 10 CFR 820.11 (see definition).

Authorized Certifying Official (See Definitions/Instructions):

<table>
<thead>
<tr>
<th>Printed Name</th>
<th>Signature</th>
<th>Title</th>
<th>Date</th>
</tr>
</thead>
</table>

See Instructions

C of C is Limited To One Page. Attached Additional Pages On Supplier Letter Head If Required.
CERTIFICATE OF CONFORMANCE

Instructions

General

Prepare a Certificate of Conformance (C of C) addressing each Purchase Order line item, Contract Deliverable, and/or each partial shipment. Unless otherwise specified, the C of C shall accompany each shipment. All applicable form entries must be completed.

A Supplier system-generated C of C may be attached and referenced. All applicable information required on form 540.04 shall be accounted for. Section A and Section F shall be completed in their entirety, regardless of any attachments used.

Definitions

Authorized Company Certifying Official. The certification shall be attested to by an authorized representative of the supplier; and the certification system, including the procedures for completing, reviewing, and approving the certificate shall be described in the Company’s administrative control system.

Certification. The act of determining, verifying, and attesting in writing to the qualifications of personnel, processes, procedures, or items in accordance with specified requirements.

Certificate of Conformance. A document signed or otherwise authenticated by an authorized individual certifying the degree to which items or services meet specified requirements.

10 CFR 820.11. Procedural Rules for DOE Nuclear Activities, Subpart “A”, Information requirements. The regulation states:

(a) Any information pertaining to a nuclear activity provided to DOE by any person or maintained by any person for inspection by DOE shall be complete and accurate in all material respects.

(b) No person involved in a DOE nuclear activity shall conceal or destroy any information concerning a violation of a DOE Nuclear Safety Requirement, a Nuclear Statute, or the Act.

Instructions

Section A, Purchase Order(PO)/Contract Data

Entry 1 Enter the complete INEEL Purchase Order (PO) number.

Entry 2 Enter PO Revision Number (if applicable).

Entry 3 Enter the PO Line Item Number, i.e., 1, 2, 3, etc....

Entry 4 Enter the INEEL Contract Number (if not a PO).

Entry 5 Enter the latest Contract Amendment Number (if applicable).

Section B, Supplier/Source Information

Entry 6 Enter the legal Supplier company name, as stated on the PO or Contract.

Entry 7 Enter the Supplier business address, as stated on the PO or Contract.

Entry 8 Enter the point of shipping origin by city, state, and country if different than Block 7. The point of origin shall be the originating location from which final shipment/delivery to the INEEL is made. If different than Block 7, see CAUTION statement.

Section C, Applicable Requirements

Entry 9 Enter the applicable design code or consensus standard and revision, edition, or addendum.

Entry 10 Enter the applicable specification and revision, edition, or addendum.

Entry 11 Enter the applicable technical drawing/diagram and applicable revision, edition, or addendum.

Entry 12 Enter Other applicable requirements documents and revision, edition, or addendum.
CERTIFICATE OF CONFORMANCE

Section D, Approved Changes/Deviations/Waivers/Substitutions/Nonconformances

Enter any approved changes. Reference change documentation control numbers as applicable. (Attach additional pages if necessary).

Section E, Nonconformance(s)

Self Explanatory.

Section F, Certification Statement (see definitions)

Enter the Company name (or commonly used acronym).

Print or type the authorized company certifying officials name, title, and date.

Affix certifying official signature (indelible ink only - no stamps).