

Oliktok Instrument Shelters
Technical Specification
November 6, 2012

Background

The Atmospheric Radiation Measurement (ARM) Climate Research Facility, a U.S. Department of Energy (DOE) scientific user facility, provides the climate research community with strategically located in-situ and remote sensing observatories designed to improve the understanding and representation, in climate and earth system models, of clouds and aerosols as well as their interactions and coupling with the Earth's surface. The DOE ARM Program operates both fixed and mobile sites at locations around the world (more information on sites and instruments at www.arm.gov).

This solicitation is for instrument shelters that will be part of a new mobile facility designated as the Third ARM Mobile Facility or AMF3. This mobile ARM facility is tentatively scheduled to be installed near Oliktok Point, Alaska during Summer 2013.

The new Oliktok Point site will be established as an extended-duration mobile facility deployment. Data from this site will expand ARM data collections for use in studies of Arctic climate processes and to support modeling activities for improving climate simulations for this rapidly changing climatic regime. In addition to the ground-based instruments and contingent on FAA approval, regular deployments of small, unmanned aerial vehicles (UAVs) will obtain similar measurements in the sky. These data complement and extend the observational coverage of ARM's North Slope of Alaska locale to the North Pole.

This RFP is a request for six instrument shelters that will serve as the core of the AMF3. Detailed specifications for these six shelters are provided in the attached package of drawings and written specifications. Umiaq, Inc. in Anchorage Alaska is the Architectural and Engineering firm supporting Sandia National Labs and the Pacific Northwest National Laboratory (PNNL) in this procurement.

Certain components of the final AMF3 shelter system will be specified and procured at a later time. These components to be built at a later time include an Arctic Entry with mechanical room, an elevated deck for instrument placement, various satellite shelters, and related hardware for the deck and entry.

This requirement is for six shelters that shall be delivered to Sandia National Laboratories in Albuquerque, New Mexico. The bidder will not be responsible for installation in Alaska or other field locations. Bidders will not be responsible for permits required for installation.

An Aerosol Observing System (AOS) shelter will be specified and procured at a later time.

An electrical power generator system will be specified and procured at a later time. The shelter for the electrical power generator system will be specified and procured separately.

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Pre-Award and Progress Inspections

A small team of two or three staff members from PNNL and Sandia will visit candidate bidder's facilities after the initial down-selection process based on proposal evaluations. Down-selection will identify a short list of candidate firms that will be visited for on-site facilities evaluation and recommendations for the panel evaluation process.

Progress inspections may be conducted at the 25% and 75% completion points at the option of the Contracts Representative.

Update on Specification for a Best and Final Bid Notes on errors, modifications, and clarifications will be provided to all bidders. Before a Best and Final Proposal is requested, a list of errata and any changes in specifications will be issued to bidders.

Contract Deliverables

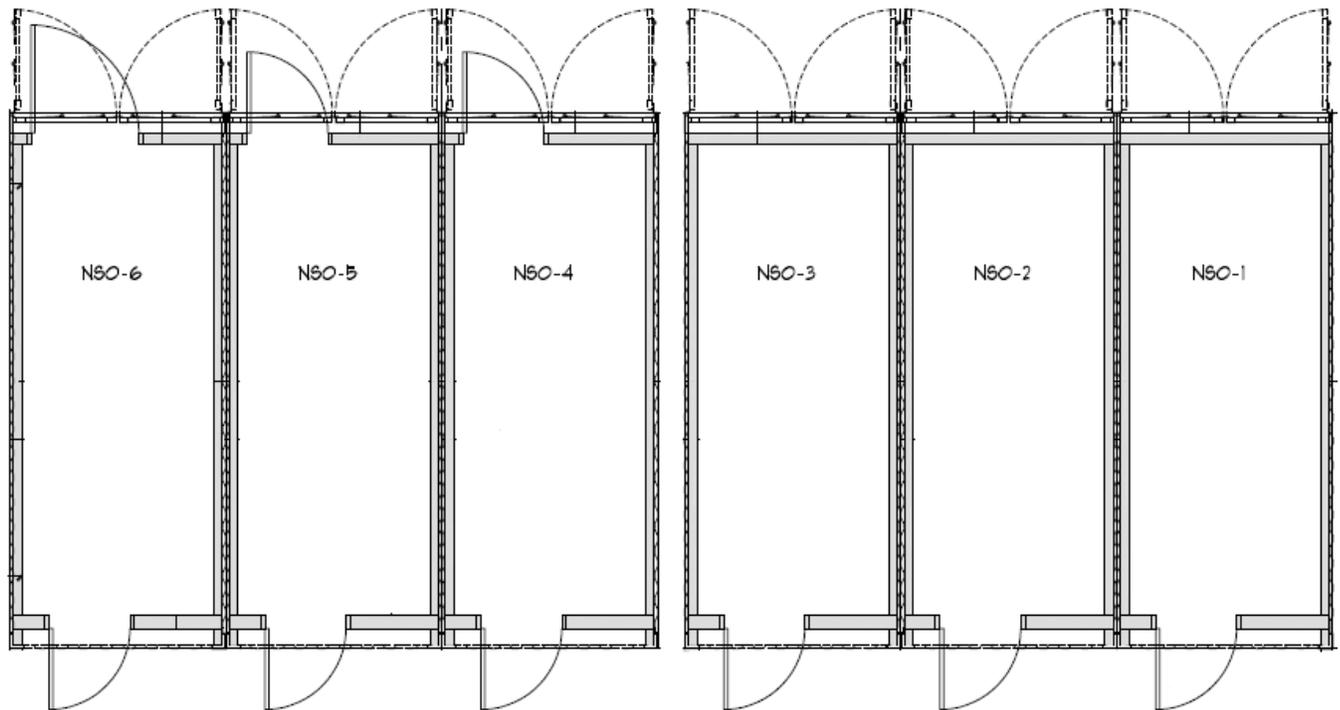
1. Final Progress Schedule at commencement of work, updated bi-weekly or more frequently if Schedule changes occur. Progress reports at bi-weekly intervals starting 2 weeks after contract award.
2. Shop Drawings & Material Submittals:
 - a. Provide submittals for approval prior to ordering materials that will be used to construct the shelters.
 - b. Submit copies to:
 - i. three copies to Architect
 - ii. two copies to Owner
3. Completed shelters in accordance with Construction Documents (Drawings and Specifications) and Contract requirements, delivered to a designated site at:
Sandia National Laboratories, Kirtland AFB, Albuquerque, NM
4. Complete Final Documentation Package with:
 - a. Three (3) hard copies of as-built drawings,
 - b. Three (3) copies of all material cut sheets (material information, supplier/manufacturer information, maintenance information, etc.),
 - c. Electronic files (Autocad) of as-built drawings, and
 - d. ISO certifications and supporting documentation as required for shelters.
5. User Manual with Maintenance Guide for each type of shelter, to include:
 - a. Container Certificates as required in Specifications, and
 - b. Detailed Drawings and Specifications of original Container type(s); with dimensions, material specifications, size/shape/gauge/etc. of all structural elements, and maintenance

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recommendations. Also include directions for removal of container doors and removable panel where used. Other information relevant to the proper use and maintenance of the modified containers shall be provided to the Owner. Information on original container construction may be integrated into the Final Drawings of the modified containers, if Contractor prefers, but all information must be clear and legible.

6. Excess materials (paints, insulation, panels, etc.) in good condition, stored and sealed per manufacturer recommendations. Include all material information, and label all containers clearly and legibly to assure Owner can identify each.
7. Bidder shall provide one-year warranty on Container shelters and modifications under this Contract.

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IDs: NSO-1, NSO-2, NSO-3, NSO-4, NSO-5, NSO-6 (North Up)

Documents:

For Bidding and Construction purposes, reference Drawings in combination with these Specifications, as well as all Procurement documents. Drawing set is identified as “**ISO Procurement Documents – Sandia National Laboratories ARM Climate Research Facilities – Oliktok, AK**”.

1.0 Container Type – all containers:

1.1 Single Use Standard 20' ISO General Purpose Container, with corrugated steel walls and wooden floor, constructed per ISO 1496. Container dimensions to be:

1.1.1 Outside dimensions: 20' (6058 mm) long x 8' (2438 mm) wide x 8'-6" (2590 mm) tall.

1.1.2 Inside dimensions: Min. of 19'-3" (5867 mm) long x 7'-(8-1/2)" (2350 mm) wide x 7'-(9-7/8)" (2383 mm) tall.

1.2 Container features: Container to include:

1.2.1 Fork-lift pockets full width of container.

1.2.2 Weather-sealed removable steel doors one end and removable panels at opposite end.

1.2.2.1 Doors: Minimum of 7'-6" (2286 mm) x 7'-5" (2261 mm), with full height galvanized lockable gear attaching at top and bottom. Doors to be removable by way of unbolting doors from hinges (not removable pins). Fit all moveable hardware with zerk fittings for grease servicing.

1.2.2.2 Removable steel end panels: Each are to be in two sections of equal size, full height with vertical weather-tight seams all around. Panels do not require insulation. Design for installation and removal with conventional non-pneumatic hand tools; and such that there are no obstructions across the full height and width of the container opening when the panel is removed.

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1.2.2.3 Design: Both ends of the container shall be engineered to resist the design loads with the doors and/or removable end panels removed.

2.0 Certification:

- 2.1 Containers to be ISO certified and to bear a current CSC Safety Approval plate. Ensure all modifications to container, including external penetrations and projections do not invalidate the original certification of the container. Strengthen the container as needed to retain certification and CSC safety approval.
- 2.2 Record all marking schemes prior to sanding and priming. Markings to be re-stenciled after final painting. Markings to comply with ISO 6346 for coding, identification and marking of intermodal containers, to include a unique serial number (with check digit), owner code, a country code, size, type and equipment category as well as any operational or warning marks.
- 2.3 Certification plate to remain intact and reattached to same location after final painting.
- 2.4 Design Loads: Each shipping container shall be engineered to support the following additional design loads in accordance with the International Building Code, 2009 Edition. Containers shall be designed to support the required loads when supported at the bottom corner connection locations. (note: these load criteria are applicable for any location on the North Slope of Alaska.)
 - A. Roof Live Load: 60 psf
 - B. Ground Snow Load: 50 psf
 - C. Floor live load: 250 psf
 - D. Wind load: 130 mph, Exposure D
 - E. Seismic loads: $S_s = 0.64$; $S_1 = 0.192$; Site Class D
- 2.5 Certification Submittals:
 - 2.5.1 Submit shop drawings of the transportable container representing proposed modifications, including all container penetrations, meeting the design drawings and these specifications for approval before purchasing equipment or starting construction. The shop drawings will need to be engineered and stamped by an engineer licensed in the State of Alaska, where the modules will ultimately be placed into service.
 - 2.5.2 Submit construction safety plan for review and approval before commencement of work. Submit product information for all proposed equipment before purchase.
 - 2.5.3 Submit list of proposed subcontractors to be used.
 - 2.5.4 Submit reports of process and results of all testing specified for each container.

3.0 Material Submittals:

- 3.1 Submit cut sheets for materials and products to be used for construction/modification of containers. Include information for evaluation according to Drawings and these Specifications in order to obtain approval of submittals, to include:
 - 3.1.1 Manufacturer's data sheets on each product to be used, including:
 - a. Preparation instructions and recommendations.
 - b. Storage and handling requirements and recommendations.
 - c. Installation methods.
 - 3.1.2 Selection Samples: For each finish specified, two complete sets of color chips/charts representing manufacturer's full range of available colors and textures as applicable.
 - 3.1.3 Maintenance Instructions.

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4.0 Wood Framing:

- 4.1 Scope: Wood framing and miscellaneous lumber as shown in Drawings for use in wall, ceiling and floor assemblies.
- 4.2 Quality Standards: Comply with "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by American Lumber Standard Committee's (ALSC) Board of Review (i.e. West Coast Lumber Inspection Bureau (WCLIB) and Western Wood Products Association (WWPA)), as applicable to species. Lumber design values are to comply with ASTM D245 and ASTM D2555. Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
- 4.3 Delivery and Storage: All wood framing to be supplied new from single supplier. Deliver and store wood bundled to protect during transport and during storage. Inspect for damage upon delivery. Remove and replace any damaged material. Keep dry, under cover, and provide for air circulation. Protect from weather and contact with wet surfaces.
- 4.4 Materials: As indicated on Drawings, provide dimension lumber of any species and grades indicated below. Where nominal sizes are indicated, provide actual sizes as required for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber. Select all lumber to be straight and unwarped; with minimal splits, knots or holes.
 - 4.4.1 General framing and studs: Provide dressed lumber, surfaced four sides (S4S), unless otherwise indicated. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal (38 mm actual) thickness or less. For dimension lumber, provide No. 3 or Standard grade lumber of any species.
 - 4.4.2 Wood furring: At floors and ceilings, 5/4 softwood lumber (1" actual thickness) of No. 3 or Standard grade lumber of any species.
 - 4.4.3 Miscellaneous lumber: Provide lumber for support or attachment of other construction. Fabricate miscellaneous lumber from dimension lumber into shapes shown on Drawings or as required to perform work.

5.0 Coatings:

- 5.1 Surface Prep: Surface must be cleaned, dry, undamaged and free of all contaminants, including salt deposits. Round off all rough welds and sharp edges, and remove all weld spatter. Do not leave blasted steel uncoated overnight. Spot blast if needed. Complete all prep per manufacturer recommendations.
- 5.2 Priming: Apply primer as soon as possible after surface prep to avoid rusting or other recontamination. Apply per manufacturer recommendations.
- 5.3 Exterior Coating System: Exterior and Interior Coating systems (primer, intermediate and finish coats) to be from a single manufacturer (see Section 5.7 below for Interior Coating systems). Provide and apply systems as shown on Drawings, to perform in Arctic marine environments. Supply from approved manufacturer, to include those below, or other equivalent systems if prior approval is obtained from the Owner:
 - 5.3.1 Apply exterior coating system by PPG Industries Protective and Marine Coatings, as:
 - Finish coat: Amercoat 229T Epoxy, over
 - Intermediate coat: Amercoat 385 Epoxy, on
 - Primer: Dimetcote 9H primer (inorganic-zinc silicate).

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5.3-Bid Alternate #1: Provide and apply systems to perform in Arctic marine environments as approved, to include those below, or other equivalent systems if prior approval is obtained from Owner:

5.3.1a-Bid Alternate #1: Sherwin-Williams Protective and Marine Coatings:

Finish coat: SeaGuard 3000 Marine Polyurethane (a 2-component polyester-aliphatic polyurethane), Part A resin and Part B cure; over

Intermediate coat: SeaGuard 5000 HS epoxy, on

Primer: Fast Clad Zinc primer

5.3.1b-Bid Alternate #1: PPG Industries Protective and Marine Coatings:

Finish coat: Amercoat 450H (an aliphatic polyurethane), over

Intermediate coat: Amercoat 385 Epoxy, on

Primer: Dimetcote 9H primer (inorganic-zinc silicate).

5.4 Coating System Application: Apply all coatings per manufacturer recommendations for optimal performance in Arctic marine conditions. Apply to all steel surfaces of containers. Do not apply over hot-dip galvanized surfaces, and protect hot-dip galvanized surfaces from damage during all work.

5.5 Roof: Apply final roof coat as a slip resistant surface:

5.5.1 Sherwin Williams Protective and Marine Coatings: SharkGrip Slip-Resistant Additive micronized polymer in finish coat. Mix and apply per manufacturer recommendations.

5.5.2 PPG Industries Protective and Marine Coatings: Anti-slip additive 886 (50-70 mesh) in finish coat. Mix and apply per manufacturer recommendations.

5.6 Porch Areas:

5.6.1 North Porch Floors and Walls:

5.6.1.1 At North End Porch: Between framed end walls and outer edge of container at North end opening, apply 2 coats of Rhino Hybrid 21-55 (Polyurethane/polyurea blend) or Rhino Extreme 21-55 coating for the outside porch floor and extend continuously for 6" up all wall surfaces.

5.6.1.2 At North End Porch: Porch walls and ceiling: Use same system as used for container exterior in North porch area, starting at 6" above the floor and going up all walls and across ceiling of the porch area.

5.6.2 South Porch Floors and Walls:

5.6.2.1 At South End Porch: Between framed end walls and outer edge of container at South end opening, apply floor coating system as described for interior coatings in Section 5.7.

5.6.2.2 At South End Porch: Porch walls and ceiling: Use same system as used for container interior in South porch area, full height of all walls and at ceiling, as described in Section 5.7.

5.7 Interior Coating System: Provide and apply Interior Coating system at exposed interior surfaces and floor. Interior and Exterior Coating systems (primer, intermediate and finish coats) to be from a single manufacturer (see Section 5.3 above for Exterior Coating systems). Colors as selected by Owner.

5.7.1 Wood floor coating prep: (1) clean floor free of all oil, sap, dirt and debris, (2) use a pole sander with a 60-80 grit screen to scuff the surface and create a mechanical bond, (3) vacuum the area thoroughly to remove all dust, and (4) mop or wipe the area with a damp rag or cloth to clean up any remaining dust. Apply final floor coat as a slip-resistant surface, as specified above for container roof.

5.7.2 Gypsum wallboard coating prep: Tape all joints, fill cracks and nail holes with patching paste or spackle; sand smooth. Remove all dust.

5.7.3 Coating Systems: Provide and apply systems to perform in Arctic marine environments as approved, to include those below, or equivalent systems if prior approval is obtained from Owner.

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5.7.2.1 Sherwin-Williams Protective and Marine Coatings:

Wood and Gypsum board substrates:

Finish coat: Pro Industrial Zero VOC WB Epoxy (2 coats at floor, 1 coat at walls), on

Primer: ProMar 200 Zero VOC Latex Primer (1 coat), for

Total Dry film thickness (DFT) of 8 mils at floor, 4 mils at walls.

Steel and Galvanized steel substrates:

Finish coat: SeaGuard 5000 HS epoxy, on

Primer: Fast Clad Zinc primer

5.7.2.2 PPG Industries Protective and Marine Coatings:

Wood and Gypsum board substrates:

Finish coat: Amercoat 335 Epoxy-Acrylic (2 coats at floor, 1 coat at walls), on

Primer: Amercoat 335 Epoxy-Acrylic (2 coats), for

Total Dry film thickness (DFT) of 8 mils at floor, 4 mils at walls.

Steel and Galvanized steel substrates:

Finish coat: Amercoat 385 Epoxy, on

Primer: Dimetcote 9H primer (inorganic-zinc silicate), for

6.0 Interior Frame Walls, Ceiling & Floor Assemblies:

5.1 Front and rear framed end walls to be recessed from inside face of the front double doors and rear removable panels, as depicted on Drawings. Ensure container double doors close and that removable panel will install with all fixtures installed in false walls.

6.2 **Framed end walls:** According to details provided, frame with galvanized 14 gauge (68 mil) steel punched "C" studs (3-5/8" deep x 1-5/8" flanges [92 mm x 41 mm]).

6.2.1 Framed end wall studs to be Grade 50 (50 ksi minimum yield strength), with G60 galvanized coating and standard punched web holes (approximately 3" x 1.5" at 24" o.c). Comply with standards ASTM A653/A653M, A924/A924M, & A1003/A1003M, C955, and C1007.

6.2.2 End Walls Exterior Face:

6.2.2.1 Wall Section 2 per Drawings for End Wall at North End (inside double doors): Clad exterior with sheet metal ASTM A1011 CS Type B, 14 gauge ((68 Mil)) X 48" (hot rolled commercial quality, general purpose sheet metal). Install vertically and weld to C-studs and 14 gauge galvanized metal angle at floor - do not use screws. Paint same as steel container exterior. The North End Wall cladding shall be seal welded to the container and the door frame and any other required appurtenances with a full penetration weld around the entire perimeter.

6.2.2.2 Wall Section 1 per Drawings for End Wall at South End (inside removable panels): Clad exterior with painted 5/8" [16 mm] thick gypsum board. Supply Type 'X' fire-resistant rated gypsum board complying with ASTM C1396, with tapered edge to receive tape and fire-resistant joint compound. Paint same as steel container interior coating system for gypsum board, according to Section 4.7. Approved manufacturers, or equal as approved by Owner:

- CertainTeed (ProRoc Type X Gypsum Board);
(<http://www.certainteed.com/Products/313675>),
- National Gypsum (Gold Bond XP Fire Shield Gypsum Board);
(<http://www.nationalgypsum.com/products/Product.aspx?ProductID=2374>,
<http://www.nationalgypsum.com/File/111081.pdf>).

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- 6.2.3 End Walls Insulation: Provide and install 2-component, closed cell, spray foam polyurethane for full thickness in all framed end walls. Insulation to be ASTM E84 Class 1 fire-resistant, CertainTeed CertaSpray or equal, with density of 2.2 +/- 0.3 lbs/cu.ft. (~35 kg/cu.m.), with an initial R-value of at least 6.7/inch (aged value of at least 6.4/inch), and water vapor permeability (perm rating) of < 1.5 +/- 0.2 perm-inch.
- 6.2.4 End Walls Interior furring: Install 16 gauge (54 mil) galvanized steel cold rolled channels (3/4" deep x 1/2" flange) at 16" o.c. Channels to be ASTM C955 (load-bearing steel studs and bracing), ASTM A653 with G60 or G40 coating (galvanized steel sheet or zinc-iron alloy coated by hot-dip process), Grade 50 (50 ksi minimum yield strength), ASTM A1003/A1003M (cold-formed framing members), conforming to ASTM C645 standards.
- 6.2.5 End Walls Interior face: Install fiberglass-reinforced plastic (FRP) laminate on one side of 3/4" [18 mm] A-C or better exterior grade plywood. Supply exterior grade plywood of any species, per Western Wood Products Association (WWPA) and the Engineered Wood Association (APA). Install plywood over vapor barrier. FRP laminate to be ≥ 0.09" (2.29mm) thick, with smooth finish, and color as selected by Owner. FRP laminate to be Class C/III (Flame spread index of 200 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E 84), with randomly oriented fibers at a density of >2.2 g/cm³. Acceptable Manufacturer: Marlite; (202 Harger Street, Dover, OH 44622, Tel: (330) 343-6621; Email: info@marlite.com; www.marlite.com), or Owner-approved substitution.
- 6.2.5.1 Work Conditions: Store products in manufacturer's unopened packaging until ready for installation, protect and install panels according to manufacturer recommendations. Protect installed panels from damage through completion of all work. Replace any panels with damaged surfaces. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- 6.2.5.2 FRP Substrate: Warped plywood should be replaced. Level high spots, fill low spots, and lightly sand the plywood surface with coarse-grit sandpaper. Remove any raised chips of wood and make the surface as smooth as possible for the best bond. Verify that substrate is dry, even and free from dirt, grime and dust prior to installing FRP.
- 6.2.5.3 Layout/spacing: Prefit FRP panels to the wall prior to applying adhesive. FRP panels expand and contract due to changes in temperature and humidity. Adequate space must be allowed around panels to allow for expansion and contraction. Allow 1/8" spacing between panels and 3/8" gap at the floor and ceiling, as recommended by manufacturer.
- 6.2.5.4 FRP laminate prep: All cutting or drilling should be done prior to applying adhesive to the panels. Holes should be predrilled in the panels using a bit that is 1/8"-1/4" larger than the screw shaft. Follow manufacturer recommendations for all cutting and drilling. (Note: for ceilings, under no situation shall anything be of a length or positioned such that it could penetrate the VIP insulation envelope.)
- 6.2.5.5 Installation: Install PVC trim, of same manufacturer and color as panels, and seal all joints using silicone sealant. Begin in a top corner by installing corner molding and applying silicone sealant in the channel of the molding. Apply the adhesive to the backside of the FRP panel as described below. Set FRP panel true, and using a laminate roller, roll firmly over the panel starting at the top corner nearest the molding, rolling down and away toward the opposite edge. Eliminate all trapped air pockets and roll 100% of the panel firmly for the best bond. Adhesive and residue should be removed from the face of the panels before it dries. Apply silicone sealant around any exposed edges or penetrations.

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Secure FRP on plywood to metal framing with #7 x 2" self-tapping screws with flat washers spaced at 16" o.c. in the field and at 12" o.c. at perimeter edges. Install screws snug, do not over-tighten as would restrict expansion of FRP. Pre-drill holes in FRP at 1/8-1/4" larger than the diameter of screws to allow for expansion. Apply silicone sealant beneath all fasteners.

6.2.5.5.1 Use adhesive which is formulated specifically for FRP (Titebond GREENchoice Fast Grab FRP Adhesive, or equal). Follow manufacturer recommendations for specific trowel, open time, coverage, etc. Apply adhesive to 100% of the backside of the panel using a crosshatch pattern, all the way out to the edges of the panel. Do not apply adhesive to the wall, only to the back of the FRP panels.

6.2.6 Vapor Barrier: According to Drawings and details provided, install Class I vapor barrier (retarder) at all walls, ceiling and floor. Vapor barrier material is to conform with ASTM E-96 Test Method A (dessicant or dry cup method). Vapor barrier material to be 10 mil thick polyethylene sheet (approx. 0.06 perm rating). Lap vapor barrier material a minimum of 6 inches and seal laps with sealant and vapor retarder tape. Seal perimeter of vapor barrier to adjoining construction with sealant.

6.2.7 Sealant: Seal all joints using polyurethane sealant, unless noted otherwise.

6.3 Interior Side Walls construction:

6.3.1 Interior Wall Framing: According to Drawings and details provided, frame with 2" x 4" untreated lumber, flat, over 1-1/2" steel studs at 24" (600 mm) o.c.

6.3.1.1 Metal studs to be galvanized 18 gauge (43 mil), with punched web; with G60 or G40 coating per ASTM A653 (galvanized steel sheet or zinc-iron alloy coated by hot-dip process) Grade 50 (50 ksi minimum yield strength), ASTM A1003/A1003M (cold-formed framing members), conforming to ASTM C645 standards.

6.3.1.2 Install metal studs horizontally at 24" (610 mm) o.c., as shown on Drawings, and stitch weld to container walls (1/8" fillet welds, 1" at 12" (300 mm) o.c.). Attach metal studs not more than 4" (100 mm) from both the floor line and the ceiling line. Weld all metal studs ends, top and bottom, to container metal panels.

6.3.1.3 Install 2 x 4 untreated wood framing vertically at 24" (610 mm) o.c. over metal studs, beginning from center of container length, as shown on Drawings. Secure wood to metal studs with galvanized #10 x 2-1/2" Type S self-tapping screws at 24" o.c. (at each metal horizontal stud/framing intersection), and within 4" of ends. Use two (2) screws at each metal framing connection/intersection. Connect wood wall framing to floor and ceiling assemblies according to details provided. Frame around all openings according to details provided.

6.3.2 Interior Side Walls Insulation: Provide and install 2-component, closed cell, spray foam polyurethane for full thickness in all framed side walls. Insulation to be ASTM E84 Class 1 fire-resistant, CertainTeed CertaSpray or equal, with density of 2.2 +/- 0.3 lbs/cu.ft. (~35 kg/cu.m.), with an initial R-value of at least 6.7/inch (aged value of at least 6.4/inch), and water vapor permeability (perm rating) of < 1.5 +/- 0.2 perm-inch.

6.3.3 Interior Side Wall Panels: According to Drawings and details provided, attach FRP finish to plywood panels over the vapor barrier at interior walls.

6.3.3.1 Side wall finish shall be fiberglass-reinforced plastic (FRP) laminate as described above in Section 6.2.5.

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- 6.3.3.2 Attach FRP over plywood with adhesive as described in Section 6.2.5. Secure FRP on plywood to wood framing with #7 x 1-1/2" screws with flat washers at 12" o.c. along FRP perimeters only. Install screws snug, do not over-tighten as would restrict expansion of FRP. Pre-drill holes in FRP at 1/8-1/4" larger than the diameter of screws to allow for expansion. Apply silicone sealant beneath all fasteners.
- 6.3.4 Vapor Barrier: Vapor barrier shall be polyethylene as described above in Section 6.2.6.
- 6.3.5 Mounting Brackets (Unistrut): Side Walls to have vertical (floor to ceiling), surface mounted, 7/8" x 1-5/8" galvanized steel channels. Mount from middle of container to each end at 24" o.c. for the length of both side walls (at center of 2 x 4 wood framing), at same locations as ceiling channels. Install Unistrut model P3300 type HS or T, hot dip galvanized; screwed through wood to metal framing with #10 x 2" self-tapping flat-head screws, at 12" o.c. as detailed, and at no more than 4" from ends. **Caution – do not puncture VIP insulation envelopes.** Refer to detail provided.

6.4 Ceiling Assembly:

- 6.4.1 Construct ceiling assembly to extend for container length (See Drawings), and across the full width of the container. General assembly to consist of FRP laminate on plywood over a vapor barrier, secured to 5/4x4 wood framing against container panel, with insulation between framing of vacuum insulation panels (VIPs) and XPS insulation each side.
- 6.4.1.1 Wood framing to be 5/4x4 untreated framing in both directions (framing and perpendicular blocking as shown on Drawings), held in place flat against interior of container panel with galvanized metal angles. Secure wood framing to angles each side of studs with #8 x 1-1/2" type S screws at 16" o.c. Steel angles to be 1" x 1" x 18 gauge (43 mil), with G60 or G40 coating per ASTM A653 (galvanized steel sheet or zinc-iron alloy coated by hot-dip process) Grade 50 (50 ksi minimum yield strength), ASTM A1003/A1003M (cold-formed framing members), conforming to ASTM C645 standards. Secure angles to container panel with stitch welds same as for wall channels as described above in Section 6.3.1.2.
- 6.4.1.2 Vacuum Insulation Panels: Provide vacuum insulation panels (VIPs) of high-efficiency insulation, with good compressive strength (15 psi), fire rating performance (flame spread index ≤ 25 , smoke developed index ≤ 20) and initial R-value $\geq R-38/\text{inch}$. Panels to be constructed of high-performance core (i.e. fumed silica) with getter and desiccant, encapsulated under vacuum by a metalized multi-laminate polyester/polyethylene envelope with hermetically welded seams to maintain vacuum and eliminate moisture penetration. Panels shall fit tightly between framing, with sizes to minimize the number of panels and joints between panels. VIPs to be 7/8" thick with a bulk density between 9.5-18 lbs/ft³ [150-300 kg/m³], vacuum of 0.015 to 0.06 psi [1 - 4 mbar] pressure, and continuous operating temperature range of (-)330 to 250 °F [(-)200 to 120 °C]. Obtain approval from Owner prior to substitution from approved manufacturers. Approved VIP manufacturers are:
- Dow Corning Vacuum Insulation Panels; Dow Corning Corporation, PO Box 994, Midland, MI, 48686, USA;
 - NanoPore Vacuum Insulation Panels; NanoPore Inc., 2525 Alamao Ave. SE, Albuquerque, NM 87106, info@nanopore.com, www.nanopore.com;
 - MicroTherm (SlimVac); 3269 Regal Drive, Alcoa, Tennessee 37701, 865 681 0155, sales@microtherm.us, www.microthermgroup.com.
 - Vacupor Vacuum Insulation Panels; Porextherm GmbH, info@porextherm.com, www.bau-vip.de (US distributor at <http://www.peakbp.net/>).

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6.4.1.2.1 Storage and Handling: Store VIPs in original packages, lying flat and supported on a flat surface in a dry and clean place. Protect against moisture, extended exposure to sunlight, and mechanical impact. Transport packaging should only be removed and panels checked shortly before assembly. VIPs must be protected against all mechanical impacts during transport and storage. Short-term, unprotected storage on dirty floors, storage racks or scaffolds is not allowed.

6.4.1.2.2 Installation:

- a. Before installation, VIPs must be checked for loss of vacuum. A properly sealed panel is relatively hard and the barrier film fits tightly, with a crinkly appearance (similar to vacuum packed coffee). A damaged/unsealed panel is softer and the barrier film is loose with slight bubble formation, without the distinctive crinkled appearance. Sort out any damaged/unsealed panels right away and do not use.
- b. Substrate must be clean and dry, with uneven surfaces leveled prior to installation. Surfaces must be clean and free of sharp edges or barbs. Verify that all welds and connectors, have been ground smooth and are free of sharp edges, etc. prior to installing VIPs.
- c. The VIP barrier film must not be damaged or removed. Sawing, cutting, drilling, piercing, etc. of the panels is prohibited, and do not walk on unprotected VIP panels. Avoid contact with flames or excessive heat, and apply under conditions where temperature is $< 176\text{ }^{\circ}\text{F}$ [$80\text{ }^{\circ}\text{C}$]. Keep away from solvents, and use solvent-free installation adhesives only (if adhesive is used).
- d. Install VIPs with foam backer rod at perimeter (1, 2, 3, or 4 sides as needed). Install backer rod continuous around sides as required for a snug fit of the VIP into the cavity without forcing or straining the VIP panel, as noted in next paragraph. Install backer rods with blunt tools (none sharp) and take care to not damage moisture-resistant outer skin.
- e. **Do not damage VIPs during installation** – install snugly, but **do not force into place – install with even pressure to prevent bending, etc.** All damaged panels must be replaced. Do not expose panels to excessive tensile, bending, or compressive forces at any time. Install panels snug against one another, as joints may cause heat bridges and infiltration. Fill all gaps at edges and between VIPs with closed cell foam backer rods.

6.4.1.2.3 Foam Backer Rods:

- a. Install foam backer rods around VIP perimeters as noted above.
- b. Supply foam backer rods of closed-cell polyurethane or polyethylene per ASTM C1330, density of $\geq 1.75\text{ lbs/ft}^3$, $\geq 24\text{ psi}$ tensile strength, $\geq 25\%$ compression deformation at 5 psi, $\leq 0.03\text{ g/cm}^3$ water absorption, R value $\geq 3.4/\text{inch}$, for temperatures between $(-55\text{ to }150\text{ }^{\circ}\text{F})$ or better, size of $\frac{3}{4}$ " diameter with non-stick skin.

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- 6.4.1.3 Protection board and film: Provide protection boards and films as described:
- 6.4.1.3.1 Provide protection boards in 1/8" (3mm) thickness as indicated on Drawings; of polycarbonate sheet, density of $\geq 1.2 \text{ g/cm}^3$, $\leq 0.15\%$ water absorption, $\geq 2350 \text{ MPa}$ tensile/flexural/compressive moduli, flame spread < 1 inch per ASTM D635, polished both sides, 1/8" x 48" x 96". Approved manufacturers or equal:
- Bayer (Makrolon GP),
(<http://www.sheet.bayerpolymers.com/51/Products/Makrolon/Makrolon-GP.htm?PHPSESSID=2ccfcec7fc6a21bc006e20a380f6af9c>);
 - SABIC Innovative Plastics (Lexan 9034), (http://www.sabic-ip.com/resins/DataSheet/Internet/PDF/1002002131_1002003932_1002038126_Sl.pdf);
- 6.4.1.3.2 Provide protection sheet/film of non-woven, non-perforated, polyolefin weather barrier; based upon DuPont Tyvek CommercialWrap® and related assembly components. Install per manufacturer recommendations, tape in place without mechanical fasteners. Use 3" wide seam tape at all seams. Performance characteristics:
1. Air Penetration: $\leq 0.001 \text{ cfm/ft}^2$ at 75 Pa, per ASTM E2178. Type I per ASTM E1677, and $\leq 0.04 \text{ cfm/ft}^2$ at 75 Pa, per ASTM E2357.
 2. Water Vapor Transmission: ≥ 28 perms, per ASTM E96, Method B.
 3. Water Penetration Resistance: $> 200 \text{ cm}$ per AATCC Test Method 127.
 4. Air infiltration: > 1500 seconds, per TAPPI Test Method T-460; or 0.000 cfm/ft^2 at 75 Pa, per ASTM E2178.
 5. Tensile Strength: 35/28 lbs/in., per ASTM D882, Method A.
 6. Tear Resistance: 12/10 lbs., per ASTM D1117.
 7. Surface Burning Characteristics: Class A, per ASTM E 84; Flame Spread ≤ 10 ; Smoke Developed ≤ 10 .
- Approved manufacturers include (substitutions as approved by Owner):
- Dupont, 4417 Lancaster Pike, Chestnut Run Plaza 728, Wilmington, DE 19805; 1-800-448-9835; <http://www.construction.tyvek.com> .
 - GreenGuard (Ultra),
(<http://greenguard.pactiv.com/commercial.aspx#building-wrap.ultra-wrap>),
- 6.4.1.4 Vapor Barrier: Vapor barrier shall be polyethylene as described above in Section 6.2.6. Install over framing prior to installing plywood panels.
- 6.4.1.5 Interior Side Walls Panels: According to details provided, attach FRP to plywood over the vapor barrier at interior walls.
- 6.4.1.5.1 Side wall finish shall be fiberglass-reinforced plastic (FRP) laminate as described above in Section 6.2.5.
- 6.4.1.5.2 Attach FRP over plywood with adhesive as described in Section 6.2.5. Secure FRP on plywood to wood framing with #6 x 1-1/2" screws with flat washers at 12" o.c. along FRP perimeters only . **Do not use screws at interior where no framing is present – do not puncture/penetrate VIP envelopes.** Install screws snug, do not over-tighten as would restrict expansion of FRP. Pre-drill holes in FRP at 1/8-1/4" larger than the diameter of screws to allow for expansion. Apply silicone sealant beneath all fasteners.

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- 6.4.1.6 Mounting Brackets (Unistrut): Ceilings to have horizontal (wall to wall, across container width), mounting channels as described above in Section 6.3.5. Locate at middle of the container and toward each end at 24" o.c. for the length of the ceiling (at center of 2 x 4 wood framing), at same locations as wall channels.
 - 6.4.1.6.1 Install Unistrut model P3300 type HS or T, hot dip galvanized; screwed to wood framing with #10 x 1" self-tapping flat-head screws at 12" o.c., and at no more than 4" from ends. Caution – do not puncture VIP insulation envelopes, do not use longer screws that would strike the container steel panels.
 - 6.4.1.6.2 Install brace angle according to Drawings and details provided, at match of Unistrut channels from ceiling to wall brackets.

6.5 Floor Assembly:

- 6.5.1 Floor assembly: Construct floor assembly to extend for container length (as shown on Drawings), and across the full width of the container. General assembly to consist of sanded plywood combination subfloor over a vapor barrier, secured to wood framing (sleepers) against container floor. Install with vacuum insulation panels (VIPs) between framing/sleepers, with protection sheet and protection board as described in Section 6.4.1.3. Secure wood framing to existing container floor according to details provided, using #10 x 3" Type S screws at 16" o.c.
 - 6.5.1.1 Insulation:
 - 6.5.1.1.1 Provide Vacuum Insulation Panels (VIPs) as described in Section 6.2.5 above, with 7/8" thickness.
 - 6.5.1.1.2 Provide protection boards as described in Section 6.4.1.3 above and installed according to details provided.
 - 6.5.1.2 Plywood flooring: Provide a single layer of 9/8" x 48" x 96" min. tongue-and-groove plywood combination subfloor, C/C plugged–single floor, exterior grade, any species per WWPA and APA; manufactured with a smooth side (i.e., a sanded or touch-sanded face) ready for finishing.
 - 6.5.1.3 Vapor Barrier: Provide and install vapor barrier as described above in Section 6.2.6.
- 6.5.2 Flooring Installation: According to details provided, install flooring to extend each container length (as indicated on Drawings), and across the full width of the container.
 - 6.5.2.1 Prep: Thoroughly clean manufactured container floor. Wash if required, let dry, sweep and vacuum.
 - 6.5.2.2 Insulation:
 - 6.5.2.2.1 Outer protection film/sheet: Install protection film and secure to wood framing with tape and silicone adhesive. Do not use mechanical fasteners.
 - 6.5.2.2.2 VIP insulation: Install as described above in Section 6.4.1.2.
 - 6.5.2.2.3 Inner protection board: Install rigid protection board as described above in Section 6.4.1.3 to fit snug between wood framing. Install one board per area between wood framing, without seams. Sand edges of board smooth to remove any sharp edges. Secure to wood framing with tape and silicone adhesive. Do not use mechanical fasteners.
 - 6.5.2.2.4 Foam backer rods: Fill all gaps at edges and between VIPs with closed cell, foam backer rods, as described above in Section 6.4.1.4.
 - 6.5.2.3 Vapor barrier: Install vapor barrier across entire floor assembly prior to placing flooring. Install material as described above in Section 6.2.6.

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- 6.5.2.4 Flooring: Install T&G plywood flooring for full length of container, setting plywood in direction perpendicular to longitudinal axis of containers. Use adhesive in T&G joints. Place T&G edges lightly together (not tight). Nail flooring to wood framing with #8d x 2" deformed shank screws at 8" o.c. along perimeter, and at 12" o.c. at intermediate framing. **Do not use screws at interior where no framing is present – do not puncture/penetrate VIP envelopes.** Cut new flooring to leave ½"-3/4" gap at walls and ends of the container. Fill edge gaps with 2-component spray foam polyurethane insulation.
- 6.5.2.5 Floor Coating: Prep and apply floor coating system as specified in Coatings, Section 5.7. Paint floor field color as selected by Owner. In addition, paint stripes over wood sleeper framing locations to accurately identify locations of wood sleeper framing. Purpose is to protect VIP panels from possible floor penetrations in future use of the containers. Provide as follows:
- 6.5.2.5.1 Painted Stripes: Paint stripes on floor, at locations of all floor wood sleeper framing. Paint stripes of contrasting color (as selected by Owner), of same coating as used on floor. Stripes to be solid 3" wide, centered over 5/4 x 4 (3.5" wide) sleepers. Be cautious to locate wood sleepers accurately and paint stripes directly over sleeper locations.
- 6.5.2.5.2 Lettered Stencils: Use lettered stencils within painted stripes to block out striping and expose floor color (or paint additional coat if preferred). Purpose is to convey information on purpose of the stripes to users of the containers in the future. Stencil letters to be 2" tall with spacing and san-serif characters (i.e. Arial) as approved by Owner. Provide one stencil at each sleeper length. Stencil to read: "FLOOR FASTENERS PERMITTED IN [*insert stripe color*] STRIPE LOCATIONS ONLY".

7.0 Doors and Openings

- 7.1 General: Connectors: All screws and connectors subject to exterior exposure are to be stainless steel.
- 7.2 End Wall Door Assemblies: Commercial insulated door system equal to Plyco Corporation Series 92 (800/558.5895), ThermAll Knock-down door (888-246-7858), or equal, with features to include:
- 7.2.1 Doors: At framed end walls, provide and install a pedestrian entry door, 1-3/4" thick x 36" wide by 84" high (48" wide at NSO-6 only). Door to be insulated 18-24 gauge galvanized steel, pre-hung, white. Door insulation to be polyurethane foam with R-value >11 (total thickness). Door is to have a 16" x 16" or larger vandal proof sealed 1" section dual pane thermal window in aluminum frame with the center at approximately 60" from the bottom. At South End Walls only, also install louvers in door, of size and type as indicated on Drawings.
- 7.2.2 Door Frames: Frames to be 16 gauge galvanized steel, with true thermal break and thermally broken aluminum stop. Install with thermal anchors to reduce thermal transmission from frame to wall framing.
- 7.2.3 Door Hardware: Pre-hung with three heavy-duty 4-1/2" fixed pin hinges - welded in place – with full thermal break and gaskets all around. Locksets to be brushed stainless steel, including a deadbolt and a keyed lockset capable of unlocking from the inside without a key. All locksets on all doors of all containers are to use the same key. Assembly to include threshold with thermal break.
- 7.2.4 Additional Hardware: Install a heavy-duty door sweep – exterior surface-mount aluminum flange with EPDM/rubber sweep.

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- 7.4 Opening Covers (Blanking Plates): At all exterior penetrations, provide ISO Certified, steel weatherproof blanking plates, according to details provided. All bolts to be Stainless Steel and to have polyurethane washers and security heads. No threaded inserts to be used. Paint steel covers with coating systems as specified in Section 5 – Coatings.
- 7.4.1 Connectors: All screws and connectors subject to exterior exposure are to be stainless steel.
- 7.5 Container Roof Openings:
- 7.5.1 Install stainless steel Unistrut channels all around exterior side of roof openings according to details provided. Weld container steel panels continuously at Unistrut channel. Install steel shapes (angles, or tees, etc) as required by container Manufacturer to satisfy ISO certification requirements for openings, as described in Section 2.
- 7.5.2 Provide roof openings according to details provided. No threaded inserts to be used. Place at locations shown on the Drawings. Containers NSO-1, NSO-2, and NSO-3 do NOT have roof openings; and containers NSO-4, NSO-5, and NSO-6 do have roof openings as shown on Drawings. CONFIRM ANY/ALL OPENINGS for all containers prior to work on any openings.
- 7.6 Container Wall Openings: Install additional structural support for all container wall openings, same as container roof openings.
- 7.6.1 Install stainless steel Unistrut channels all around exterior side of opening according to details provided. Weld container steel panels continuously at Unistrut channel. Locate wall openings in same locations for all containers as indicated so container openings will match/marry when set side-by-side. Vertical center of wall openings as shown on the Drawings. CONFIRM ANY/ALL OPENINGS for all containers prior to work on any openings.
- 7.7 End wall penetrations: Install penetrations at end wall to include the following:
- 7.7.1 Both end walls to have Schedule 80 ABS 4" FPT coupling feeds through walls at each corner (4 per end wall typical, unless noted otherwise), as shown on Drawings. Cap inside and outside with 4" MPT brass cleanout plug with recessed square head.
- 7.7.2 At South End Wall only, provide HVAC duct passage of approximately 20.5" x 10.5" (as indicated on Drawings). Pack with insulations and seal with temporary caps at interior and exterior ends of passage.

8.0 Electrical System

- 8.1 All electrical fixtures and conduit will be surface mounted unless noted otherwise.
- 8.2 Provide and install surface mount subpanel on interior wall, located as indicated on Drawings. Subpanels to be NEMA 1, 125 or 150 Amp, 115/208VAC 3 phase breaker panel with at least 24 spaces. Breaker amperage and poles to be determined, coordinate with Owner.
- 8.2.1 Install each panelboard with a surge protector device (SPD) installed by manufacturer (example: Square D TVS2IMA12P SPD in a Square D type NQ panelboard).
- 8.3 Provide and install hard wired 110VAC, 60 hz, smoke/CO detector, with 9VDC back up battery.
- 8.4 Provide and install conduit and 110V, 20 amp, spec grade quad outlets located 12" above the floor and spaced at 4' o.c. on the interior walls (4 separate circuits). Use 4" by 4" J-Boxes and EMT Conduit.
- 8.4.1 Provide and install conduit and 4" x 4" J-boxes, 4' o.c. at the ceiling along each side wall for full length of the interior ceiling, as shown on Drawings. Use EMT Conduit.
- 8.4.2 Provide and install 1 weatherproof in use 120VAC, 60hz, GFCI convenience duplex outlet on the exterior of each end wall.

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8.5 Lighting:

- 8.5.1 Provide and install 3 each, 4 foot long, overhead surface mounted lighting fixtures with 60 Hz 120VAC power; Grainger #1VNU5 48" (Lithonia is manufacturer) or equal (verify with Owner before substitution), with (-20) degF or colder rating.
- 8.5.2 Install an exterior surface mounted LED Light fixture on one framed end wall, as shown on Drawings. Provide fixture that is UL-rated for wet locations, for 120/240V, 50/60 Hz power supply; RAB Lighting #WPLED20, or equal (verify with Owner before substitution).
- 8.5.3 Install emergency lighting to be Grainger #4ZDA5 (Lithonia is manufacturer) or equal (verify with Owner before substitution).

8.6 Provide and install Snake Tray down both sides and back end of container wall at ceiling level.

8.8 Provide and install cable tray. See Electrical Drawings for Specifications and locations.

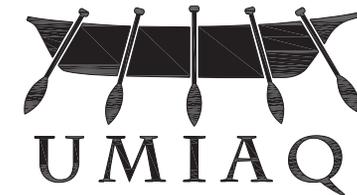
9.0 Mechanical: See Mechanical Drawings for Specifications and locations of Mechanical work.

10.0 Other:

- 10.1 As-built Drawings: Provide fully dimensioned, to scale, as built architectural and mechanical drawings, and electrical one line diagram in AutoCAD (.dwg) and Adobe Portable Document Format (.pdf) files. Provide 3 sets of CDs and Drawings (11" x 17" size). All drawings to be Owner (Sandia National Laboratories) property, and released as non-proprietary by company awarded contract to build/modify containers.

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ISO PROCUREMENT DOCUMENTS
JULY 3, 2012

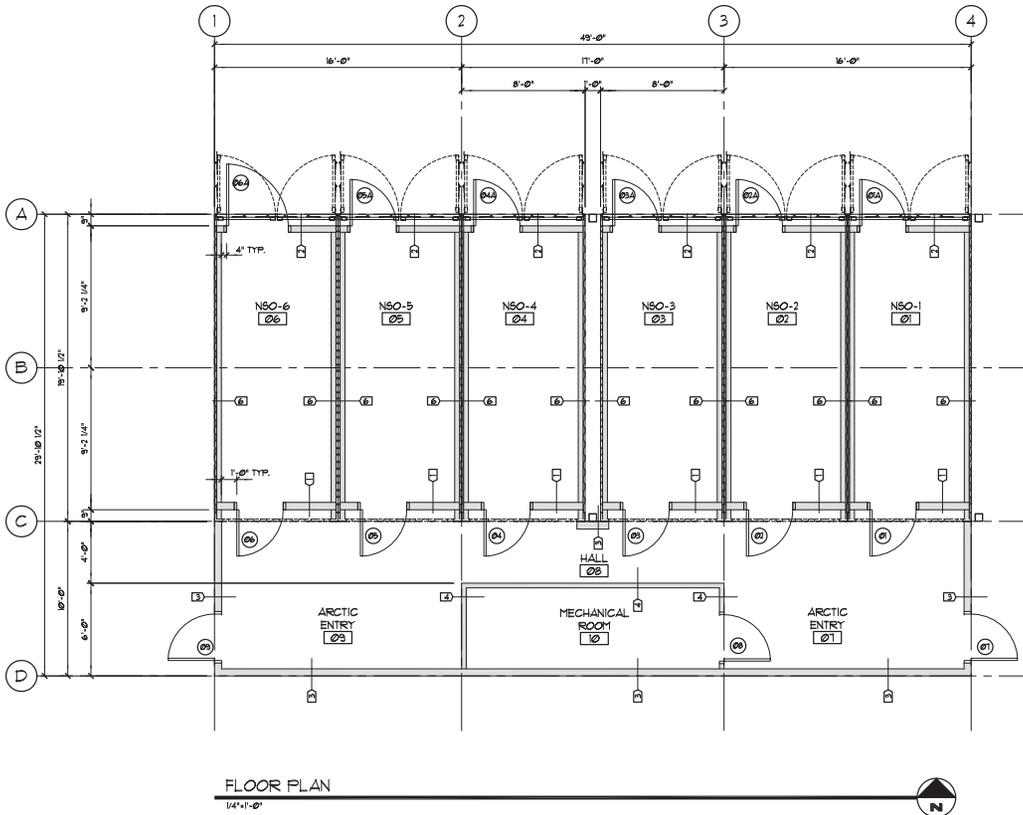


6700 Arctic Spur Road · Anchorage, AK 99518 · (907)677-8220



CONSULTANTS	DRAWING SHEET INDEX
ARCHITECTURAL	COVER
UMIAQ LLC 6700 ARCTIC SPUR ROAD ANCHORAGE, ALASKA 99518 TELEPHONE (907) 677-8220 FACSIMILE (907) 273-1831	ARCHITECTURAL
MECHANICAL / ELECTRICAL	1 OF 7 A1.1 FLOOR PLAN, WALL, FLOOR, AND CEILING ASSEMBLIES 2 OF 7 A2.1 ISO CONTAINER SECTION, WALL SECTION 3 OF 7 A3.1 TYPICAL ISO CONTAINER FLOOR PLAN, ELEVATIONS, AND END WALL SECTIONS 4 OF 7 A3.2 TYPICAL ISO CONTAINER REFLECTED CEILING PLAN, INTERIOR ELEVATIONS, AND DETAILS
RSA ENGINEERING, INC. 2522 ARCTIC BLVD, SUITE 200 ANCHORAGE, ALASKA 99503 TELEPHONE (907) 276-0521 FACSIMILE (907) 276-1751	MECHANICAL
	5 OF 7 M0.1 MECHANICAL LEGEND, SCHEDULES, AND ABBREVIATIONS ELECTRICAL 6 OF 7 E0.1 ELECTRICAL LEGEND, ISO PLAN, FIXTURE AND PANEL SCHEDULES 7 OF 7 E1.0 ELECTRICAL PLANS AND ELEVATIONS

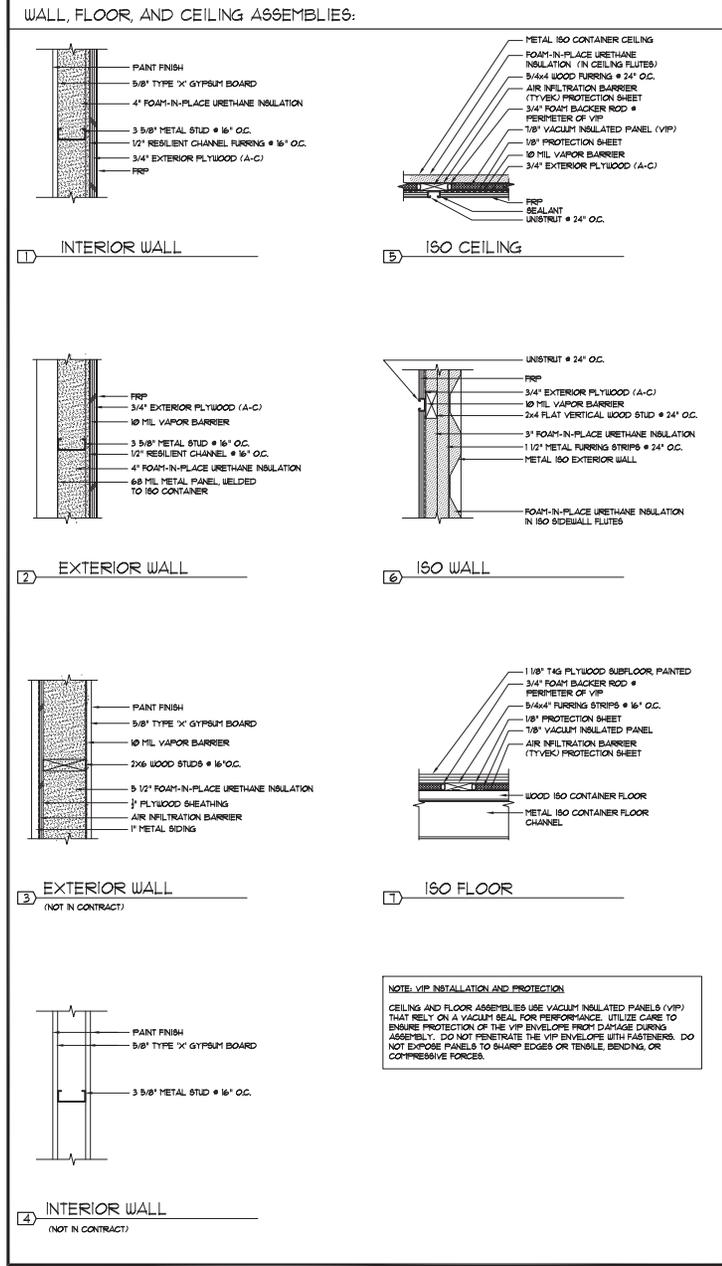
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ISO PROCUREMENT DOCUMENTS:

THIS SET OF DRAWINGS DEPICTS THE REQUIREMENTS FOR THE PROCUREMENT OF (6) ISO CONTAINER UNITS AND MODIFICATIONS (NSO-1 THROUGH NSO-6).

ALL CONSTRUCTION FROM GRID C TO GRID D INCLUDING ROOMS #1 THROUGH #6, IS FUTURE CONSTRUCTION AND SHALL NOT BE PROVIDED IN THIS CONTRACT.



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ISO PROCUREMENT DOCUMENTS

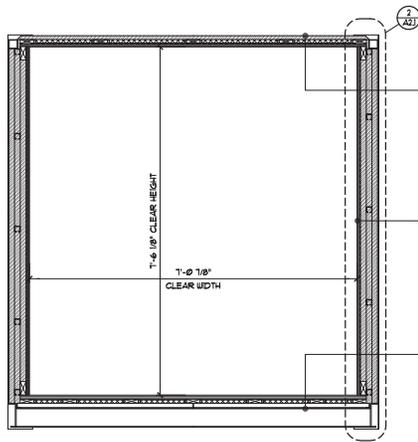
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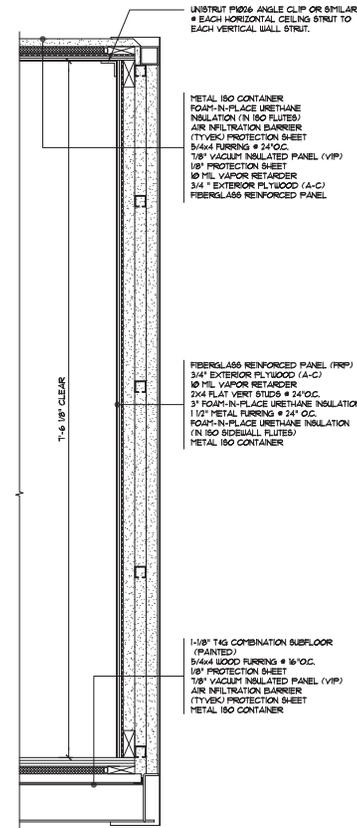
DATE: 07/03/12
 DRAWN BY: JFK
 CHECKED BY: JFK
 JOB NUMBER: 60022.12

DRAWING TITLE:
 FLOOR PLAN
 WALL, FLOOR, AND
 CEILING ASSEMBLIES

A1.1
 SHEET 1 OF



- METAL ISO CONTAINER
 - FOAM-IN-PLACE URETHANE INSULATION (IN CEILING FLUTES)
 - AIR INFILTRATION BARRIER (TYVEK) PROTECTION SHEET
 - 5/4x4 FURRING # 2x10 OC
 - 1/8\"/>
 - 10 MIL VAPOR RETARDER
 - 3/4\"/>
 - FIBERGLASS REINFORCED PANEL (FRP)
- FIBERGLASS REINFORCED PANEL (FRP)
 - 3/4\"/>
 - 10 MIL VAPOR RETARDER
 - 2x4 FLAT VENT STUDS # 2x10 OC
 - 3\"/>
 - 1 1/2\"/>
 - FOAM-IN-PLACE URETHANE INSULATION IN ISO SIDEWALL FLUTES
 - METAL ISO CONTAINER
- 1-1/8\"/>
 - 5/4x4 WOOD FURRING # 16\"/>
 - 1/8\"/>
 - 10 MIL VAPOR RETARDER
 - 1/8\"/>
 - AIR INFILTRATION BARRIER (TYVEK) PROTECTION SHEET
 - METAL ISO CONTAINER



- UNISTRUT #10026 ANGLE CLIP OR SIMILAR # EACH HORIZONTAL CEILING STRUT TO EACH VERTICAL WALL STRUT.
 - METAL ISO CONTAINER
 - FOAM-IN-PLACE URETHANE INSULATION (IN ISO FLUTES)
 - AIR INFILTRATION BARRIER (TYVEK) PROTECTION SHEET
 - 5/4x4 FURRING # 2x10 OC
 - 1/8\"/>
 - 10 MIL VAPOR RETARDER
 - 3/4\"/>
 - FIBERGLASS REINFORCED PANEL (FRP)
- FIBERGLASS REINFORCED PANEL (FRP)
 - 3/4\"/>
 - 10 MIL VAPOR RETARDER
 - 2x4 FLAT VENT STUDS # 2x10 OC
 - 3\"/>
 - 1 1/2\"/>
 - FOAM-IN-PLACE URETHANE INSULATION (IN ISO SIDEWALL FLUTES)
 - METAL ISO CONTAINER
- 1-1/8\"/>
 - 5/4x4 WOOD FURRING # 16\"/>
 - 1/8\"/>
 - 10 MIL VAPOR RETARDER
 - 1/8\"/>
 - AIR INFILTRATION BARRIER (TYVEK) PROTECTION SHEET
 - METAL ISO CONTAINER

NOTE: VIP INSTALLATION AND PROTECTION
 CEILING AND FLOOR ASSEMBLIES USE VACUUM INSULATED PANELS (VIP) THAT RELY ON A VACUUM SEAL FOR PERFORMANCE. UTILIZE CARE TO ENSURE PROTECTION OF THE VIP ENVELOPE FROM DAMAGE DURING ASSEMBLY. DO NOT PENETRATE THE VIP ENVELOPE WITH FASTENERS. DO NOT EXPOSE PANELS TO SHARP EDGES OR TENSILE, BENDING, OR COMPRESSIVE FORCES.

1 ISO CONTAINER SECTION - TYPICAL
 A2.1 3/4\"/>

2 ISO WALL SECTION, TYP.
 A2.1 1/2\"/>



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ISO PROCUREMENT DOCUMENTS	
REVISIONS	DESCRIPTION

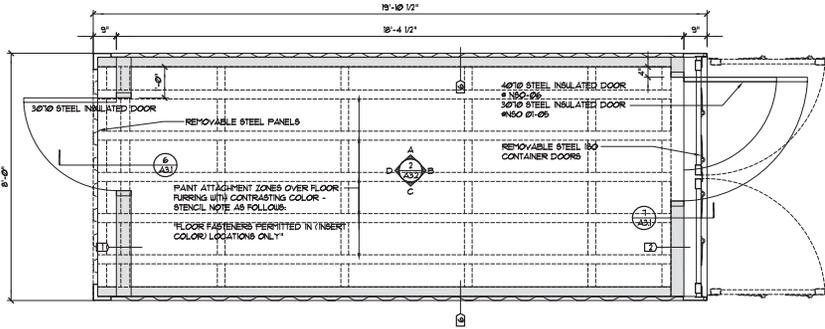
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 CHECKED BY: JFK
 JOB NUMBER: 60022.12

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 ISO CONTAINER SECTION WALL SECTION

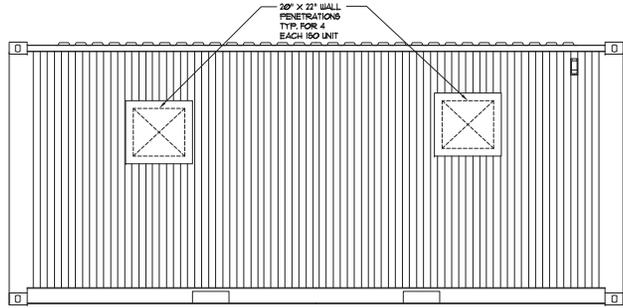
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SHEET 2 OF

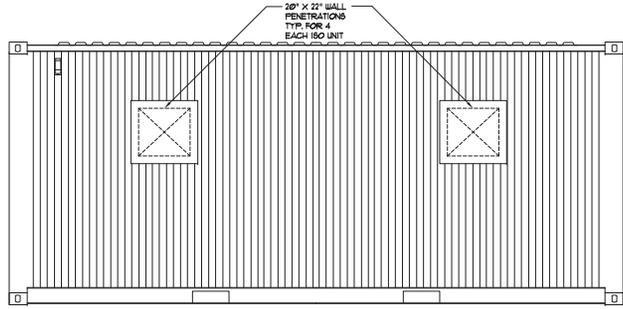


NOTE: VIP INSTALLATION AND PROTECTION
CEILING AND FLOOR ASSEMBLIES USE VACUUM INSULATED PANELS (VIP) THAT RELY ON A VACUUM SEAL FOR PERFORMANCE. UTILIZE CARE TO ENSURE PROTECTION OF THE VIP ENVELOPE FROM DAMAGE DURING ASSEMBLY. DO NOT PENETRATE THE VIP ENVELOPE WITH FASTENERS. DO NOT EXPOSE PANELS TO SHARP EDGES OR TENSILE, BENDING, OR COMPRESSIVE FORCES.

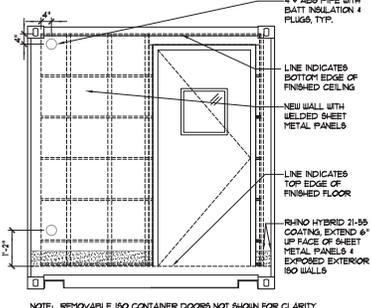
1 ISO CONTAINER TYPICAL FLOOR PLAN
A31 1/2" = 1'-0"



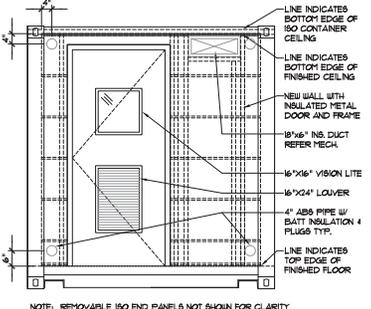
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A31 1/2" = 1'-0"



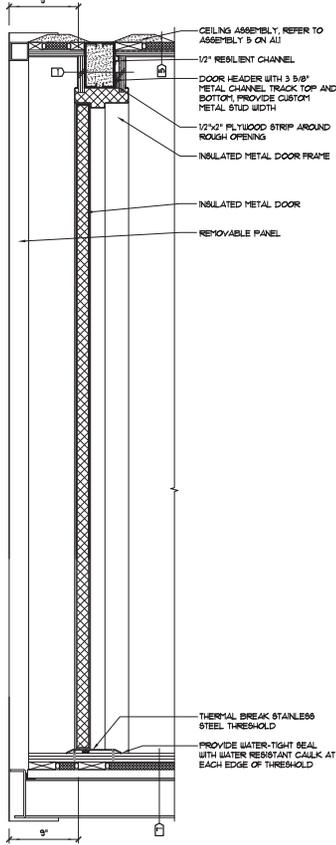
4 ISO CONTAINER WEST ELEVATION
A31 1/2" = 1'-0"



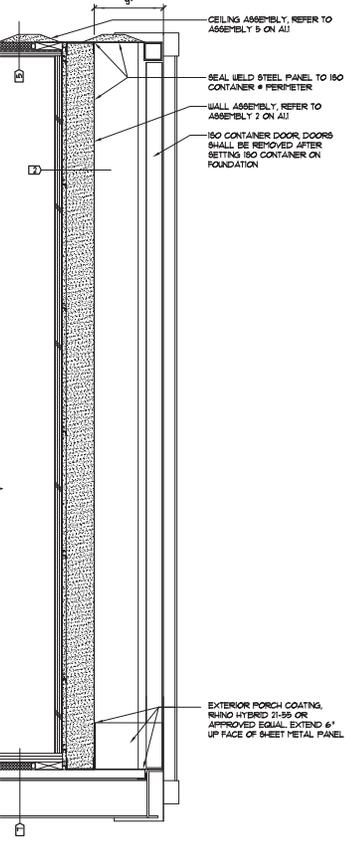
3 ISO CONTAINER NORTH ELEVATION
A31 1/2" = 1'-0"
TYP. FOR N50-1 TO 5 & DOOR # N80-6



5 ISO CONTAINER SOUTH ELEVATION
A31 1/2" = 1'-0"



6 WALL SECTION- REMOVABLE PANEL
A31 1/2" = 1'-0"



7 WALL SECTION- CONTAINER DOORS
A31 1/2" = 1'-0"



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ISO PROCUREMENT DOCUMENTS

REVISIONS	DESCRIPTION

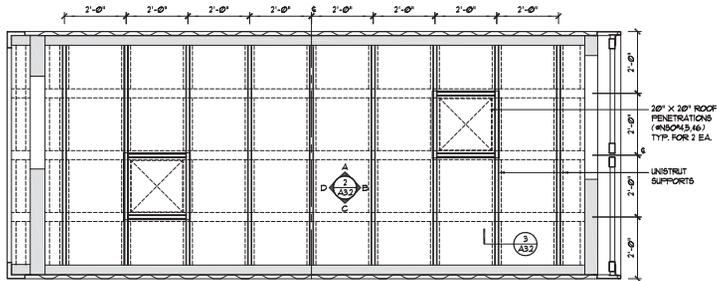
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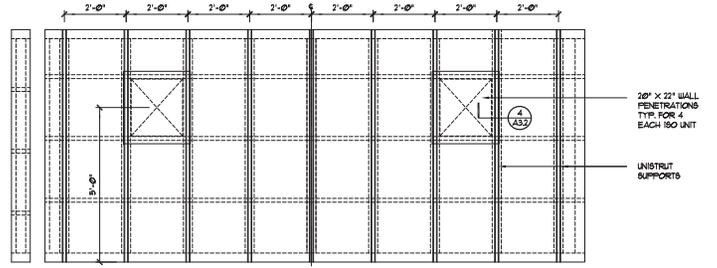
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TYPICAL ISO CONTAINER FLOOR PLAN, ELEVATIONS, AND END WALL SECTIONS

A3.1
SHEET 3 OF

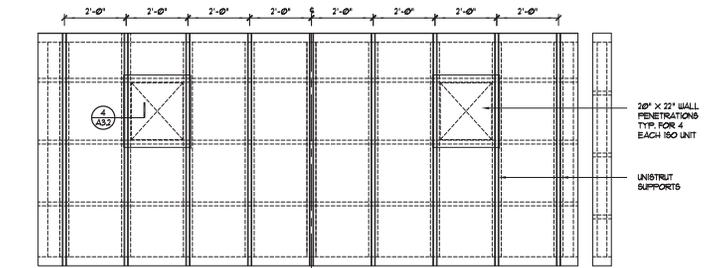
DWG. FILE: 60022ARCHBASE.DWG LAYOUT: A3.1
XREFS: None
IMAGES: None
PLOT DATE: Jul 05, 2012 12:12pm



1 ISO CONTAINER TYPICAL REFLECTED CEILING PLAN
A32 12' x 1'-0"

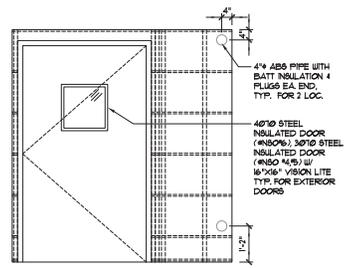


2A ISO CONTAINER INTERIOR ELEVATION
A32 12' x 1'-0"

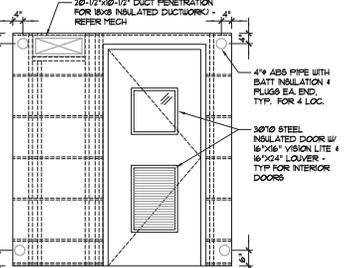


2C ISO CONTAINER INTERIOR ELEVATION
A32 12' x 1'-0"

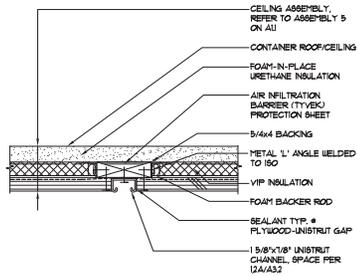
NOTE: VIP INSTALLATION AND PROTECTION
CEILING AND FLOOR ASSEMBLIES USE VACUUM INSULATED PANELS (VIP) THAT RELY ON A VACUUM SEAL FOR PERFORMANCE. UTILIZE CARE TO ENSURE PROTECTION OF THE VIP ENVELOPE FROM DAMAGE DURING ASSEMBLY. DO NOT PENETRATE THE VIP ENVELOPE WITH FASTENERS. DO NOT EXPOSE PANELS TO SHARP EDGES OR TENSILE, BENDING, OR COMPRESSIVE FORCES.



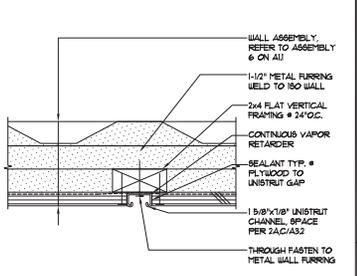
2B ISO INTERIOR ELEVATION
A32 12' x 1'-0"



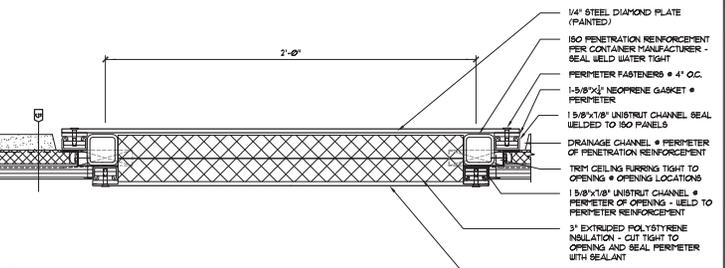
2D ISO INTERIOR ELEVATION
A32 12' x 1'-0"



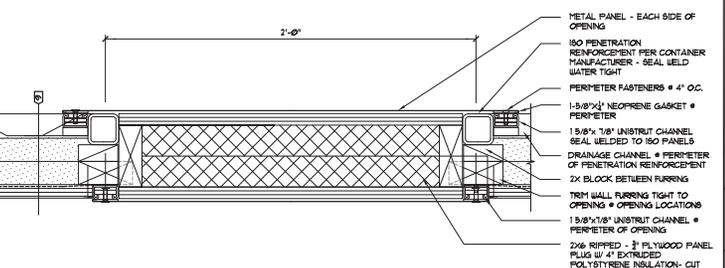
3 UNISTRUT DTL - ISO CEILING TYPE 5
A32 3' x 1'-0"



4 UNISTRUT DETAIL - ISO WALL TYPE 6
A32 3' x 1'-0"



5 ROOF PENETRATION DETAIL
A32 3' x 1'-0"



6 WALL PENETRATION DETAIL
A32 3' x 1'-0"



SANDIA NATIONAL LABORATORIES
ARM CLIMATE RESEARCH FACILITIES
OULIKTOK, ALASKA

ISO PROCUREMENT DOCUMENTS	
REVISIONS	DESCRIPTION

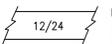
VERIFY SCALES
0 THIS BAR REPRESENTS ONE INCH ON ORIGINAL DRAWING

DATE: 07/03/12
DRAWN BY: TJC
CHECKED BY: JFK
JOB NUMBER: 60022.12

DRAWING TITLE:
TYPICAL ISO CONTAINER REFLECTED CEILING PLAN, INTERIOR ELEVATIONS, AND DETAILS

A3.2
SHEET 4 OF

DWG FILE: 60022ARCHASE.DWG LAYOUT: A3.2
XREFS: None IMAGES: None
PLOT DATE: Jul 05, 2012 12:14pm

DUCTWORK LEGEND	LOGIC	ABBREVIATIONS
 THERMOSTAT OR SENSOR  SUPPLY AIR UP & DOWN  VOLUME DAMPER  DUCT SIZE (FIRST FIGURE - SIDE SHOWN) (SECOND FIGURE - SIDE NOT SHOWN)  INSULATED DUCTWORK	 5 DETAIL NUMBER  MZ SHEET LOCATED ON  CONNECTION  CFM NECK SIZE CFM DIFFUSER OR GRILLE TYPE	AFF ABOVE FINISHED FLOOR AHAP AS HIGH AS POSSIBLE AMPS AMPERES BLDG BUILDING BOD BOTTOM OF DUCT BTUH BRITISH THERMAL UNIT/HOUR CAP CAPACITY CFM CUBIC FEET PER MINUTE CIRC CIRCUATING CLG CEILING DIA DIAMETER DIM DIMENSION ECUH-X ELECTRIC CABINET UNIT HEATER DESIGNATOR F FAHRENHEIT FIN FINISHED FLR FLOOR FT FEET HP HORSEPOWER HR HOUR IN. INCHES IBC INTERNATIONAL BUILDING CODE IMC INTERNATIONAL MECHANICAL CODE MAX MAXIMUM MBH THOUSAND BTUH MFR MANUFACTURER MIN MINIMUM MTD MOUNTED NEC NATIONAL ELECTRICAL CODE OC ON CENTER R/A RETURN AIR S/A SUPPLY AIR SQ SQUARE TEMP TEMPERATURE TOD TOP OF DUCT T'STAT THERMOSTAT TYP TYPICAL VAC VOLT-AC VDC VOLT-DC W/ WITH W/O WITHOUT

GENERAL NOTES

PLANS - THE CONTRACTOR SHALL PROVIDE ALL MATERIALS AND LABOR NECESSARY FOR A COMPLETE AND OPERABLE SYSTEM. THE DRAWINGS ARE PARTLY DIAGRAMMATIC, NOT NECESSARILY SHOWING ALL OFFSETS OR EXACT LOCATIONS OF PIPING AND DUCTS UNLESS SPECIFICALLY DIMENSIONED. CONTRACTOR TO COORDINATE DIFFUSER LOCATIONS WITH ELECTRICAL PLANS TO AVOID CONFLICT.

COMPLETE PROJECT - THE INTENT OF THIS PROJECT IS TO LET ONE CONTRACT WHICH INCLUDES ALL WORK REQUIRED FOR A COMPLETE JOB. THIS INCLUDES ALL ELECTRICAL, CARPENTRY, PLUMBING, SHEET METAL, PAINTING, CLEAN UP, ETC. AS REQUIRED.

PERMITS - THE CONTRACTOR SHALL SECURE AND PAY FOR ALL NECESSARY PERMITS AND FEES.

CODE - ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE LATEST ADOPTED EDITION OF THE INTERNATIONAL BUILDING CODE (IBC), INTERNATIONAL MECHANICAL CODE (IMC), UNIFORM PLUMBING CODE (UPC) AND NATIONAL ELECTRICAL CODE (NEC) AS AMENDED BY THE STATE OF ALASKA AND LOCAL JURISDICTION. SHEET METAL WORK SHALL BE DONE IN ACCORDANCE WITH SMACNA STANDARDS.

INSURANCE - CONTRACTOR MUST PROVIDE BUILDERS' ALL RISK INSURANCE, WORKERS' COMPENSATION INSURANCE, AND GENERAL LIABILITY INSURANCE AT ALL TIMES WHILE WORKING ON THIS PROJECT.

WARRANTY - ALL WORK PERFORMED UNDER THIS CONTRACT TO BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM ACCEPTANCE. ANY FAULTY MATERIALS OR WORKMANSHIP SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE OWNER DURING THE GUARANTEE PERIOD.

ELECTRICAL WORK - ALL ELECTRICAL WORK IS TO BE PERFORMED BY A LICENSED ELECTRICIAN.

EQUIPMENT SUBSTITUTIONS - ALL EQUIPMENT LISTED IS REPRESENTATIVE OF THE STANDARD OF QUALITY AND PERFORMANCE REQUIRED. OR EQUAL SUBSTITUTIONS WILL BE CONSIDERED IF THE SUBSTITUTES ARE SHOWN TO BE EQUAL OR BETTER QUALITY, INCLUDING EFFICIENCY OF PERFORMANCE, SIZE AND WEIGHT.

MATERIALS - ALL MATERIALS SHALL BE NEW AND UNUSED, INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S DIRECTIONS AND IN THE BEST PRACTICE OF THE CRAFT. OBTAIN OWNER'S APPROVAL OF ALL PRODUCTS PRIOR TO ORDERING OR INSTALLING ANY PART OF ANY SYSTEM.

INSULATION - INSULATE ALL SUPPLY AIR DUCTS WITHIN 10' OF THE AIR CONDITIONING UNIT WITH 1" THICK NEOPRENE FACED FIBERGLASS FLEXIBLE DUCT LINER TO ATTENUATE NOISE AND AIR TURBULENCE AND TO PREVENT CONDENSATION AT 30 DEGREES F.

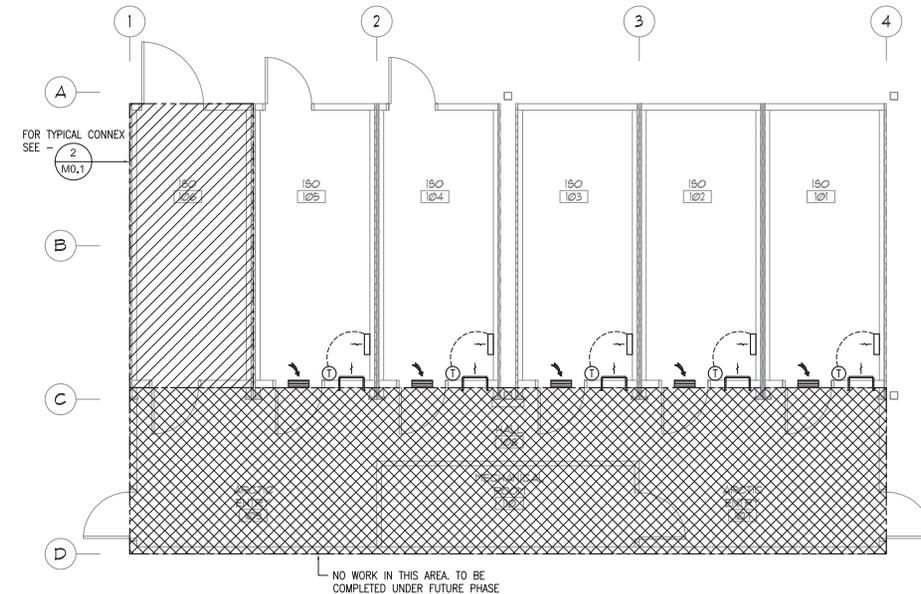
DUCTWORK - PROVIDE GALVANIZED SHEET METAL RECTANGULAR DUCT WHERE CALLED OUT ON THE PLANS. SEAL ALL DUCT SEAMS AND JOINTS AIRTIGHT. USE TURNING VANES IN ALL SQUARE ELBOWS. INSTALL VOLUME DAMPERS AND EXTRACTORS WHERE SHOWN ON THE DRAWINGS. ALL SHEET METAL WORK TO BE CONSTRUCTED, INSTALLED, TESTED AND BALANCED IN ACCORDANCE WITH SMACNA STANDARDS.

AIR INLET/OUTLET SCHEDULE

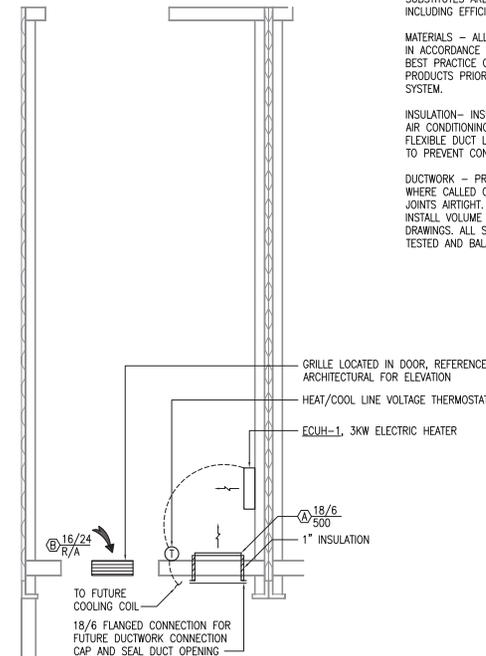
SYMBOL	MANUFACTURER	MODEL	TYPE	USE	MATERIAL	FINISH	CFM	FACE SIZE (IN.)	NC	REMARKS
(A)	TITUS	DL	WALL	SUPPLY	STEEL	WHITE	PER PLANS	18"x6"	<25	DUCT MOUNTED DIFFUSER; 35° DEFLECTION
(B)	TITUS	CT700-L	DOOR	RETURN	ALUMINUM	WHITE	500	16x24"	<30	

ELECTRIC UNIT HEATER SCHEDULE

SYMBOL	MANUFACTURER	MODEL	KW	AMPS	POWER	REMARKS
ECUH-1	BROAN	198	3	14.4	208/60/1	PROVIDE SEPERATE LINE VOLTAGE HEAT/COOL THERMOSTAT, SIEMENS ET-134 OR EQUAL



1 MECHANICAL PLAN
1/4" = 1'-0"



2 TYPICAL CONNEX MECHANICAL PLAN
1/2" = 1'-0"



SANDIA NATIONAL LABORATORIES
ARM CLIMATE RESEARCH FACILITIES
 OLIKTOK, ALASKA

ISO PROCUREMENT DOCUMENTS	DESCRIPTION
REVISIONS	
REV DATE	

VERIFY SCALES
0 = 1" = 1"

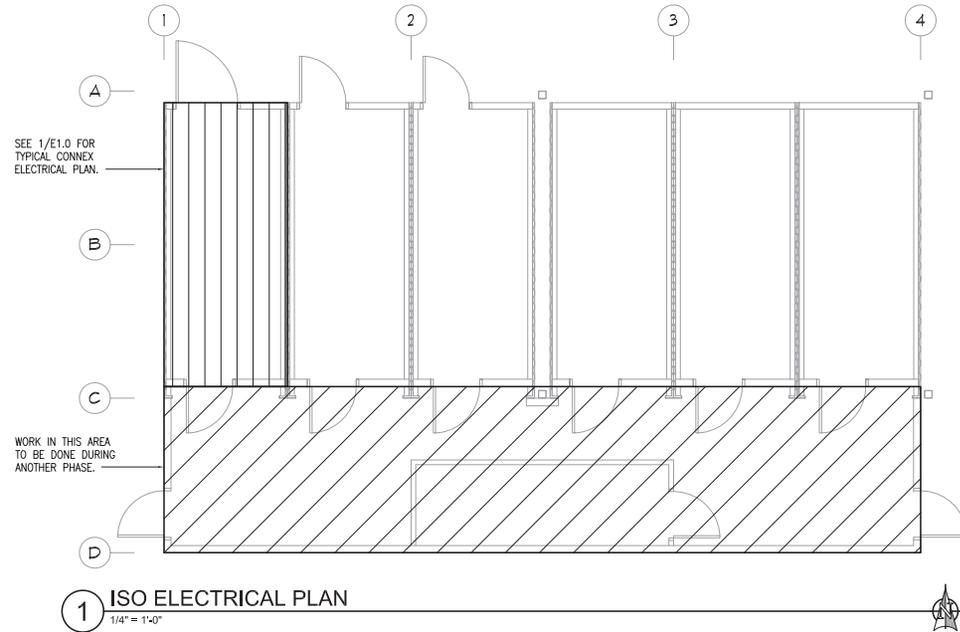
DATE: 7/05/2012
 DRAWN BY: ARN
 CHECKED BY: TLM
 JOB NUMBER: L2070.00
 DRAWING TITLE:
 MECHANICAL LEGEND,
 SCHEDULES AND
 ABBREVIATIONS

M0.1
 SHEET OF

LIGHT FIXTURE SCHEDULE										
TYPE	LOCATION	MANUFACTURER AND CATALOG NUMBER (OR APPROVED EQUAL)	LUMINAIRE DESCRIPTION	MOUNTING		LAMPS		BALLAST		INPUT WATTS
				TYPE	HEIGHT	NO.	WATTS	NO.	TYPE	
A	ARCTIC ENTRY, MECHANICAL HALL AND ISO	LITHONIA #DMW-254TSHO-MVOLT-GE810PS90	SURFACE MOUNTED, FIBERGLASS REINFORCED FULLY GASKETED FIXTURE, HIGH-GLOSS BAKED WHITE ENAMEL FINISH, AND HIGH-IMPACT ACRYLIC DIFFUSER	SURFACE	CEILING	2	54 TSHO	1	MULTI-VOLT PROGRAM START BALLAST, -20F START, 9F-0.88	60
X	ARCTIC ENTRY, MECHANICAL HALL AND ISO	LITHONIA #ELM2-LED-SD	WHITE THERMOPLASTIC EMERGENCY LIGHTING UNIT, (2) FULLY ADJUSTABLE LED LAMPS, NICKEL-CADMIUM BATTERY AND SELF-DIAGNOSTIC CIRCUITRY.	SURFACE	CEILING	2	1.5 LED	1	DUAL-VOLTAGE INPUT.	1.44

TYPICAL ISO PANEL																							
MFR/MODEL		SQUARE D' TYPE NQ		VOLTS		120/208V, 3PH, 4W		ENCLOSURE		NEMA 1		100 A											
NOTE		CIRC POLE		AMPS		SERVICE		TYPE		A		B		C									
1	1	-	SPACE								1,000			HEAT	HEATER	15	3	2					
3	1	-	SPACE									1,000		HEAT	HEAT	15	3	4					
5	1	-	SPACE										1,000	HEAT	HEAT	15	3	6					
7	1	20	RECP					RECP	RECP	360	181			LTG	LIGHTING	20	1	8					
9	1	20	RECP					RECP	RECP			360	360	RECP	RECP	20	1	10					
11	1	20	RECP					RECP	RECP				360	360	RECP	RECP	20	1	12				
13	1	20	RECP					RECP	RECP	360	360			RECP	RECP	20	1	14					
15	1	20	SPARE									360		RECP	RECP	20	1	16					
17	1	20	SPARE										100	MISC	SMOKE DETECTOR	15	1	18					
19	1	-	SPACE							100				SPEC	SPD	30	3	20					
21	1	-	SPACE								100			SPEC	SPD	30	3	22					
23	1	-	SPACE									100		SPEC	SPD	30	3	24					
TOTAL V-A										2,361	2,180	1,920			6,461	VA							
TOTAL AMPS										20		18		16		18		A					
A.I.C. RATING: 10,000																							
CONNECTED LOAD IN KVA (THIS PANEL):										0.18	2.88	0.00	0.00	0.10	0.00	3.00	0.30	6.5	KVA	18	A		
CONNECTED LOAD IN KVA (BRANCH PANELS):																				0.0	KVA	0	A
TOTAL CONNECTED LOAD IN KVA:										0.18	2.88	0.00	0.00	0.10	0.00	3.00	0.30	6.5	KVA	18	A		
DEMAND LOAD IN KVA:										0.23	2.88	0.00	0.00	0.10	0.00	3.75	0.30	7.3	KVA	20	A		
PANEL NOTES:										a PROVIDE RED HANDLE LOCKABLE BREAKER IN SPACE INDICATED.													
										PANEL OPTIONS: MAIN LUGS ONLY													

LEGEND	
	EMERGENCY LIGHT
	FLUORESCENT FIXTURE - SURFACE MTD
	FIXTURE TAG (LETTER INDICATES TYPE)
	SINGLE POLE SWITCH
	CONDUIT, CONCEALED
	NUMBER AND SIZE OF WIRES (NO MARKS = 3 #12)
	HOMERUN TO PANEL (PANEL AND CIRCUIT NO.)
	PANEL
	QUADRUPLEX RECEPTACLE
	JUNCTION BOX
	DISCONNECT SWITCH
	CABLE TRAY
	PHOTOELECTRIC SMOKE DETECTOR
	NOTE TAG (No. INDICATES NOTE)
AFF	ABOVE FINISHED FLOOR
C	CONDUIT
BF	BALLAST FACTOR
CO	CONDUIT ONLY
EM	DENOTES EMERGENCY POWER
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GRSC	GALVANIZED RIGID STEEL CONDUIT
LED	LIGHT EMITTING DIODE
MLO	MAIN LUGS ONLY
NEC	NATIONAL ELECTRICAL CODE
SPD	SURGE PROTECTIVE DEVICE
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED



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OLIKTOK, ALASKA

ISO PROCUREMENT DOCUMENTS	REVISIONS	DESCRIPTION
	REV DATE	

VERIFY SCALES
0 1" = 1"
THIS BAR REPRESENTS ONE INCH ON ORIGINAL DRAWING

DATE: 7/3/12
DRAWN BY: PCC
CHECKED BY: CPL
JOB NUMBER: L2070.00

DRAWING TITLE:
ELECTRICAL LEGEND,
ISO PLAN, FIXTURE, AND
PANEL SCHEDULES

E0.1
SHEET OF

