

SECTION I

STATEMENTS OF WORK FOR

REPLACEMENT OF D-SITE COOLING TOWER
PUMP HOUSE ROOF AND OF D-SITE LEC
BUILDING CANOPY ROOF

STATEMENT OF WORK
FOR
REPLACE D-SITE COOLING TOWER PUMP HOUSE ROOF

SOW: C/D-FAC-SOW-072

Work Planning #1989

REVISION D

DATED Dec 23, 2014

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1.0 INTRODUCTION:

The Subcontractor shall provide all materials, labor, supervision, equipment and expertise required to remove and replace the roof of the Cooling Tower Pump House at D-Site. The scope of work for this project will include but not be limited to the following:

- 1.1 The Subcontractor shall install a new roofing system suitable for a 30-year warranty.
- 1.2 The Subcontractor and the installers assigned to this project shall be experienced in the installation of this product. The Subcontractor shall furnish written proof of manufactures training and also experience with similar scope projects prior to the start of construction.
- 1.3 The Subcontractor shall protect the mechanical and electrical equipment within the project limits to prevent damage during the demolition and construction activities, since the equipment must remain in service during the term of the subcontract.
- 1.4 All work shall be performed in accordance with OSHA regulations.
- 1.5 Asbestos is present in the roof flashing. Removal shall be in accordance with the requirements of 29 CFR 1926.1101 (g) (11).
- 1.6 Furnish dumpster(s) of sufficient capacity to remove all non-asbestos debris from the PPPL site. All asbestos containing materials must be removed in a closed conveyance and taken to a landfill. Provide a project debris inventory and tracking report to PPPL.
- 1.7 Disposal of all construction debris in accordance with all Federal, State, and Local requirements.

2.0 APPLICABLE DOCUMENTS

- 2.1 40 CFR 761.123 – Protection of the Environment
- 2.2 OSHA 1926.32 (f) Definition of a Competent Person
- 2.3 40 CFR 761.123 Protection of Environment
- 2.4 10 CFR 851 Worker Health and Safety
- 2.5 29 CFR 1926.1101 (g) (11) Methods of Compliance
- 2.6 PPPL ES&H 5008 (http://www.pppl.gov/eshis/ESHD_MANUAL/sm.html) with special attention to Sections 1.0 Construction safety, Section 8.0 Subsection 8.0 Construction waste, Section 9.0 Chapter 16 Fall protection Section 12.0 Environmental Protection (for asbestos)
- 2.7 Attachment No. 1 PPPL Job Hazard Analysis (JHA) Form
- 2.8 Attachment No. 2 PPPL Construction Contractor Safety Requirements
- 2.9 Attachment No. 3 PPPL Guidelines for Hoisting and Rigging Services

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3.0 APPLICABLE DRAWINGS

The following drawings are included for Reference:

- 3.1 Giffels Associates Inc. Drawing A-801, Rev 2, dated 12/13/83, Maintenance and Utility Building Pump House, Floor & Roof Plans - Elevations and Sections
- 3.2 Giffels Associates Inc. Drawing A-801, Rev. 1, dated 12/13/83, Cooling Tower and Pump House, Roof Framing Plan – Elevations, Material & Column Schedule & Base Plate Details.
- 3.3 PPPL Drawing AD-300, Sheet#67, dated 1/17/85, TRTR Pump House and Cooling Tower

4.0 RESPONSIBILITIES

4.1 Princeton Plasma Physics Laboratory

- 4.1.1 All construction activities must be coordinated with the PPPL Technical Representative to minimize systems down time and shall not have any negative impact on experimental operations.
- 4.1.2 All communications on technical matters shall be directed to the assigned PPPL Technical Representative (PTR)
- 4.1.3 All communications on administrative matters shall be directed to the PPPL Procurement Representative.
- 4.1.4 PPPL permits all employees to issue a “STOP WORK” order, if unsafe work practices are observed.

4.2 Subcontractor

- 4.2.1 The Subcontractor shall provide a Single point of contact for any communication between PPPL and the Subcontractor.
- 4.2.2 The subcontractor shall provide all labor, materials, equipment and construction supervision services necessary to complete the demolition, removal, and replacement of approximately 4,600 square feet of roofing in accordance with the requirements of this Statement of Work, the Technical Specifications, the referenced standards, and the project requirements.
- 4.2.3 To protect the structural integrity of the existing roof support system, demolition debris cannot be stockpiled on the building roof but must be removed on a continuous basis as the demolition progresses.
- 4.2.4 Work shall be performed in accordance with OSHA requirements. Fall protection will be used as directed by the Subcontractors *Competent Person*, and/or by the PPPL Construction Coordinator.
- 4.2.5 *The Subcontractor shall perform Asbestos removal in accordance with the requirements of 29 CFR 1926.1101 (g) (11) as follows:*
 - a) *a Competent Person;*
 - b) *eight hour training for workers per 1926.1101 (k) (9) (viii);*
 - c) *material shall not be sanded, ground, or abraded (need manual methods for removal);*
 - d) *material must be carried or passed to the ground by hand or it must be lowered to the ground via covered, dust-tight chute, crane, or hoist;*

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- e) all such material must be removed from the roof as soon as practicable but no later than the end of a work shift;*
- f) all asbestos removal has to be performed using wet methods.*

- 4.2.6 PPPL requires the Subcontractor to furnish an Asbestos Supervisor, with documented training, at the job-site at all times during the removal of any asbestos containing materials.
- 4.2.7 Limited indoor storage area will be available for materials and tools. The Subcontractor will be responsible for complying with the manufacturer's recommendations for protecting materials from damage due to the weather and elements while stored and during installation.
- 4.2.8 The Subcontractors OSHA *Competent Person* shall inspect the job site daily, before the start of work, after any storm, and document the inspection.
- 4.2.9 The Subcontractor shall identify any facility changes, modifications or obstructions to be mitigated, prior to acceptance of the subcontract, in order to safely and efficiently perform work.
- 4.2.10 The Subcontractor shall schedule the work sequence so that the roof openings are closed and sealed at the end of each work day. Weather sealing shall be verified to PPPL by the Subcontractor at the end of each working day.
- 4.2.11 All lightning protection system including rods, wiring, etc. shall be temporarily removed, reinstalled and reset by an experienced Subcontractor in this type of work. Certification of the final system reconnection shall be provided to PPPL after completion.
- 4.2.12 The Subcontractor shall dispose of all construction debris in accordance with all Federal, State, and Local requirements.
- 4.2.13 All work should be completed during normal working hours of 7:00 AM to 4:00 PM, Monday through Friday.
- 4.2.14 A government issued Photo ID is required for Subcontractor access to PPPL.
- 4.2.15 The Subcontractor shall notify and obtain PPPL approval for any lower-tier Subcontractor proposed for this project, prior to their arrival on site.
- 4.2.16 The actual building dimensions must be verified by the Bidder/Subcontractor prior to the submission of a fixed price bid for construction. Unit cost prices shall be submitted, separate to the fixed price bid, for material, equipment, installation, and/or removal of each item. Unit cost prices shall be provided as follows:
 - a) Asbestos removal (\$/SF)*
 - b) Replacement in kind of metal deck (\$/SF)*
 - c) Walkway pads (\$/UNIT)*

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5.1 REQUIREMENTS

5.2 Materials and Equipment

5.2.1 The Subcontractor shall provide a Total System FleeceBack Adhered Roofing system utilizing minimum 145 mil FleeceBack Sure-White EPDM membrane as manufactured by Carlisle-Syntec. The system shall include polyisocyanurate insulation, required cover board and with a fully adhered EPDM roofing system. The insulation shall be of such thickness to provide an average thermal insulating value of R-30. The contractor shall provide all

related materials and equipment required to complete the project scope of work as defined in this Statement of Work.

5.2.2 Only new first quality materials will be supplied and used in this project.

5.2.3 The installation and application of the roofing materials must be in accordance with the Carlisle's specifications and/or the drawings as approved by PPPL. There must be no deviations from the specifications or the approved submittals/shop drawings without the Prior Written Approval of PPPL.

5.2.4 Materials shall be delivered to the site in unopened, original containers, bearing the manufacturers printed label stating the quality, brand or trade name, batch number, date of manufacture and directions for use. Delivery of small day-to-day supplies will not be permitted.

5.2.5 The Subcontractor is responsible for inspection of materials to detect counterfeit parts and remanufactured, rebuilt, or used parts represented as new.

a) High strength fasteners, those rated 100 ksi or greater proof load, must be from a domestic manufacturer, must comply with a national standard, and must have Certified Material Test Reports (CMTR) from the manufacturer that show actual properties and are directly traceable to the fasteners through lot numbers or other clear identification. **This applies regardless of function.** Copies of the CMTR's are to be provided for PPPL approval prior to installation.

b) In addition to any other requirements imposed as part of this procurement, lifting equipment, including rings, eyes, or other such equipment installed in components, shall show the manufacturer's name or symbol and their rated load capacity. Personnel shall be alert for variations from the manufacturer's usual packaging, labeling, or painting practices and shall inspect for signs of over-marking or marking modifications.

5.3 INSTALLATION

5.3.1 The Subcontractor shall furnish a Construction Plan for PPPL approval, detailing how the requirements of this Statement of Work will be maintained. The Plan must contain a description of the Subcontractors work plan, a resource loaded Project Schedule listing all major activities, and all proof of qualifications required by this SOW. The Plan must comply with all OSHA,

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Federal, State, Local and PPPL regulations. PPPL will review and return the Plan to the Subcontractor within 5 working days.

- 5.3.2 Daily inspections of the job site, the adjacent areas, and protective systems shall be made by the Subcontractors *Competent Person* for evidence of a situation that could result in possible failure of protective systems or other hazardous conditions. Inspections shall be conducted by the Subcontractors *Competent Person* prior to the start of work, after every rain storm, and as needed during the shift.

5.4 PERFORMANCE REQUIREMENTS

5.4.1 Sustainability

PPPL's prime contract with the DOE requires the purchase of certain types of environmentally preferable products such as, but not limited to, EPEAT-registered electronic devices, ENERGYSTAR and FEMP-listed energy-consuming equipment, Water-Sense listed products, bio based materials, and EPA-designated recycled content products. Where such products are available and meet the technical requirements of the work, they should be utilized to the maximum extent practical. Information on environmentally preferable products is available online at:

<http://www-local.pppl.gov/erwm/EPP.htm>

<http://www.epa.gov/greenerproducts/>

<http://www.epa.gov/epawaste/consERVE/tools/cpg/products/construction.htm>

<http://www.epa.gov/epp/>

<https://www.fedcenter.gov/programs/buygreen/>

5.4.2 PERFORMANCE CHARACTERISTICS

Not Applicable

5.4.3 OPERATING ENVIRONMENT

Not Applicable

5.4.4 DESIGN LIFE

Warranty requirements are listed in Section 11.0.

5.4.5 RELIABILITY

Not Applicable

5.4.6 MAINTAINABILITY

Not Applicable

5.4.7 HUMAN FACTORS

Requirements are listed in Section 8.0.

5.5 EQUIPMENT DEFINITION

5.5.1 Specifications and Standards

Documents are listed in Section 2.0.

5.5.2 General Design Features

Not Applicable

5.5.3 Materials

Materials are listed in Section 5.0.

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5.5.4 **Electromagnetic Interference and Susceptibility**
Not Applicable

5.5.5 **Identification and Marking**
Not Applicable

5.5.6 **Workmanship**
Workmanship must comply with generally accepted industry practice. The Installation must be water-tight. The Subcontractor shall inspect the completed area to ensure a water-tight roof. Maintenance and repair work must comply with the original manufacturer recommendations; including parts, workmanship requirements, applicable standards, parts, and functionality.

6.1 TEST AND INSPECTION REQUIREMENTS

6.2 Performance Tests

Not Applicable

6.3 Acceptance Inspections & Tests

A final walkthrough inspection will be conducted with the Carlisle Representative, the Subcontractor and PPPL representatives to evaluate the project construction upon completion of work. A punch list will be created at this time.

7.0 QUALIFICATIONS

7.1 The roofing materials covered by this SOW must be installed by a Subcontractor experienced in the installation of these systems. Documentation of the subcontractors experience installing similar scope systems and the manufacturer's approval of the subcontractors training program shall be furnished to PPPL prior to start of construction work.

7.2 The installation must be in accordance with Carlisle's specifications and the submittals/shop drawings as approved by PPPL. There must be no deviations made from the specifications or the approved submittals/shop drawings without the Prior Written Approval of PPPL.

7.3 Qualifications for Hoisting and Rigging and mobile equipment operation and repair are in the PPPL Engineering Standard contained in Attachment 3.

8.1 ENVIRONMENT, SAFETY, AND HEALTH

8.2 General ES&H Statement

The Subcontractor shall comply with:

8.2.1 The specific PPPL project documents, requirements, permits and courses listed in this Statement of Work – all of which will be provided by the PPPL PTR.

8.2.2 The Subcontractors approved ISM Plan.

8.2.3 All applicable Federal, State, and local laws, regulations and requirements

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whether or not they are specifically listed in the Statement of Work or subcontract.

8.3 Job Hazard Analysis (JHA) form

8.3.1 The PPPL Job Hazard Analysis (JHA) form requirements are contained in PPPL procedure ESH-004. The JHA is used as a tool to help identify ES&H hazards, controls, and related PPPL requirements that potentially apply to a subcontract. The JHA form can be found in Attachment No. 1 to this SOW and also at the following web site:

http://www.pppl.gov/sites/pppl/files/department_assoc_files/node49/JHA%20form.pdf

8.4 Applicable PPPL Permits

The following list of PPPL permits may be applicable to the subcontractor's work scope. The subcontractor must confirm with their PPPL Construction Coordinator that all prerequisites have been met before initiating any activity that involves the following areas:

8.4.1 Hot Work Permit,

8.5 OSHA Requirements

PPPL follows a strict interpretation of all OSHA regulations. For hoisting and rigging and for mobile equipment, see the specific PPPL Engineering Standards where specific OSHA requirements are listed and where all OSHA and ASME requirements are detailed in the specific requirements sections.

8.6 Applicable PPPL ES&H training

The following list of PPPL ES&H training courses is applicable to the Subcontractor's work scope.

Safety Courses at PPPL	Written Test
General Employee Training for Subcontractors	YES
Fire Extinguisher Training	YES

8.7 Additional ES&H Requirements

8.7.1 The Subcontractor's safety record will be considered in the proposal/bid evaluations.

8.7.2 The Subcontractor's number of reportable injury/illness cases, in the last year will be included in the bid evaluation.

8.7.3 All PPPL ES&H Requirements imposed on the Subcontractor are also applied to work performed by their sub-tier contractors.

8.7.4 The Subcontractor will be required to submit an Integrated Safety Management (ISM) Plan to PPPL for approval. Submittal of the ISM Plan will be required within 14 days of subcontract award. The receipt and approval of the ISM Plan is a condition of letting the Subcontractor begin on-site work. The requirements for an Integrated Safety Management (ISM) Plan can be found at Section 1, Subsection 1.4.4 of the following web site:

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http://bp.pppl.gov/ESHD_MANUAL/sm.html

- 8.7.5 The Subcontractor must inform its employees of the contents of their ISM Plan, including hazards and controls. A Pre-Job Briefing form will be attached to the subcontract and must be signed prior to starting the job. The JHA form can be found in Attachment No. 1 to this SOW and also at the following web site:
http://www.pppl.gov/sites/pppl/files/department_assoc_files/node49/JHA%20form.pdf
- 8.7.6 PPPL will monitor execution of the ISM Plan and Subcontractor compliance.
- 8.7.7 All work shall be in accordance with PPPL ESHD 5008. The manual is available on the Internet at the following web address:
http://www.pppl.gov/eshis/ESHD_MANUAL/sm.html
- 8.7.8 The Construction Subcontractor and all lower tier subcontractors must each prepare a written Integrated Safety Management (ISM) Plan (Construction Project Safety and Health Plan) that implements the requirements listed below for the construction work under their responsibility and obtain approval of the plan by PPPL prior to commencement of any work covered by the plan. In the plan, the Subcontractor must designate the individual(s) responsible for its on-site implementation, specify qualifications for those individuals, and provide a list of those project activities for which subsequent job hazard analyses are to be performed. In addition the Subcontractor shall be required to:
- A. Prepare, and have approved by PPPL, Job Hazard Analyses (JHAs) in accordance with PPPL procedure ESH-004 prior to commencement of affected work. The JHAs must identify foreseeable hazards and protective measures, and address further hazards revealed by any supplemental information provided by the Construction Manager.
 - B. Provide for approval, drawings and/or other documentation of protective measures for which applicable OSHA standards require preparation by a P.E. or other qualified individual.
 - C. Identify *Competent Person(s)* for approval by the PPPL Construction Manager for activities as required by applicable OSHA standards. This includes Asbestos Exposure, the operation of Aerial Lifts, Construction and Inspection of Scaffolding, and Fall Protection requirements.
 - D. Ensure workers are aware of foreseeable hazards and the protective measures as defined by the JHAs, and require that workers acknowledge being so informed.
 - E. Ensure that any unsafe work is stopped and that workers not following the safe work practices are subject to the Subcontractor's disciplinary process.
 - F. Maintain a designated representative onsite during all active construction

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that is knowledgeable of the associated hazards and has the authority to act on behalf of the Subcontractor; and that makes frequent and regular inspections of the construction worksite to identify and correct any instances of noncompliance with project safety and health requirements.

- G. Instruct workers to report hazards not previously identified or evaluated to the Subcontractor's designated representative. If immediate corrective action is not possible or the hazard falls outside the project scope, the Subcontractor must immediately notify affected workers, post appropriate warning signs, modify the appropriate JHA's, implement needed interim control measures, and notify the PPPL Construction Coordinator of the action taken. The Subcontractor or the designated representative must

stop work in the affected area until appropriate protective measures are established.

- 8.7.9 All Subcontractor equipment & vehicles must be in good working condition with no leaks of any kind. Any spills must be reported immediately to PPPL and work stopped until the spill can be cleaned. The Subcontractor is responsible for remediation cost caused by negligence and or faulty equipment. PPPL Environmental Services will determine the proper method of remediation.
- 8.7.10 For all equipment with Safety ramifications, perform an Operating Daily Checklist (ODCL) using either the manufacturer's recommendation for a daily inspection, or use a PPPL ODCL for similar equipment as a guide. The ODCL file shall be kept at the job site for review by PPPL.
- 8.7.11 All work shall be in accordance with all OSHA, DOE, and PPPL Requirements. Care must be taken to protect personnel, employees and surroundings.
- 8.7.12 Subcontractor workers must take and pass PPPL General Employee Training (GET) if they are to be on-site for more than 40 hours per calendar year.
- 8.7.13 All construction waste, including paints and other chemicals must be disposed of properly in accordance with Federal, State, Local, and PPPL requirements.
- 8.7.14 MSDS sheets for all paints, adhesives, chemicals, stains, and solvents must be furnished to PPPL for approval at least 48 hours prior to the start of work.
- 8.7.15 The Subcontractor must complete a PPPL Job Hazard Analysis (JHA) using a format supplied by PPPL, or another format that is approved by PPPL. The JHA must be reviewed with the responsible PPPL representative at a pre-job brief to be held prior to the start of any construction activity.
- 8.7.16 When applicable, the Subcontractor must comply with OSHA regulations regarding Confined Space Entry. Subcontractor must submit a copy of their confined space program for ES&H approval, or take PPPL Confined Space training on site.

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9.0 QUALITY ASSURANCE REQUIREMENTS

- 9.1.1 Qualifications: Subcontractor shall perform work on this project only with tradesmen with a demonstrated history of the quality of work required with the specified products on previous jobs.
- 9.1.2 Pre-Construction Meeting: Before the start of construction, the Subcontractor shall meet at the job site with PPPL, the material manufacturer, and any other appropriate parties. Provide meeting minutes complete with any record decisions.
- 9.1.3 Field Quality Control: Arrange for attendance of Carlisle’s representative immediately before, as may be required during the installation, and after the completion of construction.
- 9.1.4 Daily Meetings: The assigned PPPL Construction Coordinator and the Subcontractors representative/foreman are required to hold daily job briefings. The briefings shall be held at the start of a shift, as weather and schedule permits.
- 9.1.5 The Subcontractor is responsible for inspecting all work in progress to ensure compliance with this Statement of Work.

10.0 SHIPPING STORAGE AND HANDLING

Not Applicable

11.0 WARRANTY

- 11.1 A 30 year Golden Seal Total System Warranty shall be provided requiring all components utilized to be manufactured or marketed by Carlisle. This warranty includes coverage against incidental membrane punctures, damage from hail up to 3 in. in diameter and 100-mph peak gust wind speeds.
- 11.2 Pro-rated system warranties shall not be accepted.
- 11.2 The warranty shall cover the complete project including penetrations, etc. for the period of the warranty. Subcontractor shall make good any defect without cost to PPPL.

12.1 ATTACHMENTS

- 1. Attachment No. 1 PPPL Job Hazard Analysis (JHA) Form
- 2. Attachment No. 2 PPPL Construction Contractor Safety Requirements
- 3. Attachment No. 3 PPPL Guidelines for Hoisting and Rigging Services
- 4. Attachment No. 4 PPPL Technical Specifications

END OF SECTION

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13.0 DOCUMENTATION AND DELIVERABLES

#	Physical Deliverables Required	When Deliverable Is Required	Deliverable Received (✓)

#	Document Deliverables Required	When Deliverable Is Required*	Deliverable format* (paper, electronic etc.)	Date Deliverable Received* (✓)
1	Integrated Safety Management Plan (ISM)	N	P, E	
2	Lift Plan (as req'd)	PS	P, E	
3	Installer Qualifications & Certifications	PS	P	
4	Competent Person(s) Letter	PS	P	
5	Construction/Installation Plan	N	P, E	
6	Shop & Fabrication Drawings	PS	P, E	
7	Proposed Construction Schedule	N	P, E	
8	Equipment Maintenance and Inspection Records	PS	P	
9	MSDS Sheets	PS	P, E	
10	JHA	PS	P, E	
12	Approved Application Procedure-Adhesive	PS	P, E	
13	Manufacturers Approval of Installer	PS	P	
14	OSHA Training Records	PS	P, E	
15	Proposed Product List & Material Submittals/Certs	PS	P, E	
16	Product Warranties	A	P	
17	Record Drawings	A	P, E	
21	Fastener Material Certifications per 5.1 (as req'd)	PS	P	
22	Roof Uplift Calculation by P.E.	PS	P	
23	List of Lower Tier Subcontractors	PS	P, E	
24	Certificate Lightning protection was replaced	A	P, E	
25	Hoisting and Rigging personnel qualifications	PS	P, E	
26	Asbestos Supervisor Qualifications	PS	P, E	
27	Equipment model, serial number, and manual (as req'd)	PS	P, E	
28	Equipment Operator Training Qualifications or Certifications	PS	P, E	

	<i>* Legend:</i>			
	N = Notice to Proceed Requirement			
	PS = Prior to Start of Construction			
	D = During Construction/As Required			
	A = At Project Completion			
	P, E = Paper or Electronic			

Procurement Technical Representative/COG: _____

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ATTACHMENT No. 1

PPPL

JOB HAZARD ANALYSIS (JHA) FORM

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PRINCETON PLASMA PHYSICS LABORATORY	PROCEDURE	No. ESH-004 Rev 4 Attachment 1, Page 1 of 2
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JOB HAZARD ANALYSIS

Reference:
 Work Order # _____ Work Permit # _____ Work Planning # _____ Procedure # _____ Other _____

Written by (Print): _____ Date: _____ Division/Branch/Org: _____

Description of job/work to be performed:

Location of job/work to be performed:

Hazard (Check-off and <u>Describe</u> the source of the hazard)	Control Measures (Write # of Control(s) in Box)	See Back
<input type="checkbox"/> Chemicals	<input type="checkbox"/> MSDS's Available <input type="checkbox"/> Training Provided	
<input type="checkbox"/> Ergonomic Issues (Repetitive Motion, Lifting, Physical Stresses, etc.)	<input type="checkbox"/> Contact IH for briefing	
<input type="checkbox"/> Ionizing Radiation [Health Physics-HP]	<input type="checkbox"/> Radiation Work Permit (RWP)	
<input type="checkbox"/> Non-Ionizing Radiation (Lasers, Magnetic Fields (EMF), RF, etc.)	<input type="checkbox"/> Contact IH for high power lasers/EMF/RF <input type="checkbox"/> Laser Safety Training	
<input type="checkbox"/> Environmental Impacts (Environmental Release, Hazardous Wastes, etc.) [M&ES]	<input type="checkbox"/> Contact M&ES for guidance	
<input type="checkbox"/> Noise	<input type="checkbox"/> Hearing Protection	
<input type="checkbox"/> Sharp objects/tools		
<input type="checkbox"/> Walking / Working Surfaces (Slips, Trips, Falls)		
<input type="checkbox"/> Falls / Elevated Work (6' above surface)	<input type="checkbox"/> Fall Protection Training	
<input type="checkbox"/> Ladders / scaffolds / manlifts	<input type="checkbox"/> Inspection <input type="checkbox"/> Training	
<input type="checkbox"/> Cranes / rigging / Forklifts	<input type="checkbox"/> Trained/Qualified Personnel	
<input type="checkbox"/> Welding / cutting / grinding / open flame	<input type="checkbox"/> Hot Work Permit [ESU]	
<input type="checkbox"/> Impairing a Security / Fire System [ESU]	<input type="checkbox"/> Contact Security	
<input type="checkbox"/> Hot Surfaces / Cryogenics	<input type="checkbox"/> Cryogenic Training	
<input type="checkbox"/> Heat or Cold Stress		
<input type="checkbox"/> Steam		
<input type="checkbox"/> Electrical ^h [Electrical Safety]	<input type="checkbox"/> Lockout/Tagout <input type="checkbox"/> Arc Flash Analysis ^h <input type="checkbox"/> GFCI <input type="checkbox"/> Trained Personnel	
<input type="checkbox"/> Confined Space / Oxygen Deficiency	<input type="checkbox"/> Confined Space Permit	
<input type="checkbox"/> Machinery / Machine tools	<input type="checkbox"/> Machine Guards <input type="checkbox"/> Chip Guards	
<input type="checkbox"/> Hand Tools / Power Tools	<input type="checkbox"/> GFCI	
<input type="checkbox"/> Eye Hazards	<input type="checkbox"/> Safety Glasses <input type="checkbox"/> Goggles	
<input type="checkbox"/> Falling Objects	<input type="checkbox"/> Hard Hats	
<input type="checkbox"/> Potential / Stored Energy (Springs, instability, capacitors, batteries, fans, hydraulics)		
<input type="checkbox"/> Foot Hazard	<input type="checkbox"/> Safety Shoes	
<input type="checkbox"/> Trenching / Digging	<input type="checkbox"/> Digging Permit	
<input type="checkbox"/> Wall / Floor Penetrations	<input type="checkbox"/> Penetration Permit	

For questions about these topics, contact Industrial Hygiene (IH) except where noted in [brackets].
 IH = 2533, 2531, 546, 639. HP = 2311, 2315. M&ES = 3380. ESU/Security = 2536. Electrical Safety = 3740

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<input type="checkbox"/> Access / Escape / Communications Concerns	
<input type="checkbox"/> Biological (Bodily fluids, insects, Poison plants)	
<input type="checkbox"/> Vehicle Use / Fuel / Exhaust	
<input type="checkbox"/> Illumination / inadequate lighting	
<input type="checkbox"/> Working Alone (Requires IH Approval)	<input type="checkbox"/> IH Must Review/Approve <input type="checkbox"/> Contact Security
<input type="checkbox"/> Pressure / Vacuum cylinders, pressure tests	<input type="checkbox"/> Compressed Gas Training
<input type="checkbox"/> Others:	
Comments	

Control Measures (Write the number of the appropriate control next to the hazard to which it applies)			
Engineering Controls	Administrative Controls	Personal Protective Equipment (PPE)	
01 - Platforms, Scaffolds	12 - Procedures	23 - Hard Hats	29 - Safety Glasses/Goggles
02 - Use less hazardous chemicals	13 - Specific training for job/location	24 - Face Shields	30 - Coveralls
03 - Machine Guards, Chip Guards	14 - Worker Rotation, Rest Breaks	25 - Safety Shoes	31 - Boots / Booties
04 - Ventilation (fume hoods, elephant trunks, local exhaust systems)	15 - Permits (Confined Space, RWP, Hot Work, Digging, Penetrations, Flame)	26 - Ear Plugs/ Muffs	32 - Gloves (leather, kevlar, neoprene, nitrile, voltage rated)
05 - Fall Protection (Guardrails, toe boards)	16 - Signs & Labels, Warning alarms ("high level")	27 - Respirator / Dust Mask	33 - Full Body Harness & lanyards
06 - Engineered Equipment Design	17 - System or Job Walk down	28 - Lab Coat / Apron	34 - Flame retardant / flash resistant clothing
07 - Noise enclosure, absorption, mufflers	18 - Safety watch, Buddy System	29 - Electrically insulated Mat / Tools	
08 - Vibration dampeners	19 - Lockout/Tagout	Emergency Equipment:	
09 - Temporary lights	20 - Spill Containment	36 - Fire Extinguishers	40 - Retrieval Gear.
10 - Welding Screens	21 - Barricades	37 - Telephones/Radios	41 - First Aid Equip.
11 - Mechanical lifting aids	22 - Training / Qualification / Certification	38 - Sprinkler System	42 - Alarms
		39 - Eye Washes & Safety Showers	

Human Performance Tools for an Enhanced Pre-Job Brief:
Situational Awareness – Job Site Review – Questioning Attitude – Stop When Unsure – Effective Communication

Task Review using SAFER
Summarize Critical Steps - Anticipate Errors - Foresee Consequences - Evaluate Controls - Review Previous Experience

Human Performance Tools During Work:
Self-Checking – Peer Checking – Flagging – Independent Verification

Identify and eliminate or mitigate Error Precursors:			
Task Demands	Work Environment	Individual Capabilities	Human Nature
Time Pressure	Distractions/Interruptions	Unfamiliarity with Task / First Time	Stress
High Workload	Changes / Departure from Routine	Lack of Knowledge	Habit Patterns
Simultaneous, Multiple Tasks	Confusing Displays or Controls	New Technique not used before	Assumptions
Repetitive monotonous actions	Workarounds / OOS Instruments	Imprecise Communication Habits	Complacency / Overconfidence
Irrecoverable Acts	Hidden System Response	Lack of Proficiency / Inexperience	Mindset (tuned to see)
Interpretation Requirement	Unexpected Equipment Conditions	Indistinct Problem-Solving Skills	Inaccurate risk perception
Unclear Goals, Roles, Responsibilities	Lack of Alternative Indication	"Hazardous" Attitude for Critical Task	Mental Shortcuts
Lack or Unclear Standards	Personality Conflicts	Illness/Fatigue	Limited Short-Term Memory

<input type="checkbox"/> Industrial Hygiene Review Required IH Signature:	Date:
<input type="checkbox"/> Other Review Required Who? _____ Signature:	Date:

<input type="checkbox"/> Cog. Individual or RLM Approval Required Signature:	Date:
--	-------

Personnel Briefed on this JHA (print):

SEND Original or Copy to: Industrial Hygiene (Required)

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ATTACHMENT No. 2

PPPL

Construction Contractor Safety Requirements

Statement of Work		
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Construction Contractor Safety Requirements Guidance

(Applies to any contractor engaging in alterations, modifications, moving, demolition, or new installation of a building or structures, systems and components at PPPL)

General Requirements:

All work done at PPPL must, at a minimum, meet OSHA standards for safety and health.

All other applicable building codes and standards shall apply.

If standards conflict, the most protective standard shall be followed.

All personnel working at PPPL have Stop Work Authority. If serious hazards are noted, any individual may ask that work be stopped. If this occurs, place all work in a safe condition and stop all work. Contact your PPPL representative to resolve the issue. If corrective measures cannot be immediately implemented, work may not resume until the Head of PPPL ES&H provides written authorization.

Required before arriving on site:

Name and qualifications of OSHA Competent Person(s)

(Must be on site during all active construction and must be knowledgeable of the associated hazards and have the authority to act to correct safety concerns)

Name of Designated Representative (if different from Competent Person)

Policy ensuring that workers are subject to disciplinary process if not following safe work

Policy informing employees to report safety concerns to Designated Representative or Competent Person

Any required drawings or specifications that affect safety: scaffold engineering, excavation shoring, crane lift plans

Required before starting work:

Approved site specific Health and Safety Plan (HASP) or Job Hazard Analyses (JHA) covering each phase of the work

(Must address the specific hazards expected and controls to be used at PPPL. A company safety manual does NOT qualify as a site specific HASP or JHA. PPPL's JHA form may be used if desired)

Material Safety Data Sheets (MSDS) for all chemicals 24 hours before being brought on site

Any required training documentation: crane operator, aerial lift operator, forklift operator, asbestos removal certificates, lead removal certificates, confined space entry, etc.

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A pre-job brief must be held before the start of each new job task with all workers and affected PPPL personnel to discuss scope of work, hazards and controls, and all workers on the job must print their name on the JHA.

Hazard Specific Requirements:

If Permit Required Confined Space Entry is required, an OSHA compliant confined space entry permit program must be submitted, the contractor's permit will be used, and training qualifications must be presented prior to the start of any confined space work. Contractors wishing to use PPPL's Confined Space Entry program must take PPPL's Confined Space Entry Training ~ 2.5 hours. This must be scheduled in advance.

If a crane is being brought on site, copies of all required inspections (including monthly wire rope inspection) must be provided.

Contractors are generally NOT permitted to use PPPL equipment such as forklifts, cranes and man lifts.

Barricade tape, when needed, shall only be red "Danger" tape where personnel hazards exist. Yellow "Caution" tape may only be used for equipment protection. All barricade tape will be posted with the name and phone number of a contact. The PPPL representative may provide the contact information.

Additional Requirements

To get on site, all contractors must provide government issued photo ID.

If working on-site for more than 40 hours in a year, General Employee Training must be taken & a test passed ~ 2 hours

Manlift Requirements

All work shall comply with PPPL Engineering Standard MECH-012, Manlifts. Equipment includes but not limited to:

1. Aerial Lifts - telescoping boom and articulated boom elevating work platforms
2. Scissor Lifts - self-propelled and manually propelled elevating work platforms
3. Truck Mounted Aerial Lifts

The primary requirements for Subcontractors are:

1. Subcontractor employee shall be qualified as defined in this Standard and approved by the Manlift Manager.
2. Subcontractor shall provide records that the operators are qualified. Qualifications required shall be equivalent to that noted for PPPL employees within Engineering Standard MECH-012.
3. Subcontractor shall provide equipment maintenance and safety records including

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- equipment Model and Serial number three days in advance of delivery.
4. Subcontractor shall ensure all equipment and attachments are designed to operate together by the original equipment manufacturer.
 5. Approval by the Manlift Manager is required prior to bringing this type of equipment on site.
 6. Daily, Frequent and/or Periodic inspections are required by the Operator, for all equipment, consisting of visual inspections and functional tests as detailed within Engineering Standard MECH-012. The Subcontractor employee must provide date, time, results, and sign off on each inspection. Annual inspections are required for all equipment and shall be performed by a qualified mechanic in accordance to the manufacturer's specifications. All maintenance shall be the responsibility of the Subcontractor employee and conducted as detailed within Engineering Standard MECH-012.
 7. All operational and travel requirements shall be adhered to as noted for PPPL employees within Engineering Standard MECH-012. Only loads within the rated capacity of the equipment shall be handled.

PPPL Engineering Standards may be found online at <http://bp.pppl.gov/EngStds.html> ; if you are unable to open the Engineering Standard web-site, please contact the PPPL Technical Representative (PTR) for a paper or PDF copy of the required Standard.

END OF SECTION

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ATTACHMENT No.3

PPPL

Guidelines for Hoisting and Rigging Services

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PPPL Guidelines for Hoisting and Rigging Services

PPPL requires conformance with all applicable OSHA and ASME B30 Standards regarding powered industrial truck, Aerial lifts, Fall Protection, and Hoisting and Rigging applications. Procurement shall ensure the following requirements are passed down to all sub-tiered contractors and the PPPL Technical Representative shall ensure that the PPPL Lift Manger is notified in a timely fashion to verify compliance with all requirements. A checklist is provided at the end of this document for convenience. Please note that failure to abide by the suggested advance notice may result in disallowance of the crane onsite. These shall include but are not limited to:

OSHA 1910 Subpart N

- 1910.178 - Powered industrial trucks.
- 1910.179 - Overhead and gantry cranes.
- 1910.180 - Crawler locomotive and truck cranes.
- 1910.184 - Slings.

OSHA 1926 Subpart L

- 1926.453 - Aerial lifts.
- 1926.454 - Training requirements.

OSHA 1926 Subpart M – Fall Protection

OSHA 1926 Subpart N - Cranes, Derricks, Hoists, Elevators, and Conveyors

- 1926.550 - Cranes and derricks.
- 1926.554 - Overhead hoists.

OSHA 1926 Subpart CC – Cranes and Derricks in Construction

Subset of typical ASME B30 series for hoisting and rigging operations:

ASME	Standard
B30.1	Jacks
B30.2	Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)
B30.3	Construction Tower Cranes
B30.5	Mobile and Locomotive Cranes
B30.9	Slings
B30.10	Hooks
B30.11	Monorails and Underhung Cranes
B30.16	Overhead Hoists (Underhung)
B30.17	Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist)
B30.20	Below-the-Hook Lifting Devices
B30.21	Manually Lever Operated Hoists

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- B30.23 Personnel Lifting Systems
- B30.26 Rigging Hardware
- BTH-1 Below the Hook Lifting Devices

In addition to these standards, PPPL requires the following:

- 1) Procedural Steps - Prior to award, proposing H&R subcontractor shall provide details of all H&R procedures, including references to Lift Plans (see next paragraph) and proposed equipment to be used.
- 2) Lift Plans - Prior to any lift or rigging, H&R subcontractor shall provide a lift Plan for review and approval, including:
 - a. Plan view of lift with dimensions, including any nearby structures or power lines. Ensure that all crane locations are identified with dimensions to loads (picking and setting).
 - b. Section View rigging sketch with dimensions and listing all slings and hardware and their capacities. Load angle factors should be calculated and provided on sketch.
 - c. Crane load charts as applicable
 - d. Forklift capacities as applicable and assure that the load weight and CG does not overextend the capacity of the forklift.

NOTE: A generic lift plan may be provided but rigging shall be sized for the largest worst-case load.

3) Lift Execution

- a. Any item to be lifted that weighs more than 80% of the capacity of the crane shall be witnessed by PPPL. Load cells may be required. For planning purposes, proper notice shall be given.
- b. All items to be lifted shall have known weights. If a weight estimate needs to be made, the estimate calculation shall be provided in writing.
- c. Lifts of items valued at more than \$200,000 or have a program impact of more than two months are considered critical lift. A critical lift plan shall be drafted and approved by the Responsible Line Manager and the Lift Manager. The Lift Manager and QA shall witness the lift.
- d. Hard Hats, safety shoes and gloves shall be used during lifts.
- e. ASME Hand Signals with clear lines of sight shall be used at all times.
- f. Slings shall be in good condition. Kinked or bent wire rope shall not be used. Highly worn and frayed synthetic slings are also unacceptable and shall not be used.
- g. Any unusual conditions shall be brought to the PPPL contract representative's attention immediately.
- h. Anyone has stop work authority.

- 4) Mobile Crane Certifications - Prior to any lift or rigging, H&R subcontractor shall provide Crane Certifications for review, including:
 - a. Evidence of recent periodic inspection.

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- b. For subcontracted mobile cranes, current annual inspection and current monthly wire rope and brake inspection (sample form attached).

NOTE: Mobile cranes shall be free from leaks and all safety limits must be operational.

- 5) Mobile Crane Operator Qualifications - Prior to any mobile crane lift, the H&R subcontractor shall provide the designated crane operators qualifications including:
 - a. NJ Mobile Crane Operators License.
 - b. NCCCO Mobile Crane qualification
 - c. Discussion of recent and frequent experience with proposed crane.

- 6) Overhead Crane Operator Qualifications (if applicable) - Prior to any overhead crane lift, the H&R subcontractor shall provide the designated crane operators qualifications including:
 - a. Overhead crane certification
 - b. Resume of recent and frequent experience with similar type/class crane.
 - c. Annual medical examination as required per ASME B30.2 ch2-3.1.2 for cab crane operation if applicable.

- 7) Qualified Rigger and Qualified Signal Person Certifications - Prior to any lift or rigging, H&R subcontractor shall provide Qualified Rigger and Qualified Signal Person Certifications in accordance with 1926 Subpart CC (1926.1400). (See attached example)

- 8) PPPL requires strict adherence to OSHA. Standard 29 CFR 1910.179(n) (3) (vi) for overhead and gantry cranes states that "The employer shall require that the operator avoid carrying loads over people." OSHA Standard 29 CFR 1926.550(a) (19) for mobile cranes states "All employees shall be kept clear of loads about to be lifted and of suspended loads."

- 9) Forklift Operator Experience – Prior to any forklift operation, H&R subcontractor shall provide a forklift operator certificate. Include a narrative of operator experience, with number of year’s experience.

- 10) A 125% proof load test certificate shall be provided for all subcontractor provided below the hook lifting devices and lift beams.

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MONTHLY HOOK, RUNNING ROPE, & BRAKE
INSPECTION FOR MOBILE CRANES
(Suggested Form)

Equipment: _____

Owner: _____

Inspector (Print): _____

Rope Identification: _____

Result of inspection (Circle):

Rope: PASS FAIL _____

Hook: PASS FAIL _____

Brakes: PASS FAIL N/A _____

Comments (if any): _____

Signature: _____ Date: _____

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"Running Rope" Inspection Requirement References

1910.180(g) "Rope inspection."

1910.180(g) (1)

"Running Ropes." A thorough inspection of all ropes in use shall be made at least once a month and a certification record which includes the date of inspection, the signature of the person who performed the inspection and an identifier for the ropes shall be prepared and kept on file where readily available. All inspections shall be performed by an appointed or authorized person. Any deterioration, resulting in appreciable loss of original strength shall be carefully observed and determination made as to whether further use of the rope would constitute a safety hazard. Some of the conditions that could result in an appreciable loss of strength are the following:

1910.180(g) (1) (I)

Reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires.

1910.180(g) (1) (ii)

A number of broken outside wires and the degree of distribution of concentration of such broken wires.

1910.180(g) (1) (iii)

Worn outside wires.

1910.180(g) (1) (iv)

Corroded or broken wires at end connections.

1910.180(g) (1) (v)

Corroded, cracked, bent, worn, or improperly applied end connections.

1910.180(g) (1)(vi)

Severe kinking, crushing, cutting, or unstranding.

1910.180(g) (2) "Other ropes."

1910.180(g)(2)(i)

Heavy wear and/or broken wires may occur in sections in contact with equalizer sheaves or other sheaves where rope travel is limited, or with saddles. Particular care shall be taken to inspect ropes at these locations.

1910.180(d) (6)

"Inspection records." Certification records which include the date of inspection, the signature of the person who performed the inspection and the serial number, or other identifier, of the crane which was inspected shall be made monthly on critical items in use such as brakes, crane hooks, and ropes. This certification record shall be kept readily available.

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Qualified Rigger and Qualified Signal Person
(Suggested Form)

Dear _____ FAX: _____

Please certify that the following people are qualified per OSHA § 1926.1400 for performing lifts with the following equipment:

Mobile Crane Make and Model: _____

Owner: _____

Qualified Rigger(s) and Qualified Signal Person per OSHA § 1926.1400

Qualified Rigger(s) (Print): _____

Qualified Signal Person (Print): _____

The above listed people are employees of

 Company Name
 and certified to meet the qualification standards listed in OSHA § 1926.1400

Signature: _____ Date: _____

Company position: _____

Please sign and FAX back to Mike Viola (609) 243-3091

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Partial Qualified Rigger, Signal Person, and Employer Training references

§ 1926.1400 Rigger qualifications.

§ 1926.1401 Definitions.

Qualified person means a person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, successfully demonstrated the ability to solve/resolve problems relating to the subject matter, the work, or the project.

Qualified rigger is a rigger who meets the criteria for a qualified person.

§ 1926.1403 Assembly/Disassembly – general requirements (applies to all assembly and disassembly operations)...

(r) *Rigging*. In addition to following the requirements in 29 CFR 1926.251 and other requirements in this and other standards applicable to rigging, when rigging is used for assembly/disassembly, the employer must ensure that:

- (1) The rigging work is done by a **qualified rigger**.

§ 1926.1428 Signal person qualifications.

(a) The employer of the signal person must ensure that each signal person meets the Qualification Requirements (paragraph (c) of this section) prior to giving any signals. This requirement must be met by using either Option (1) or Option (2) of this section.

(4) Know and understand the relevant requirements of § 1926.1419 through § 1926.1422 and § 1926.1428.

(5) Demonstrate that he/she meets the requirements in paragraphs (c) (1) through (4) of this section through an oral or written test, and through a practical test.

§ 1926.1419 Signals – general requirements.

§ 1926.1420 Signals – radio, telephone or other electronic transmission of signals.

§ 1926.1421 Signals – voice signals – additional requirements.

§ 1926.1422 Signals – hand signal chart.

§ 1926.1424 Work area control.

§ 1926.1425 Keeping clear of the load.

§ 1926.1430 Training.

The employer must provide training as follows:

(a) Overhead powerlines. The employer must train each employee specified in § 1926.1408(g) and § 1926.1410(m) in the topics listed in § 1926.1408(g).

(b) Signal persons. The employer must train each employee who will be assigned to work as a signal persons who does not meet the requirements of § 1926.1428(c) in the areas addressed in that paragraph.

(c) Operators.

(d) Competent persons and qualified persons. The employer must train each competent person and each qualified person regarding the requirements of this subpart applicable to their respective roles.

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SAMPLE LIFT PROCEDURE

Procedure No. L - _____

TITLE: _____

Note: LIFT DATA SHEET NEEDED TO PERFORM THIS LIFT

PREPARED BY (Qualified Engineer): _____ DATE _____

A. INTRODUCTION

Describes component to be lifted, classification and reason for classification.

B. PREREQUISITES

1. PIC will attest on the Lift Data Sheet that any installation, disassembly, or removal procedures required to allow the equipment to be moved have been completed.

C. PRECAUTIONS

Include in the procedure only those precautions that are directly applicable:

1. Protection of slings and equipment from edges.
2. Protection of finished surfaces from damage.
3. Areas needed to be roped off.
4. Security guards, if necessary.
5. Adjacent equipment protection needed.
6. Ensure the items in the lift are free from any connection or obstruction.

D. PROCEDURE FIELD CHANGES

Procedure field change can be made on site if approved by the PPPL Lift Engineer by revising an existing or developing a new Lift Data Sheet. Revised lift data sheets also require written approval of the Lift Manager.

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E. LIFT DATA SHEET INSTRUCTIONS

The Lift Data Sheet provides the specification for the hoisting and rigging aspects of the lift and shall be initiated by a qualified engineer.

Reference any drawings/sketches in Lift Data Sheet. Include as attachments any required drawings. These can be marked up blue prints or a sketch. Sketch inclusions: (see attached example also)

Identification of the items to be moved, the weight, dimensions, and center of gravity of the load, and any hazardous or toxic materials that are present.

Identification of operating equipment to be used by type and rated capacity.

Rigging sketches that include (as applicable):

Identification and rated capacity of slings, lifting bars, rigging accessories, and below-the-hook lifting devices. Calculate and provide the rated capacity of equipment in the configuration in which it will be used.

Load-indicating devices.

Load vectors.

Lifting points.

Sling angles.

Boom and swing angles.

Methods of attachment.

Crane orientations.

Other factors affecting equipment capacity (e.g. load path sketch, key point heights, floor or soil bearing capacity).

Operating procedures and special instructions to operators including rigging precautions and safety measures to be followed as applicable. Show floor plan with path of intended travel. Note lift points and travel (by cart/fork lift) path.

If the rigging team is an outside contractor, provide the names and copies of qualification of team members.

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F. PROCEDURE

Assure all prerequisites and precautions have been completed. Indicates the technical requirements to protect the equipment and personnel during the lift and QC shall assure that all Prerequisites are complete. List steps and order if applicable.

LIFT DATA SHEET

LIFT TITLE: _____ LIFT PROCEDURE NO. L - _____ AREA: _____ Sheet No (if applicable) _____	Effective Date: _____ Repetitive Lift Expiration Date: _____	Date Performed: _____	Approved: _____ <p style="text-align: center;">LIFT MANAGER</p>
DISASSEMBLY PROCESS COMPLETED (Print and Initial)		PIC: _____	
DESCRIPTION: WEIGHT: _____ DETERMINED BY: _____ Sketch of rigging shall include: Crane Capacity, Hook Load, All Rigging, Lift Height, Flight Plan Sketch of equipment shall include: Dimensions, Bolts Removed, Allowable Tilt			
(Print & Initial)	<u>Crane Operator(s)</u> _____ _____	<u>Rigging Team</u> _____ _____	
APPROVED: (Print and Initial)	_____ Crane Operator (Rigged to sketch)	_____ PIC (Equipment ready to lift)	

SAMPLE COMPLETED LIFT DATA SHEET

LIFT TITLE: _____	Effective Date: _____	Date Performed: _____	
LIFT PROCEDURE NO. <u>L</u> - _____	Repetitive Lift Expiration Date: _____	Approved: _____	
AREA: _____		LIFT MANAGER	
Sheet No (if applicable) _____			
DISASSEMBLY PROCESS COMPLETED (Print and Initial)		PIC: _____	
DESCRIPTION: WEIGHT: _____ DETERMINED BY: _____ Sketch of rigging shall include: Crane Capacity, Hook Load, All Rigging, Lift Height, Flight Plan Sketch of equipment shall include: Dimensions, Bolts Removed, Allowable Tilt			
(Print & Initial)	Crane Operator(s) _____	Rigging Team _____	
APPROVED: (Print and Initial)	_____ Crane Operator (Rigged to sketch)	_____ PIC (Equipment ready to lift)	

Checklist of Requirements for Procured Hoisting and Rigging Services

Note: Failure to abide by the suggested advance notice
may result in disallowance of the crane onsite.

Contract Number: _____
Work Planning Number: _____ PPPL
Technical Representative: _____
Subcontractor contact Person: _____
Phone: _____ FAX: _____

1 Week in advance

Prejob onsite discussion (>1 week in advance): _____
Site underground survey performed: _____
Item Being Lifted: _____ Value: _____
Lift Plan Provided: _____
Special (e.g. electrical) considerations: _____
Weight: _____ Dimensions: _____ CG Known: _____
Radius: _____ Height: _____ Obstructions: _____

3 Days in advance

Crane Make and Model: _____
Owner: _____ Periodic
Inspection (copy provided) Date: _____
Monthly hook and wire rope form (copy provided) Date: _____
Load Chart pertinent to this lift (copy provided): _____
Operator: _____ NJ License
Expiration Date: _____
NCCCO Expirations Date: _____
Medical: _____
Rigging supplied by: _____
OSHA § 1926.1400 Form Provided
Qualified Rigger(s): _____ Qualifie
d Signal Person(s): _____

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ATTACHMENT No.4

PPPL

Technical Specifications

For

REPLACE D-SITE COOLING TOWER PUMP HOUSE ROOF

REPLACE D-SITE COOLING TOWER PUMP HOUSE ROOF TECHNICAL SPECIFICATIONS

1.1 SUMMARY OF WORK AND GENERAL REQUIREMENTS

1.2 General

- A. The Roof Replacement Project for the D-Site Cooling Tower Pump House Building includes, but is not limited to the following major elements:
1. Removal of existing roof membrane, insulation, cant strips and tapered edges.
 2. Removal of asbestos containing flashings in accordance with the requirements of 29 CFR 1926 (g) (11)
 3. Off-site disposal of all removed materials.
 4. Removal and replacement of deteriorated blocking and curbing.
 5. Installation of roof membranes, cover boards and in-place tapered rigid insulation.
 6. Provide new flashings, coping, reglets, and other trim metal work as specified and required.
 7. Provide and install new roof drains

1.3 Subcontractor Responsibility

- A. The Subcontractor shall supply all labor, materials, equipment and construction supervision services to complete the demolition and replacement of existing roofing, and the installation of approximately 4,600 square feet of Sure-White FleeceBack EPDM roofing on the building designated.
- B. The Subcontractor shall provide all shop drawings, to be reviewed and approved by the Roofing Manufacturer as part of warranty requirement compliance. Subcontractor shall submit product data, material sample and construction details and listing of the Sure-White FB EPDM Membrane Manufacturer, necessary to satisfy the technical and performance specifications set forth herein.
- C. The work required under the Subcontract includes the demolition, removal of all existing roofing material consisting of ballasts, membrane roofing, cover board, rigid insulation, flashing, coping, wood blocks and replacement as required of any damaged decking. To protect the structural integrity of the existing roof support system, demolition debris cannot be stockpiled on the building roof but must be removed on a continuous basis as the demolition progresses. A temporary chute to dumpsters is advisable (See Part F below).
- D. Mechanical and electrical equipment within the re-roofing project limits must be protected to prevent damage during the performance of demolition and construction activities, since the equipment must remain in service during the term of the contract. Some Mechanical equipment and duct may be required to be uninstalled for the removal of the existing roofing materials and must be re-installed after the roofing installation is completed.
- E. The Subcontractor shall provide a fall protection system around the edge of the existing roof which meets the requirements of OSHA, and the PPPL Construction Safety Officer.
- F. Asbestos materials are present in the existing perimeter flashing. Asbestos removal shall be performed in accordance with the requirements of 29 CFR 1926.1101 (g) (11) as follows:
- a) a Competent Person;
 - b) eight hour training for workers per 1926.1101 (k) (9) (viii);
 - c) material shall not be sanded, ground, or abraded (need manual methods for removal);
 - d) material must be carried or passed to the ground by hand or it must be

- lowered to the ground via covered, dust-tight chute, crane, or hoist;
- e) all such material must be removed from the roof as soon as practicable but no later than the end of a work shift;
 - f) all asbestos removal has to be performed using wet methods.
- G. PPPL requires an Asbestos Supervisor, with documented training, be at the job-site at all times during the removal of any asbestos containing materials.
 - H. Subcontractor shall schedule work sequence so roof openings are closed and sealed at the close of each work day. Weather sealing of roof shall be verified to PPPL by the Subcontractor at the close of each work day.
 - I. The Subcontractor shall be responsible for the proper installation of new insulation, and roofing membrane. The existing roof drains may require adjustments to insure conformance with the minimum insulation requirements previously described. New replacement of roof drain fixtures shall be supplied and installed by the Subcontractor.
 - J. The Subcontractor shall be responsible for flashing at all parapets, equipment post bases and equipment blocking in accordance with the details provided by the membrane manufacturer.
 - K. The Subcontractor shall remove all standing water from the roof during construction with pumps or vacuum to scuppers and/or roof drains. Provisions shall be made for rainfall runoff on weekends or other non-working time if the normal flow to the roof drains is impeded in any way. Subcontractor shall keep existing drain lines free of debris and open at all times.
 - L. The fully adhered EPDM roofing system including insulation and cover boards shall be installed as per roofing membrane manufacturer's requirements. All rough carpentry for blocking, edging and other uses shall be performed by the Subcontractor. Miscellaneous sheet-metal installations, if required, shall only be performed after obtaining specific approval from PPPL and the membrane manufacturer.
 - M. Upon completion of construction, the Subcontractor shall be responsible for the submittal to PPPL of the manufacturer's 30 year warranty, and reproducible as-built drawings with a CAD file approved by the roofing membrane manufacturer.
 - N. Safety Training -The Subcontractor and any subcontractor's employees shall be required to attend the PPPL General Employee Basic Safety, which lasts for approximately two (2) hours, and Fire Watch Training, which also lasts for approximately two (2) hours.
 - O. PPPL shall designate to Subcontractor the lay down areas for roof waste, new materials, toilets, cranes and other miscellaneous work tools, etc.
 - P. PPPL prohibits the use of existing toilet rooms for use by the Subcontractor's personnel. Use of other existing facilities within the buildings by the Subcontractor and his personnel will not be permitted.
 - R. All crane operators working on the site shall provide proper Operator Certificates to PPPL for review and approval (See Attachment No. 2).
 - S. Subcontractor shall provide all workers on roof the ability to communicate with workers on the ground by cell phone or of other means at all times workmen are on the roof.
Minimum number of persons on roof at any time - 2 persons.
 - T. No welding or burning of any kind shall be allowed. All fastening of materials shall be by mechanical means. All cutting of materials shall be by electric saws.
 - U. The lightning protection system including rods, wiring, etc. shall be

temporarily removed, reinstalled and reset by an experienced Subcontractor in this type of work. Certification of the final reconnection system shall be provided to PPPL after completion.

- V. Prior to start of work the Subcontractor shall remove all existing loose debris and materials from the roof and properly dispose of off site.

1.2 Experience

- A. The Subcontractor performing the construction and installation of fully adhered FleeceBack EPDM Sure-White total roofing system including cover board and insulating system is required to have Manufacturer's approved and certified experience in such installations. In addition, the Subcontractor must provide written documentation in the form of a Certification to PPPL from the FleeceBack EPDM Sure-White membrane manufacturer that the INSTALLERS ARE EXPERIENCED WITH THE MATERIALS, INSTALLATION AND CONSTRUCTION OF THE PARTICULAR ROOFING SYSTEM COMPONENTS PROPOSED for construction on the project as contained in his Materials and Equipment Compliance Statement which accompanies the Subcontractor's bid for construction.
- B. The Subcontractor shall provide only those supervisory personnel for the construction of this project, who are qualified and have been trained in the installation of the FleeceBack EPDM Sure-White adhered roofing systems by the membrane manufacturer of the particular roofing membrane proposed for this project.

1.3 Manufacturer's Responsibility

- A. The Manufacturer of the specified membrane roofing system must provide the review and approval of all the submittals including the shop drawings as required as per Technical and Performance Specifications. All Approved shop drawings shall bear the date and signature of the membrane manufacturer representative who approved the shop drawings.
- B. The roof manufacturer's representative shall review and approve all shop drawings for Roofing System conformance prior to the start of any work.
- C. All checked and approved shop drawings must be submitted to PPPL for review.
- D. The manufacturer of the roofing system membrane shall provide all technical data, conduct all inspections, and issue all approvals to the Subcontractor as required in these Technical and Performance Specifications and as required by PPPL.
- E. Carlisle/roof manufacturer will conduct periodic/weekly inspections. Inspections will commence at the start of roof removal and continue on a once a week basis at minimum. Brief reports of progress, etc. will be forwarded to PPPL for review.

1.4 Material And Performance Requirements

- A. The Technical and Performance Specifications describe materials supplied by a particular manufacturer and the construction procedures and practices necessary to produce a particular level of performance for the quality of materials provided by the manufacturer. The procedures and practices established by the manufacturer are further intended to permit the manufacturer to issue a warranty with specific conditions of liability for an extended and defined duration.

- B. The Technical and Performance Specifications for the roofing system proposed for this project have been derived from those of a particular manufacturer; namely the Carlisle FleeceBack EPDM Sure-White, Adhered Roofing System specification (latest revision) developed by Carlisle SynTec Inc. The named manufacturer's specification has been appropriately modified by PPPL to satisfy the particular conditions associated with the identified project.
 - C. Attention is directed to the bid requirements regarding the information which must be included as part of the Construction Materials and Equipment Compliance. The Subcontractor shall be responsible for providing appropriate documentation to PPPL that the materials proposed for use on the project by the Subcontractor and the roofing system resulting from said materials satisfy the criteria for an FM Class I Approval.
- 1.5 Roofing System Warranty
- A. Upon completion of all construction related to the roofing system, the Subcontractor shall provide PPPL with a warranty executed and issued by an authorized representative of the manufacturer of the FleeceBack EPDM Sure-White fully adhered roofing membrane which provides the following minimum warranty conditions:
 - 1. A 30 year Total System Warranty for materials warranting that the manufacturer will supply materials due to material failure or disintegration and that the manufacturer will repair all leaks which occur in the roofing system for a 30 year period.
 - 2. Certification is required such that the system is a Class A roofing system and that the roofing system conforms to UL requirements and FM Class I Approval; 1-90 roof with 100 mph peak wind speed.
- 1.6 Owner Occupancy
- 1. Full Owner Occupancy: PPPL will occupy the site and adjacent buildings during the entire roofing demolition and construction period. Cooperate with PPPL during the construction operation to minimize conflicts and facilitate Owner usage as required. Perform the work as not to interfere with PPPL's operations.
 - 2. Coordinate scheduling with PPPL in order to relocate or protect the building contents from damage during construction operations.
- 1.7 General Site Requirements
- A. Access to job site must be strictly controlled.
 - B. PPPL is surrounded by wetlands and is subject to strict environmental requirements. Material must not be allowed to enter storm drains. An Environmental Specialist from PPPL will periodically inspect the work site.
 - C. Roof removal operations must be performed in a safe manner with all material leaving the roof under controlled conditions. Windblown material must be promptly collected. Daily cleanup of the ground level perimeter is required.
 - D. Fall protection must meet OSHA requirements and conditions must be diligently monitored.
 - E. PPPL Industrial Hygienist will periodically inspect the work site to determine if sufficient safety practices and equipment are in use.
 - F. Removal operations may uncover undocumented abandoned utilities. All unplanned utility or structural contracts must be promptly reported to PPPL Project Coordinator. Work must stop if contact is made with as unknown utility.
 - G. Heavy equipment is to be operated by qualified operators when the immediate

work area is secure and when all personnel are within view of the operator or designated safety watch.

- J. The qualifications of Crane Operators, and lifting procedures and techniques shall be submitted to PPPL Lift Engineer for review.
- K. Electrical hazards are present at the job site. Be aware of:
 - 1. Medium voltage underground power lines (under 500 volts).
 - 2. GFCI must be used on all outdoor electrical tools and equipment.
- L. No welding, cutting, burning, or open flames will be permitted on the roof. Other areas require a special PPPL permit.
- M. Only chemicals required for this Project should be on site. MSDSs are required.
- N. Efficiency requires that all logistic requirements are defined and monitored:
 - a. Storage of equipment and materials.
 - b. Location and positioning of asbestos and trash containers.
 - c. Timing and scheduling of all potentially conflicting activities.
 - d. Parking of private vehicles.
 - e. Heavy equipment routes.
- O. All Personal Protection Equipment must be used as necessary. This includes safety glasses, face shields, gloves, hard hats, safety shoes, etc.
- P. There are restrictions on work hours. Normal hours are between 7AM and 5PM. Monday through Friday. Work outside these times will require approval.
- Q. PPPL is required to have emergency access to all buildings. Blocking of building access must be pre-approved.
- R. PPPL has an active solid waste/recycle program. Regulations must be followed.
- S. Hazardous waste requires special procedure. All potential hazardous waste, such as oil contaminated soil must be immediately reported.
- T. PPPL permits all employees to issue a "STOP WORK" order, if unsafe work practices are observed.
- U. Vehicle traffic control is important. All backup alarms must be working.
- V. Training requirements are listed in the Subcontract and must be followed.
- W. Daily job briefings with the PPPL Project Coordinator are required. The briefing should be held at the start of a shift, if the weather and schedule permits.
- X. PPPL has an Emergency Services Unit (ESU). ESU must be aware of all hazards at the job site so that, if necessary, an efficient emergency response can be made.
- Y. Proper management, training and introduction of new or replacement employees is essential to ensure safe working conditions.

2.1 TECHNICAL SPECIFICATION

2.2 General

2.2.1 Description

- A. Furnish and install 30-year Total System FleeceBack EPDM Sure-White Adhered Roofing System utilizing 10' wide Sure-Seal® (WHITE) FleeceBack membrane with a total thickness of approximately 145-mil thick (90-mil thick non-reinforced EPDM membrane laminated to a 55-mil thick non-woven polyester, polypropylene blended fleece-backing) as manufactured and approved by Carlisle SynTec Inc.
- B. Fleece backed membrane is fully adhered to an acceptable substrate with Carlisle's two-component low rise FAST Adhesive in full coverage. Adjoining sheets of membrane spliced together with 6" wide Factory-Applied SecurTape and Primer. Sheet end laps are butted and overlaid with 6" wide Sure-Seal Pressure-Sensitive Cured Cover Strip and overlaid with 12" wide Sure-Seal Pressure-Sensitive Overlayment Strip. All field and flashing splices are sealed with Sure-Seal Lap Sealant.

2.2.2 Design Options

- A. The 30-Year Golden Seal™ Total System Warranty includes 2" hail, limited accidental puncture and 100-mph peak gust wind speed coverage. This Project with a specified wind speed warranty, the membrane assembly must incorporate 5/8" thick Carlisle Dens-Deck or Dens-Deck Prime as a membrane underlayment installed over a base layer of Sure-Seal Polyisocyanurate insulation (standard 20 psi compressive strength) with all joints staggered between layers. Both layers may be mechanically fastened or adhered with FAST Adhesive, where applicable.

2.2.3 Quality Assurance

- A. This roofing system must be installed by a Carlisle Authorized Subcontractor approved to install this 30-year FleeceBack EPDM Sure-White Adhered Membrane Assembly. The installation of this roofing system must be in compliance with Carlisle's specification and the shop drawings as approved by Carlisle. There must be no deviations from Carlisle specifications or the approved shop drawings without the Written Approval of Carlisle and PPPL.
- B. Upon completion of the installation, an inspection will be conducted by a Field Service Representative of Carlisle SynTec to ascertain the roofing system has been installed according to Carlisle's specifications and details. This inspection is to determine that a Carlisle Warranty can be issued and is not intended as the final inspection for PPPL.

2.2.4 Submittals

- A. Prior to starting work, the roofing Subcontractor must submit the following:
 - 1. Shop drawings showing layout, details of construction and identification of materials.
 - 2. A sample of the manufacturer's Membrane System Warranty.
 - 3. Submit a letter of certification from the manufacturer which certifies the roofing Subcontractor is authorized to install the manufacturer's roofing system and lists foremen who have received training from the manufacturer along with the dates training was received.
 - 4. Certification of the manufacturer's warranty reserve.
 - 5. Furnish Roof- Uplift Analysis and calculations for metal deck and fasteners reinforcement as prepared by NJ Professional Engineer to be submitted to PPPL.
- B. Upon completion of the installed work, submit copies of the manufacturer's final inspection to PPPL prior to the issuance of the manufacturer's warranty.

2.2.5 Product Delivery, Storage and Building

- A. Deliver materials to the job site in the original, unopened containers labeled with the manufacturer's name, brand name and installation instructions.
- B. Job site storage temperatures in excess of 90° F may affect shelf life of curable materials (i.e., FAST Adhesive - Parts A and B, uncured and semi-cured Pressure Sensitive Flashing, "T" Joint Covers, adhesives, sealants, Primers, Splice Tape and Pourable Sealer).
- C. When liquid adhesives and sealants are exposed to lower temperatures, restore to a minimum of 60° F before use.
- D. Do not store adhesive containers with opened lids due to loss of solvent that will occur from flash off or potential moisture contamination.
- E. Membrane, insulation and underlayment must be stored so it is kept dry and is

protected from the elements. Store membrane, insulation or underlayment on a skid and completely cover with a breathable material such as tarp or canvas. If the insulation is lightweight, it should be weighted to prevent possible wind damage.

- F. Any materials which are found to be damaged shall be removed and replaced at the Subcontractor's expense.

2.2.6 Job Conditions

- A. Material Safety Data Sheets (MSDS) must be on location at all times during transportation, storage, and application of materials. The Subcontractor shall follow all safety regulation as recommended by OSHA, EPA and other agencies having jurisdiction.
- B. A minimum roof slope of 1/4" in 12" is recommended. Projects with a roof slope of minimum 1/8" in 12" may be accepted providing adequate positive drainage is provided. Slopes may be provided by through the use of tapered insulation. A sufficient number of roof drains should also be specified and properly located to allow for positive drainage. Significant ponding that could remain after 48 hours is not acceptable and must be eliminated with crickets/saddles and/or the addition of auxiliary drains in low areas where ponding is anticipated.
- C. All existing roofing material must be totally removed.

2.2.7 Warranty

- A. The 30-year Golden Seal Total System Warranty shall be provided requiring all components utilized to be of those manufactured or marketed by Carlisle. This warranty includes coverage against incidental membrane punctures, damage from hail up to 2" in diameter and 100-mph peak gust wind speeds.
- B. It shall be PPPL's responsibility to expose the membrane in the event warranty service is required when access is impaired. Such impairment includes, but is not limited to:
 - 1. Any equipment, ornamentation, building service units and other top surfacing materials that are not defined as part of this specification.
 - 2. Rooftop equipment that does not provide Carlisle with reasonable access to the membrane system for purposes of warranty investigation and related repairs.
 - 3. Ponded conditions.
- C. Pro-rated System Warranties shall not be accepted.

2.3 Products

2.3.1 Description

All components of the specified roofing system shall be products of Carlisle SynTec or accepted by Carlisle SynTec as compatible. All products (including adhesives, insulation, fasteners, fastening plates and edgings) must be manufactured and supplied by Carlisle and covered by the warranty.

2.3.2 EPDM Membrane

- A. Furnish Sure-White FleeceBack 145-mil membrane. The membrane shall conform to the minimum physical properties of ASTM D4637, Type III (Fabric backed membrane).
- B. Dynamic Puncture Resistance (ASTM D5635-04a) of 25 joules for 145-mil.
- C. Static Puncture Resistance (ASTM D120) of 22 lbf for 145-mil.

2.3.3 Insulation/Underlayment

- A. When applicable, insulation shall be installed in multiple layers and

mechanically fastened or secured with Carlisle FAST Adhesive to the substrate in accordance with manufacturer's published specifications.

- B. Insulation shall be multi-layer with tapered (where required to provide positive drainage to existing roof drains) insulation as supplied by Carlisle SynTec. Minimum R-value required is R-30. Insulation/underlayment shall be as recommended by the Manufacturer for this job conditions and requirements complying with one but not limited to the following systems:
1. Carlisle HP-H Polyiso - A foam core insulation board covered on both sides with a medium weight fiber-reinforced felt facer meeting ASTM C 1289-06, Type II, Class 1, Grade 2 (20 psi) or Grade 3 (25 psi).
 2. Carlisle SecurShield Polyisocyanurate- A foam core insulation board covered on both sides with a coated glass fiber mat facer meeting ASTM C 1289-06, Type II, Class 2, Grade 2 (20 psi) or Grade 3 (25 psi).
 3. Carlisle SecurShield HD Composite - Composite insulation panel comprised of 1/2-inch Low-density Polyiso cover board laminated during the manufacturing process to SecurShield rigid Polyiso roof insulation meeting ASTM C1289 Type II, Class2, Grade 2 (20 psi) or Grade 3 (25 psi).

2.3.4 Adhesives and Cleaners

All products shall be furnished by Carlisle and specifically formulated for the intended purpose.

- A. Membrane and Insulation Adhesive: FAST Adhesive: A two component insulating urethane adhesive used to attach insulation and FleeceBack membrane.
- B. Low VOC Bonding Adhesive: A Low-strength, yellow colored, synthetic rubber adhesive used for bonding Sure-White EPDM membranes to various surfaces.
- C. Carlisle Weathered Membrane Cleaner: A clear, solvent-based cleaner used to loosen and remove dirt and other contaminants from the surface of exposed EPDM membrane (for repairs, etc.) prior to applying EPDM Primer. Weathered Membrane Cleaner can also be used when applying Splicing Cement.
- D. Sure-White SecurTape: A 3" or 6" wide by 100' long splice tape used with Sure-White Systems. Complies with the South Coast Air Quality Management District Rule 1168.
- E. Low VOC EPDM Primer - A low VOC (volatile organic compound) primer (less than 250 grams/liter) for use with SecurTape or Pressure-Sensitive products.
- F. One-Part Pourable Sealer: If required use the white color, one-component, moisture curing, elastomeric polyether sealant used for attaching lightning rod bases and ground cable clips to the membrane surface and as a sealant around hard-to-flash penetrations such as clusters of pipes.
- G. Universal Single-Ply Sealant: As an alternate if recommended by the Manufacturer a one-part polyether, non-sagging sealant designed for sealing expansion joints, control joints and counterflashings may be used.

2.3.5 Fasteners and Plates

To be used for attachment of insulation in lieu of or in addition to an adhesive if specifically recommended in writing by the Manufacturer for this project:

- A. HP-X Fasteners: A heavy duty #15 threaded fastener with a #3 Phillips drive used for insulation securement into steel, wood plank or minimum 15/32 inch thick plywood when increased pullout resistance is desired.

- B. **Insulation Fastening Plates:** A nominal 3 inch diameter plastic or metal plate used for insulation attachment.

2.3.6 **Metal Edging and Membrane Terminations**

- A. **General:** All metal edging s shall be tested and meet ANSI/SPRI ES-1 standards and comply with International Building Code.
- B. **SecurEdge 3000:** A metal fascia system with a 20 gauge steel retainer bar and .050" thick aluminum or 24 gauge galvanized steel fascia. Metal fascia color shall be as designated by PPPL.
- C. **Drip Edge:** A metal fascia/edge system with a 22 or 24 gauge continuous anchor cleat and .032 inch thick aluminum or 24 gauge steel fascia. Metal fascia color shall be as designated by PPPL.
- D. **SecurEdge One Coping:** A snap-on coping edge system consisting of a 24 gauge retainer bar (face side only), corrosion resistant fasteners and a 24 gauge or 0.040 aluminum Kynar finished coping cover. The coping cover is secured by clipping on the retainer bar and fastened on the backside with corrosion resistant fasteners (with rubber washer). Metal coping cap color shall be by PPPL.
- E. **Termination Bar:** A 1" wide and .098" thick extruded aluminum bar pre-punched 6" on center; incorporates a sealant ledge to support Lap Sealant and provide increased stability for membrane terminations.

2.3.7 **Walkways**

Where applicable, protective surfacing for roof traffic shall be Sure• Seal P.S. Walkway Pads (30" x 30" molded black rubber with factory applied tape) adhered to the FleeceBack membrane after priming with HP-250 or Low VOC EPDM Primer.

3.1 **EXECUTION**

3.2 **General**

- A. Comply with the manufacturer's published instructions for the installation of the membrane roofing system including proper substrate preparation, job site considerations and weather restrictions.
- B. Position sheets to accommodate contours of the roof deck and splices to avoid buckling.

3.3 **Vapor Retarders**

- A. Vapor Retarder is not required for this Project.

3.4 **Insulation Placement**

- A. Install insulation or membrane underlayment over the substrate with boards butted together. Fill joints or gaps greater than 1/4 inch with FAST Adhesive. Stagger joints both horizontally and vertically if multiple layers are provided.
- B. Secure insulation to the substrate with FAST Adhesive or mechanical fasteners in accordance with the manufacturer's specifications.

3.5 **Membrane Placement and Bonding**

- A. Position and unroll successive sheets and align to provide for a minimum 3 inch wide splice. At end laps (along the width of the sheet), membrane shall be butted together and overlaid with 6" wide Sure-Seal Pressure Sensitive Cured Cover Strip or Pressure Sensitive Overlayment Strip.
- B. FleeceBack Membrane shall be fully adhered to an acceptable substrate with Carlisle FAST Adhesive. The adhesive is spray applied or extruded to the substrate only and the membrane is rolled into the wet adhesive once it has foamed up and

reached string/gel time (approximately 2 minutes). Roll the membrane with a weighted (100 - 150 pounds) steel roller to set the membrane into the adhesive.

NOTE: Exercise care to prevent overspray onto the membrane. If FAST Adhesive should contaminate the splice area, immediately (while the adhesive is still in liquid form) clean with Weathered Membrane Cleaner or allow FAST Adhesive to cure and remove with a paint-type scraper.

- C. Install adjoining membrane sheets in the same manner, overlapping edges approximately 4 inches. Do not apply bonding adhesive to the splice area.

3.6 Membrane Splicing

- A. General: The FleeceBack membrane has selvage edges (the fleece-backing is discontinued) and factory-applied splice tape along the length of the sheet for membrane splicing. Selvage edges are not provided along the width of the membrane; adjoining membrane sheets are butted together and overlaid with 6" wide Pressure Sensitive Cured Cover Strip or Pressure-Sensitive Overlayment Strip.
- B. Membrane Splicing with Factory-Applied Splice Tape
 1. Overlap adjacent sheets for the proper splice width.
 2. Fold the top sheet back and roller-apply EPDM Primer or Low VOC EPDM Primer to the splice area of the bottom sheet with a short nap length paint roller. The primed area will be free of globs or puddles. Allow primer to dry until it does not transfer to a dry finger.
 3. Allow the taped edge of the top sheet to fall freely onto the primed sheet below.
 4. Pull the poly backing from the Factory Applied Tape (FAT) beneath the top sheet and allow the top sheet to fall freely onto the exposed primed surface.
 5. Press top sheet on to the bottom sheet using firm even hand pressure across the splice towards the splice edge.
 6. Immediately roll the splice with a 2" (50 mm) wide steel roller or Carlisle's stand-up SeamRoller, using positive pressure. Roll across the splice edge when using a 2" roller, not parallel to it. When using the SeamRoller, roll parallel to direction of the splice.
 7. At all field splice intersections, apply Lap Sealant along the edge of the membrane splice to cover the exposed SecurTape 2" in each direction from the splice intersection. Install Carlisle's Pressure-Sensitive "T" Joint Covers or a 6" wide section (with rounded corners) of Sure-Seal Pressure-Sensitive Flashing over the field splice intersection.

3.7 Flashing

- A. Wall and curb flashing shall be cured membrane. Continue the deck membrane as wall flashing where practicable.
- B. Follow manufacturer's typical flashing procedures for all wall, curb, and penetration flashing including metal edging/coping and roof drain applications.

3.8 Walkways

- A. Install walkways at all traffic concentration points (such as roof hatches, access doors, rooftop ladders, etc.).
- B. Adhere walkways to the membrane per the manufacturer's specifications.

3.9 Daily Seal

- A. If the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.

B. Use FAST Adhesive or similar material per the manufacturer's requirements.

3.10 Clean-up

- A. Perform daily clean up to collect all wrappings, empty containers, paper, and other debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.
- B. Prior to the manufacturer's inspection for warranty, the Subcontractor must perform a pre-inspection to review all work and to verify all flashing has been completed as well as the application of all caulking.

End of Specification

STATEMENT OF WORK
FOR
REPLACE D-SITE LEC BUILDING CANOPY ROOF

SOW: D-FAC-SOW-073

Work Planning #2009

REVISION D

DATED Dec 23, 2014

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Statement of Work		
Replace D-Site LEC Building Canopy Roof		
Date: 12/23/14	SOW: D-FAC-SOW-072	Rev. D

1.0 INTRODUCTION:

The Subcontractor shall provide all materials, labor, supervision, equipment and expertise required to remove and replace the roof of the LEC Building Canopy Roof at D-Site. The scope of work for this project will include but not be limited to the following:

- 1.1 The Subcontractor shall install a new roofing system suitable for a 20-year warranty.
- 1.2 The Subcontractor and the installers assigned to this project shall be experienced in the installation of this product. Prior to the start of construction, the Subcontractor shall furnish written proof of manufactures training and also experience with similar scope projects.
- 1.3 The Subcontractor shall protect the mechanical and electrical equipment within the project limits to prevent damage during the demolition and construction activities, since the equipment must remain in service during the term of the subcontract.
- 1.4 All work shall be performed in accordance with OSHA regulations.
- 1.5 *Asbestos is present in the roof flashing. Removal shall be in accordance with the requirements of 29 CFR 1926.1101 (g) (11).*
- 1.6 Furnish dumpster(s) of sufficient capacity to remove all non-asbestos debris from the PPPL site. *All asbestos containing materials must be removed in a closed conveyance and taken to a landfill.* Provide a project debris inventory and tracking report to PPPL.
- 1.7 Disposal of all construction debris in accordance with all Federal, State, and Local requirements.

2.0 APPLICABLE DOCUMENTS

- 2.1 40 CFR 761.123 – Protection of the Environment
- 2.2 OSHA 1926.32 (f) Definition of a Competent Person
- 2.3 40 CFR 761.123 Protection of Environment
- 2.4 10 CFR 851 Worker Health and Safety
- 2.5 29 CFR 1926.1101 (g) (11) Methods of Compliance
- 2.6 PPPL ES&H 5008 (http://www.pppl.gov/eshis/ESHD_MANUAL/sm.html) with special attention to Sections 1.0 Construction safety, Section 8.0 subsection 8.0 Construction waste, Section 9.0 Chapter 16 Fall protection, Section 12.0 Environmental Protection (for asbestos)
- 2.7 Attachment No. 1 PPPL Job Hazard Analysis (JHA) Form
- 2.8 Attachment No. 2 PPPL Construction Contractor Safety Requirements
- 2.9 Attachment No. 3 PPPL Guidelines for Hoisting and Rigging Services

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3.0 APPLICABLE DRAWINGS

The following drawings are included for Reference:

- 3.1 Giffels Associates Inc. Drawing CE-102, Rev 3, dated 12/13/83, Experimental Area, LEC Tank Plan & Details.
- 3.2 Giffels Associates Inc. Drawing S-134, Rev 0, dated 12/13/83, Experimental Area, Radioactive Waste Building.
- 3.3 Giffels Associates Inc. Drawing A-142, Rev 3, dated 12/13/83, Experimental Area, Radioactive Waste Building, Plans, Elevations, Sections & Details.

4.0 RESPONSIBILITIES

4.1 Princeton Plasma Physics Laboratory

- 4.1.1 All construction activities must be coordinated with the Princeton Technical Representative (PTR) to minimize systems down time and shall not have any negative impact on experimental operations.
- 4.1.2 All communications on technical matters shall be directed to the assigned PPPL Technical Representative (PTR).
- 4.1.3 All communications on administrative matters shall be directed to the PPPL Procurement Representative.
- 4.1.4 PPPL permits all employees to issue a "STOP WORK" order, if unsafe work practices are observed.

4.2 Subcontractor

- 4.2.1 The Subcontractor shall designate a single point of contact for any communication between PPPL and the Subcontractor.
- 4.2.2 The subcontractor shall provide all labor, materials, equipment and construction supervision services necessary to complete the demolition, removal, and replacement of approximately 5,000 square feet of roofing in accordance with the requirements of this Statement of Work, the Technical Specifications, the referenced standards, and the project requirements.
- 4.2.3 To protect the structural integrity of the existing roof support system, demolition debris cannot be stockpiled on the building roof but must be removed on a continuous basis as the demolition progresses.
- 4.2.4 Work shall be performed in accordance with OSHA requirements. Fall protection will be used as directed by the Subcontractors *Competent Person*, and/or by the PPPL Construction Coordinator.
- 4.2.5 *The Subcontractor shall perform Asbestos removal in accordance with the requirements of 29 CFR 1926.1101 (g) (11) as follows:*
 - a) *a Competent Person;*
 - b) *eight hour training for workers per 1926.1101 (k) (9) (viii);*
 - c) *material shall not be sanded, ground, or abraded (need manual methods for removal);*
 - d) *material must be carried or passed to the ground by hand or it must be lowered to the ground via covered, dust-tight chute, crane, or hoist;*
 - e) *all such material must be removed from the roof as soon as practicable but no later than the end of a work shift;*

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f) all asbestos removal has to be performed using wet methods.

- 4.2.6 PPPL requires the Subcontractor to furnish an Asbestos Supervisor, with documented training, at the job-site at all times during the removal of any asbestos containing materials.
- 4.2.7 Limited indoor storage area will be available for materials and tools. The Subcontractor will be responsible for complying with the manufacturer's recommendations for protecting materials from damage due to the weather and elements while stored and during installation.
- 4.2.8 The Subcontractors OSHA *Competent Person* shall inspect the job site daily, before the start of work, after any storm, and document the inspection.
- 4.2.9 The Subcontractor shall identify any facility changes, modifications or obstructions to be mitigated, prior to acceptance of the subcontract, in order to safely and efficiently perform work.
- 4.2.10 The Subcontractor shall schedule the work sequence so that the roof openings are closed and sealed at the end of each work day. Weather sealing shall be verified to PPPL by the Subcontractor at the end of each working day.
- 4.2.11 The lightning protection system including rods, wiring, etc. shall be temporarily removed, reinstalled and reset by an experienced Subcontractor in this type of work. Certification of the final system reconnection shall be provided to PPPL after completion.
- 4.2.12 The Subcontractor shall dispose of all construction debris in accordance with all Federal, State, and Local requirements.
- 4.2.13 All work should be completed during normal working hours of 7:00 AM to 4:00 PM, Monday through Friday.
- 4.2.14 A government issued Photo ID is required for Subcontractor access to PPPL.
- 4.2.15 The Subcontractor shall notify and obtain PPPL approval for any lower-tier Subcontractor proposed for this project, prior to their arrival on site.
- 4.2.16 The actual building dimensions and quantities must be verified by the Bidder/Subcontractor prior to the submission of a fixed price bid for construction. Unit cost prices shall be submitted, separate to the fixed price bid, for material, equipment, installation, and/or removal of each item. Unit cost prices shall be provided as follows:
 - a) *Asbestos removal (\$/SF)*
 - b) *Replacement in kind of metal deck (\$/SF)*
 - c) *Walkway pads (\$/UNIT)*

5.1 REQUIREMENTS

5.2 Materials and Equipment

5.2.1 The Subcontractor shall provide all related materials and equipment required to

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complete the project scope of work as defined in this Statement of Work. The materials shall be composed of 20-year warranted Total System FleeceBack Adhered Roofing system utilizing minimum 115 mil FleeceBack Sure-White EPDM (ethylene propylene diene terpolymer) membrane as manufactured by Carlisle- Syntec. The system shall include rigid insulation, the required cover board and a fully adhered EPDM roofing system.

- 5.2.2 Only new first quality materials will be supplied and used in this project.
- 5.2.3 The installation and application of the roofing materials must be in accordance with the Carlisle's specifications and the drawings as approved by PPPL. There must be no deviations from the specifications or the approved submittals/shop drawings without the Prior Written Approval of PPPL.
- 5.2.4 Materials shall be delivered to the site in unopened, original containers, bearing the manufacturers printed label stating the quality, brand or trade name, batch number, date of manufacture and directions for use. Delivery of small day-to-day supplies will not be permitted.
- 5.2.5 The Subcontractor is responsible for inspection of materials to detect counterfeit parts and remanufactured, rebuilt, or used parts represented as new.
 - a) High strength fasteners, those rated 100 ksi or greater proof load, must be from a domestic manufacturer, must comply with a national standard, and must have Certified Material Test Reports (CMTR) from the manufacturer that show actual properties and are directly traceable to the fasteners through lot numbers or other clear identification. **This applies regardless of function.** Copies of the CMTR's are to be provided for PPPL approval prior to installation.
 - b) In addition to any other requirements imposed as part of this procurement, lifting equipment, including rings, eyes, or other such equipment installed in components, shall show the manufacturer's name or symbol and their rated load capacity. Personnel shall be alert for variations from the manufacturer's usual packaging, labeling, or painting practices and shall inspect for signs of over-marking or marking modifications or other suspicious indications.

5.3 INSTALLATION

- 5.3.1 The successful bidder/Subcontractor shall furnish a Construction Plan for PPPL approval, detailing how the requirements of this Statement of Work will be maintained. The Plan must contain a description of the Subcontractors Work Plan, a resource loaded Project Schedule listing all major activities, and all proof of qualifications required by this SOW. The Plan must comply with all OSHA, Federal, State, Local and PPPL regulations. PPPL will review and return the Plan to the Subcontractor within 5 working days.
- 5.3.2 Daily inspections of the job site, the adjacent areas, and protective systems shall be made by the Subcontractors *Competent Person* for evidence of a situation that could result in possible failure of protective systems or other hazardous conditions. Inspections shall be conducted by the Subcontractors *Competent Person* prior to the start of work, after every rain storm, and as needed during the shift.

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5.4 PERFORMANCE REQUIREMENTS

5.4.1 Sustainability

PPPL's prime contract with the DOE requires the purchase of certain types of environmentally preferable products such as, but not limited to, EPEAT-registered electronic devices, ENERGYSTAR and FEMP-listed energy-consuming equipment, Water-Sense listed products, bio based materials, and EPA-designated recycled content products. Where such products are available, meet the technical requirements of the work, and do not void the roof warranty, they should be utilized to the maximum extent practical. Information on environmentally preferable products is available online at:

<http://www-local.pppl.gov/erwm/EPP.htm>

<http://www.epa.gov/greenerproducts/>

<http://www.epa.gov/epawaste/conservetools/cpg/products/construction.htm>

<http://www.epa.gov/epp/>

<https://www.fedcenter.gov/programs/buygreen/>

5.4.2 PERFORMANCE CHARACTERISTICS

Not Applicable

5.4.3 OPERATING ENVIRONMENT

Not Applicable

5.4.4 DESIGN LIFE

Warranty requirements are listed in Section 11.0.

5.4.5 RELIABILITY

Not Applicable

5.4.6 MAINTAINABILITY

Not Applicable

5.4.7 HUMAN FACTORS

Requirements are listed in Section 8.0.

5.5 EQUIPMENT DEFINITION

5.5.1 Specifications and Standards

Documents are listed in Section 2.0.

5.5.2 General Design Features

Not Applicable

5.5.3 Materials

Materials are listed in Section 5.0.

5.5.4 Electromagnetic Interference and Susceptibility

Not Applicable

5.5.5 Identification and Marking

See Section 5.1.4.

5.5.6 Workmanship

Workmanship must comply with generally accepted industry practice. The Installation must be water-tight. The Subcontractor shall inspect the completed area to ensure a water-tight roof. .

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6.1 TEST AND INSPECTION REQUIREMENTS

6.2 Performance Tests

Not Applicable

6.3 Acceptance Inspections & Tests

A final walkthrough inspection will be conducted with the Carlisle Representative, the Subcontractor and PPPL representatives to evaluate the project construction upon completion of work. A punch list will be created at this time.

7.0 QUALIFICATIONS

- 7.1 The roofing materials covered by this SOW must be installed by a Subcontractor experienced in the installation of these systems. Documentation of the subcontractors experience installing similar scope systems and the manufacturer’s approval of the subcontractors training program shall be furnished to PPPL prior to start of construction work.
- 7.2 The installation must be in accordance with Carlisle’s specifications and the submittals/shop drawings as approved by PPPL. There must be no deviations made from the specifications or the approved submittals/shop drawings without the Prior Written Approval of PPPL.
- 7.3 Qualifications for Hoisting and Rigging and mobile equipment operation and repair are in the PPPL Engineering Standard contained in Attachment 3.

8.1 ENVIRONMENT, SAFETY, AND HEALTH

8.2 General ES&H Statement

The Subcontractor shall comply with:

- 8.2.1 The specific PPPL project documents, requirements, permits and courses listed in this Statement of Work – all of which will be provided by the PPPL PTR.
- 8.2.2 The Subcontractors approved ISM Plan.
- 8.2.3 All applicable Federal, State, and local laws, regulations and requirements whether or not they are specifically listed in the Statement of Work or subcontract.

8.3 Job Hazard Analysis (JHA) form

The PPPL Job Hazard Analysis (JHA) form requirements are contained in PPPL procedure ESH-004. The JHA is used as a tool to help identify ES&H hazards, controls, and related PPPL requirements that potentially apply to a subcontract. The JHA form can be found in Attachment No. 1 to this SOW and also at the following web site:

http://www.pppl.gov/sites/pppl/files/department_assoc_files/node49/JHA%20form.pdf

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8.4 Applicable PPPL Permits

The following list of PPPL permits may be applicable to the subcontractor's work scope. The subcontractor must confirm with their PPPL Construction Coordinator that all prerequisites have been met before initiating any activity that involves the following areas:

- 8.4.1 Hot Work Permit,

8.5 OSHA Requirements

PPPL follows a strict interpretation of all OSHA regulations. For hoisting and rigging and for mobile equipment, see the specific PPPL Engineering Standards where specific OSHA requirements are listed and where all OSHA and ASME requirements are detailed in the specific requirements sections.

8.6 Applicable PPPL ES&H training

The following list of PPPL ES&H training courses is applicable to the Subcontractor's work scope.

Safety Courses at PPPL	Written Test
General Employee Training for Subcontractors	YES
Fire Extinguisher Training	YES

8.7 Additional ES&H Requirements

- 8.7.1 The Subcontractor's safety record will be considered in the proposal/bid evaluations.
- 8.7.2 The Subcontractor's number of reportable injury/illness cases, in the last year will be included in the bid evaluation.
- 8.7.3 All PPPL ES&H Requirements imposed on the Subcontractor are also applied to work performed by their sub-tier contractors.
- 8.7.4 The Subcontractor will be required to submit an Integrated Safety Management (ISM) Plan to PPPL for approval. Submittal of the ISM Plan will be required within 14 days of subcontract award. The receipt and approval of the ISM Plan is a condition of letting the Subcontractor begin on-site work. The requirements for an Integrated Safety Management (ISM) Plan can be found at Section 1, Subsection 1.4.4 of the following web site: http://bp.pppl.gov/ESHD_MANUAL/sm.html
- 8.7.5 The Subcontractor must inform its employees of the contents of their ISM Plan, including hazards and controls. A Pre-Job Briefing form will be attached to the subcontract and must be signed prior to starting the job. The JHA form can be found in Attachment No. 1 to this SOW and also at the following web site: http://wwwlocal.pppl.gov/eshis/JHA_Form.doc
- 8.7.6 PPPL will monitor execution of the ISM Plan and Subcontractor compliance.

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- 8.7.7 All work shall be in accordance with PPPL ESHD 5008. The manual is available on the Internet at the following web address:
http://www.pppl.gov/eshis/ESHD_MANUAL/sm.html
- 8.7.8 The Construction Subcontractor and all lower tier subcontractors must each prepare a written Integrated Safety Management (ISM) Plan (Construction Project Safety and Health Plan) that implements the requirements listed below for the construction work under their responsibility and obtain approval of the plan by PPPL prior to commencement of any work covered by the plan. In the plan, the Subcontractor must designate the individual(s) responsible for its on-site implementation, specify qualifications for those individuals, and provide a list of those project activities for which subsequent job hazard analyses are to be performed. In addition the Subcontractor shall be required to:
- A. Prepare, and have approved by PPPL, Job Hazard Analyses (JHAs) in accordance with PPPL procedure ESH-004 prior to commencement of affected work. The JHAs must identify foreseeable hazards and protective measures, and address further hazards revealed by any supplemental information provided by the Construction Manager.
 - B. Provide for approval, drawings and/or other documentation of protective measures for which applicable OSHA standards require preparation by a P.E. or other qualified individual.
 - C. Identify *Competent Person(s)* for approval by the PPPL Construction Manager for activities as required by applicable OSHA standards. This includes Asbestos Exposure, the operation of Aerial Lifts, Construction and Inspection of Scaffolding, and Fall Protection requirements.
 - D. Ensure workers are aware of foreseeable hazards and the protective measures as defined by the JHAs, and require that workers acknowledge being so informed.
 - E. Ensure that any unsafe work is stopped and that workers not following the safe work practices are subject to the Subcontractor's disciplinary process.
 - F. Maintain a designated representative onsite during all active construction that is knowledgeable of the associated hazards and has the authority to act on behalf of the Subcontractor; and that makes frequent and regular inspections of the construction worksite to identify and correct any instances of noncompliance with project safety and health requirements.
 - G. Instruct workers to report hazards not previously identified or evaluated to the Subcontractor's designated representative. If immediate corrective action is not possible or the hazard falls outside the project scope, the Subcontractor must immediately notify affected workers, post appropriate warning signs, modify the appropriate JHA's, implement needed interim control measures, and notify the PPPL Construction Coordinator of the action taken. The Subcontractor or the designated representative must stop work in the affected area until appropriate protective measures are established.

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- 8.7.9 All Subcontractor equipment & vehicles must be in good working condition with no leaks of any kind. Any spills must be reported immediately to PPPL and work stopped until the spill can be cleaned. The Subcontractor is responsible for remediation cost caused by negligence and or faulty equipment. PPPL Environmental Services will determine the proper method of remediation.
- 8.7.10 For all equipment with Safety ramifications, perform an Operating Daily Checklist (ODCL) using either the manufacturer's recommendation for a daily inspection, or use a PPPL ODCL for similar equipment as a guide. The ODCL file shall be kept at the job site for review by PPPL.
- 8.7.11 All work shall be in accordance with all OSHA, DOE, and PPPL Requirements. Care must be taken to protect personnel, employees and surroundings.
- 8.7.12 Subcontractor workers must take and pass PPPL General Employee Training (GET) if they are to be on-site for more than 40 hours per calendar year.
- 8.7.13 All construction waste, including paints and other chemicals must be disposed of properly in accordance with Federal, State, Local, and PPPL requirements.
- 8.7.14 MSDS sheets for all paints, adhesives, chemicals, stains, and solvents must be furnished to PPPL for approval at least 48 hours prior to the start of work.
- 8.7.15 The Subcontractor must complete a PPPL Job Hazard Analysis (JHA) using a format supplied by PPPL, or another format that is approved by PPPL. The JHA must be reviewed with the responsible PPPL representative at a pre-job brief to be held prior to the start of any construction activity.
- 8.7.16 When applicable, the Subcontractor must comply with OSHA regulations regarding Confined Space Entry. Subcontractor must submit a copy of their confined space program for ES&H approval, or take PPPL Confined Space training on site.

9.0 QUALITY ASSURANCE REQUIREMENTS

- 9.1.1 **Qualifications:** Subcontractor shall perform work on this project only with tradesmen with a demonstrated history of the quality of work required with the specified products on previous jobs.
- 9.1.2 **Pre-Construction Meeting:** Before the start of construction, the Subcontractor shall meet at the job site with PPPL, the material manufacturer, and any other appropriate parties. Provide meeting minutes complete with any record decisions.
- 9.1.3 **Field Quality Control:** Subcontractor shall Arrange for attendance of Carlisle's representative immediately before, as may be required during the installation, and after the completion of construction.
- 9.1.4 **Daily Meetings:** The assigned PPPL Construction Coordinator and the Subcontractors representative/foreman are required to hold daily job briefings. The briefings shall be held at the start of a shift, as weather and schedule permits.
- 9.1.5 The Subcontractor is responsible for inspecting all work in progress to ensure compliance with this Statement of Work.

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10.0 SHIPPING STORAGE AND HANDLING

Not Applicable

11.0 WARRANTY

11.1 A 20 year Golden Seal Total System Warranty shall be provided requiring all components utilized to be manufactured or marketed by Carlisle. This warranty includes coverage against incidental membrane punctures, damage from hail up to 2 in. in diameter and 100-mph peak gust wind speeds.

11.2 Pro-rated system warranties shall not be accepted.

11.2 The warranty shall cover the complete project including penetrations, etc. for the period of the warranty. Subcontractor shall make good any defect without cost to PPPL.

12.1 ATTACHMENTS

1. Attachment No. 1 PPPL Job Hazard Analysis (JHA) Form
2. Attachment No. 2 PPPL Construction Contractor Safety Requirements
3. Attachment No. 3 PPPL Guidelines for Hoisting and Rigging Services
4. Attachment No. 4 PPPL Technical Specifications

END OF SECTION

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13.0 DOCUMENTATION AND DELIVERABLES

#	Physical Deliverables Required	When Deliverable Is Required	Deliverable Received (✓)

#	Document Deliverables Required	When Deliverable Is Required*	Deliverable format* (paper, electronic etc.)	Date Deliverable Received* (✓)
1	Integrated Safety Management Plan (ISM)	N	P, E	
2	Lift Plan (as req'd)	PS	P, E	
3	Installer Qualifications & Certifications	PS	P	
4	Competent Person(s) Letter	PS	P	
5	Construction/Installation Plan	N	P, E	
6	Shop & Fabrication Drawings	PS	P, E	
7	Proposed Construction Schedule	N	P, E	
8	Equipment Maintenance and Inspection Records	PS	P	
9	MSDS Sheets	PS	P, E	
10	JHA	PS	P, E	
12	Approved Application Procedure-Adhesive	PS	P, E	
13	Manufacturers Approval of Installer	PS	P	
14	OSHA Training Records	PS	P, E	
15	Proposed Product List & Material Submittals/Certs	PS	P, E	
16	Product Warranties	A	P	
17	Record Drawings	A	P, E	
21	Fastener Material Certifications per 5.1 (as req'd)	PS	P	
22	Roof Uplift Calculation by P.E.	PS	P	
23	List of Lower Tier Subcontractors	PS	P, E	
24	Asbestos Supervisor Qualifications	PS	P, E	
25	Certification of Reinstallation of lightning protection	A	P, E	
26	Hoisting & Rigging Personnel & Equip quals.	PS	P, E	
27	Equipment model, serial number, and manual (as req'd)	PS	P, E	
28	Equipment Operator Training Qualifications or Certifications	PS	P, E	

<i>* Legend:</i>				
N	=	Notice to Proceed Requirement		
PS	=	Prior to Start of Construction		
D	=	During Construction/As Required		
A	=	At Project Completion		
P, E	=	Paper or Electronic		

Procurement Technical Representative/COG: _____

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ATTACHMENT No. 1

PPPL

JOB HAZARD ANALYSIS (JHA) FORM

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PPPL

PRINCETON PLASMA
PHYSICS LABORATORY

PROCEDURE

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JOB HAZARD ANALYSIS

Reference:

Work Order # _____ Work Permit # _____ Work Planning # _____ Procedure # _____ Other _____

Written by (Print): _____ Date: _____ Division/Branch/Org. _____

Description of Job/work to be performed:

Location of Job/work to be performed:

Hazard (Check-off and <u>Describe</u> the source of the hazard)	Control Measures (Write # of Control(s) in Box)	See Back
<input type="checkbox"/> Chemicals	<input type="checkbox"/> MSDS's Available <input type="checkbox"/> Training Provided	
<input type="checkbox"/> Ergonomic Issues (Repetitive Motion, Lifting, Physical Stresses, etc.)	<input type="checkbox"/> Contact IH for briefing	
<input type="checkbox"/> Ionizing Radiation [Health Physics-HP]	<input type="checkbox"/> Radiation Work Permit (RWP)	
<input type="checkbox"/> Non-Ionizing Radiation (Lasers, Magnetic Fields (EMF), RF, etc.)	<input type="checkbox"/> Contact IH for high power lasers/EMF/RF <input type="checkbox"/> Laser Safety Training	
<input type="checkbox"/> Environmental Impacts (Environmental Release, Hazardous Wastes, etc.) [M&ES]	<input type="checkbox"/> Contact M&ES for guidance	
<input type="checkbox"/> Noise	<input type="checkbox"/> Hearing Protection	
<input type="checkbox"/> Sharp objects/tools		
<input type="checkbox"/> Walking / Working Surfaces (Slips, Trips, Falls)		
<input type="checkbox"/> Falls / Elevated Work (6' above surface)	<input type="checkbox"/> Fall Protection Training	
<input type="checkbox"/> Ladders / scaffolds / manlifts	<input type="checkbox"/> Inspection <input type="checkbox"/> Training	
<input type="checkbox"/> Cranes / rigging / Forklifts	<input type="checkbox"/> Trained/Qualified Personnel	
<input type="checkbox"/> Welding / cutting / grinding / open flame	<input type="checkbox"/> Hot Work Permit [ESU]	
<input type="checkbox"/> Impairing a Security / Fire System [ESU]	<input type="checkbox"/> Contact Security	
<input type="checkbox"/> Hot Surfaces / Cryogenics	<input type="checkbox"/> Cryogenic Training	
<input type="checkbox"/> Heat or Cold Stress		
<input type="checkbox"/> Steam		
<input type="checkbox"/> Electrical ^h [Electrical Safety]	<input type="checkbox"/> Lockout/Tagout <input type="checkbox"/> Arc Flash Analysis ^h <input type="checkbox"/> GFCI <input type="checkbox"/> Trained Personnel	
<input type="checkbox"/> Confined Space / Oxygen Deficiency	<input type="checkbox"/> Confined Space Permit	
<input type="checkbox"/> Machinery / Machine tools	<input type="checkbox"/> Machine Guards <input type="checkbox"/> Chip Guards	
<input type="checkbox"/> Hand Tools / Power Tools	<input type="checkbox"/> GFCI	
<input type="checkbox"/> Eye Hazards	<input type="checkbox"/> Safety Glasses <input type="checkbox"/> Goggles	
<input type="checkbox"/> Falling Objects	<input type="checkbox"/> Hard Hats	
<input type="checkbox"/> Potential / Stored Energy (Springs, instability, capacitors, batteries, fans, hydraulics)		
<input type="checkbox"/> Foot Hazard	<input type="checkbox"/> Safety Shoes	
<input type="checkbox"/> Trenching / Digging	<input type="checkbox"/> Digging Permit	
<input type="checkbox"/> Wall / Floor Penetrations	<input type="checkbox"/> Penetration Permit	

For questions about these topics, contact Industrial Hygiene (IH) except where noted in [brackets].
IH = 2533, 2531, %546, 639. HP = 2311, 2315. M&ES = 3380. ESU/Security = 2536. Electrical Safety = 3740

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<input type="checkbox"/> Access / Escape / Communications Concerns		
<input type="checkbox"/> Biological (Bodily fluids, Insects, Poison, Bats)		
<input type="checkbox"/> Vehicle Use / Fuel / Exhaust		
<input type="checkbox"/> Illumination (Inadequate lighting)		
<input type="checkbox"/> Working Alone (Requires IHI Approval)	<input type="checkbox"/> IH Must Review / Approve	<input type="checkbox"/> Contact Security
<input type="checkbox"/> Pressure / Vacuum (cylinders, pressure tests)	<input type="checkbox"/> Compressed Gas Training	
<input type="checkbox"/> Others:		
Comments		

Control Measures (Write the number of the appropriate control next to the hazard to which it applies)			
Engineering Controls	Administrative Controls	Personal Protective Equipment (PPE)	
01 - Platforms, Scaffolds	12 - Procedures	23 - Hard Hats	29 - Safety Glasses/Goggles
02 - Use less hazardous chemicals	13 - Specific training for job/location	24 - Face Shields	30 - Coveralls
03 - Machine Guards, Chip Guards	14 - Worker Rotation, Rest Breaks	25 - Safety Shoes	31 - Boots / Booties
04 - Ventilation (fume hoods, elephant trunks, local exhaust systems)	15 - Permits (Confined Space, RWP, Hot Work, Digging, Penetrations, Flame)	26 - Ear Plugs / Muffs	32 - Gloves (leather, kevlar, neoprene, nitrile, voltage rated)
05 - Fall Protection (Guardrails, toe boards)	16 - Signs & Labels, Warning alarms ("high level")	27 - Respirator / Dust Mask	33 - Full Body Harness & lanyards
06 - Engineered Equipment Design	17 - System or Job Walk down	28 - Lab Coat / Apron	34 - Flame retardant / flash resistant clothing
07 - Noise enclosure, absorption, mufflers	18 - Safety watch, Buddy System	35 - Electrically insulated Mat / Tools	
08 - Vibration dampeners	19 - Lockout/Tagout	Emergency Equipment:	
09 - Temporary lights	20 - Spill Containment	36 - Fire Extinguishers	40 - Retrieval Gear
10 - Welding Screens	21 - Barricades	37 - Telephones/Radios	41 - First Aid Equip.
11 - Mechanical lifting aids	22 - Training / Qualification / Certification	38 - Sprinkler System	42 - Alarms
		39 - Eye Washes & Safety Showers	

Human Performance Tools for an Enhanced Pre-Job Brief:
 Situational Awareness – Job Site Review – Questioning Attitude – Stop When Unsure – Effective Communication

Task Review using SAFER
 Summarize Critical Steps - Anticipate Errors - Foresee Consequences - Evaluate Controls - Review Previous Experience

Human Performance Tools During Work:
 Self-Checking – Peer Checking – Flagging – Independent Verification

Identify and eliminate or mitigate Error Precursors:			
Task Demands	Work Environment	Individual Capabilities	Human Nature
Time Pressure	Distractions/Interruptions	Unfamiliarity with Task / First Time	Stress
High Workload	Changes / Departure from Routine	Lack of Knowledge	Habit Patterns
Simultaneous, Multiple Tasks	Confusing Displays or Controls	New Technique not used before	Assumptions
Repetitive monotonous actions	Workarounds / OOS Instruments	Imprecise Communication Habits	Complacency / Overconfidence
Irrecoverable Acts	Hidden System Response	Lack of Proficiency / Inexperience	Mindset (tuned to see)
Interpretation Requirement	Unexpected Equipment Conditions	Indistinct Problem-Solving Skills	Inaccurate risk perception
Unclear Goals, Roles, Responsibilities	Lack of Alternative Indication	"Hazardous" Attitude for Critical Task	Mental Shortcuts
Lack or Unclear Standards	Personality Conflicts	Illness/Fatigue	Limited Short-Term Memory

<input type="checkbox"/> Industrial Hygiene Review Required IH Signature: _____	Date: _____
<input type="checkbox"/> Other Review Required Who? _____	Signature: _____ Date: _____

<input type="checkbox"/> Cog. Individual or RLM Approval Required Signature: _____	Date: _____
--	-------------

Personnel Briefed on this JHA (print):

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

SEND Original or Copy to: Industrial Hygiene (Required)

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ATTACHMENT No. 2

PPPL

Construction Contractor Safety Requirements

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Construction Contractor Safety Requirements Guidance

(Applies to any contractor engaging in alterations, modifications, moving, demolition, or new installation of a building or structures, systems and components at PPPL)

General Requirements:

All work done at PPPL must, at a minimum, meet OSHA standards for safety and health.

All other applicable building codes and standards shall apply.

If standards conflict, the most protective standard shall be followed.

All personnel working at PPPL have Stop Work Authority. If serious hazards are noted, any individual may ask that work be stopped. If this occurs, place all work in a safe condition and stop all work. Contact your PPPL representative to resolve the issue. If corrective measures cannot be immediately implemented, work may not resume until the Head of PPPL ES&H provides written authorization.

Required before arriving on site:

Name and qualifications of OSHA Competent Person(s)

(Must be on site during all active construction and must be knowledgeable of the associated hazards and have the authority to act to correct safety concerns)

Name of Designated Representative (if different from Competent Person)

Policy ensuring that workers are subject to disciplinary process if not following safe work

Policy informing employees to report safety concerns to Designated Representative or Competent Person

Any required drawings or specifications that affect safety: scaffold engineering, excavation shoring, crane lift plans

Required before starting work:

Approved site specific Health and Safety Plan (HASP) or Job Hazard Analyses (JHA) covering each phase of the work

(Must address the specific hazards expected and controls to be used at PPPL. A company safety manual does NOT qualify as a site specific HASP or JHA. PPPL's JHA form may be used if desired)

Material Safety Data Sheets (MSDS) for all chemicals 24 hours before being brought on site

Any required training documentation: crane operator, aerial lift operator, forklift operator, asbestos removal certificates, lead removal certificates, confined space entry, etc.

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A pre-job brief must be held before the start of each new job task with all workers and affected PPPL personnel to discuss scope of work, hazards and controls, and all workers on the job must print their name on the JHA.

Hazard Specific Requirements:

If Permit Required Confined Space Entry is required, an OSHA compliant confined space entry permit program must be submitted, the contractor's permit will be used, and training qualifications must be presented prior to the start of any confined space work. Contractors wishing to use PPPL's Confined Space Entry program must take PPPL's Confined Space Entry Training ~ 2.5 hours. This must be scheduled in advance.

If a crane is being brought on site, copies of all required inspections (including monthly wire rope inspection) must be provided.

Contractors are generally NOT permitted to use PPPL equipment such as forklifts, cranes and man lifts.

Barricade tape, when needed, shall only be red "Danger" tape where personnel hazards exist. Yellow "Caution" tape may only be used for equipment protection. All barricade tape will be posted with the name and phone number of a contact. The PPPL representative may provide the contact information.

Additional Requirements

To get on site, all contractors must provide government issued photo ID.

If working on-site for more than 40 hours in a year, General Employee Training must be taken & a test passed ~ 2 hours

Manlift Requirements

All work shall comply with PPPL Engineering Standard MECH-012, Manlifts. Equipment includes but not limited to:

1. Aerial Lifts - telescoping boom and articulated boom elevating work platforms
2. Scissor Lifts - self-propelled and manually propelled elevating work platforms
3. Truck Mounted Aerial Lifts

The primary requirements for Subcontractors are:

1. Subcontractor employee shall be qualified as defined in this Standard and approved by the Manlift Manager.
2. Subcontractor shall provide records that the operators are qualified. Qualifications required shall be equivalent to that noted for PPPL employees within Engineering Standard MECH-012.

3. Subcontractor shall provide equipment maintenance and safety records including equipment Model and Serial number three days in advance of delivery.
4. Subcontractor shall ensure all equipment and attachments are designed to operate together by the original equipment manufacturer.
5. Approval by the Manlift Manager is required prior to bringing this type of equipment on site.
6. Daily, Frequent and/or Periodic inspections are required by the Operator, for all equipment, consisting of visual inspections and functional tests as detailed within Engineering Standard MECH-012. The Subcontractor employee must provide date, time, results, and sign off on each inspection. Annual inspections are required for all equipment and shall be performed by a qualified mechanic in accordance to the manufacturer's specifications. All maintenance shall be the responsibility of the Subcontractor employee and conducted as detailed within Engineering Standard MECH-012.
7. All operational and travel requirements shall be adhered to as noted for PPPL employees within Engineering Standard MECH-012. Only loads within the rated capacity of the equipment shall be handled.

PPPL Engineering Standards may be found online at <http://bp.pppl.gov/EngStds.html> ; if you are unable to open the Engineering Standard web-site, please contact the PPPL Technical Representative (PTR) for a paper or PDF copy of the required Standard.

END OF SECTION

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ATTACHMENT No.3

PPPL

Guidelines for Hoisting and Rigging Services

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PPPL Guidelines for Hoisting and Rigging Services

PPPL requires conformance with all applicable OSHA and ASME B30 Standards regarding powered industrial truck, Aerial lifts, Fall Protection, and Hoisting and Rigging applications. Procurement shall ensure the following requirements are passed down to all sub-tiered contractors and the PPPL Technical Representative shall ensure that the PPPL Lift Manger is notified in a timely fashion to verify compliance with all requirements. A checklist is provided at the end of this document for convenience. Please note that failure to abide by the suggested advance notice may result in disallowance of the crane onsite. These shall include but are not limited to:

OSHA 1910 Subpart N

1910.178 - Powered industrial trucks.

1910.179 - Overhead and gantry cranes.

1910.180 - Crawler locomotive and truck cranes.

1910.184 - Slings.

OSHA 1926 Subpart L

1926.453 - Aerial lifts.

1926.454 - Training requirements.

OSHA 1926 Subpart M – Fall Protection

OSHA 1926 Subpart N - Cranes, Derricks, Hoists, Elevators, and Conveyors

1926.550 - Cranes and derricks.

1926.554 - Overhead hoists.

OSHA 1926 Subpart CC – Cranes and Derricks in Construction

Subset of typical ASME B30 series for hoisting and rigging operations:

ASME Standard

- B30.1 Jacks
- B30.2 Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)
- B30.3 Construction Tower Cranes
- B30.5 Mobile and Locomotive Cranes
- B30.9 Slings
- B30.10 Hooks
- B30.11 Monorails and Underhung Cranes
- B30.16 Overhead Hoists (Underhung)
- B30.17 Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist)
- B30.20 Below-the-Hook Lifting Devices
- B30.21 Manually Lever Operated Hoists
- B30.23 Personnel Lifting Systems

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B30.26 Rigging Hardware
 BTH-1 Below the Hook Lifting Devices

In addition to these standards, PPPL requires the following:

- 1) Procedural Steps - Prior to award, proposing H&R subcontractor shall provide details of all H&R procedures, including references to Lift Plans (see next paragraph) and proposed equipment to be used.
- 2) Lift Plans - Prior to any lift or rigging, H&R subcontractor shall provide a lift Plan for review and approval, including:
 - a. Plan view of lift with dimensions, including any nearby structures or power lines. Ensure that all crane locations are identified with dimensions to loads (picking and setting).
 - b. Section View rigging sketch with dimensions and listing all slings and hardware and their capacities. Load angle factors should be calculated and provided on sketch.
 - c. Crane load charts as applicable
 - d. Forklift capacities as applicable and assure that the load weight and CG does not overextend the capacity of the forklift.

NOTE: A generic lift plan may be provided but rigging shall be sized for the largest worst-case load.

3) Lift Execution

- a. Any item to be lifted that weighs more than 80% of the capacity of the crane shall be witnessed by PPPL. Load cells may be required. For planning purposes, proper notice shall be given.
- b. All items to be lifted shall have known weights. If a weight estimate needs to be made, the estimate calculation shall be provided in writing.
- c. Lifts of items valued at more than \$200,000 or have a program impact of more than two months are considered critical lift. A critical lift plan shall be drafted and approved by the Responsible Line Manager and the Lift Manager. The Lift Manager and QA shall witness the lift.
- d. Hard Hats, safety shoes and gloves shall be used during lifts.
- e. ASME Hand Signals with clear lines of sight shall be used at all times.
- f. Slings shall be in good condition. Kinked or bent wire rope shall not be used. Highly worn and frayed synthetic slings are also unacceptable and shall not be used.
- g. Any unusual conditions shall be brought to the PPPL contract representative's attention immediately.
- h. Anyone has stop work authority.

- 4) Mobile Crane Certifications - Prior to any lift or rigging, H&R subcontractor shall provide Crane Certifications for review, including:
 - a. Evidence of recent periodic inspection.

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b. For subcontracted mobile cranes, current annual inspection and current monthly wire rope and brake inspection (sample form attached).

NOTE: Mobile cranes shall be free from leaks and all safety limits must be operational.

- 5) Mobile Crane Operator Qualifications - Prior to any mobile crane lift, the H&R subcontractor shall provide the designated crane operators qualifications including:
 - a. NJ Mobile Crane Operators License.
 - b. NCCCO Mobile Crane qualification
 - c. Discussion of recent and frequent experience with proposed crane.

- 6) Overhead Crane Operator Qualifications (if applicable) - Prior to any overhead crane lift, the H&R subcontractor shall provide the designated crane operators qualifications including:
 - a. Overhead crane certification
 - b. Resume of recent and frequent experience with similar type/class crane.
 - c. Annual medical examination as required per ASME B30.2 ch2-3.1.2 for cab crane operation if applicable.

- 7) Qualified Rigger and Qualified Signal Person Certifications - Prior to any lift or rigging, H&R subcontractor shall provide Qualified Rigger and Qualified Signal Person Certifications in accordance with 1926 Subpart CC (1926.1400). (See attached example)

- 8) PPPL requires strict adherence to OSHA. Standard 29 CFR 1910.179(n) (3) (vi) for overhead and gantry cranes states that "The employer shall require that the operator avoid carrying loads over people." OSHA Standard 29 CFR 1926.550(a) (19) for mobile cranes states "All employees shall be kept clear of loads about to be lifted and of suspended loads."

- 9) Forklift Operator Experience – Prior to any forklift operation, H&R subcontractor shall provide a forklift operator certificate. Include a narrative of operator experience, with number of year's experience.

- 10) A 125% proof load test certificate shall be provided for all subcontractor provided below the hook lifting devices and lift beams.

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MONTHLY HOOK, RUNNING ROPE, & BRAKE
INSPECTION FOR MOBILE CRANES
(Suggested Form)

Equipment: _____

Owner: _____

Inspector (Print): _____

Rope Identification: _____

Result of inspection (Circle):

Rope: PASS FAIL _____

Hook: PASS FAIL _____

Brakes: PASS FAIL N/A _____

Comments (if any): _____

Signature: _____ Date: _____



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"Running Rope" Inspection Requirement References

1910.180(g) "Rope inspection."

1910.180(g) (1)

"Running Ropes." A thorough inspection of all ropes in use shall be made at least once a month and a certification record which includes the date of inspection, the signature of the person who performed the inspection and an identifier for the ropes shall be prepared and kept on file where readily available. All inspections shall be performed by an appointed or authorized person. Any deterioration, resulting in appreciable loss of original strength shall be carefully observed and determination made as to whether further use of the rope would constitute a safety hazard. Some of the conditions that could result in an appreciable loss of strength are the following:

1910.180(g) (1) (I)

Reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires.

1910.180(g) (1) (ii)

A number of broken outside wires and the degree of distribution of concentration of such broken wires.

1910.180(g) (1) (iii)

Worn outside wires.

1910.180(g) (1) (iv)

Corroded or broken wires at end connections.

1910.180(g) (1) (v)

Corroded, cracked, bent, worn, or improperly applied end connections.

1910.180(g) (1)(vi)

Severe kinking, crushing, cutting, or unstranding.

1910.180(g) (2) "Other ropes."

1910.180(g)(2)(i)

Heavy wear and/or broken wires may occur in sections in contact with equalizer sheaves or other sheaves where rope travel is limited, or with saddles. Particular care shall be taken to inspect ropes at these locations.

1910.180(d) (6)

"Inspection records." Certification records which include the date of inspection, the signature of the person who performed the inspection and the serial number, or other identifier, of the crane which was inspected shall be made monthly on critical items in use such as brakes, crane hooks, and ropes. This certification record shall be kept readily available.

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Qualified Rigger and Qualified Signal Person
(Suggested Form)

Dear _____ FAX: _____

Please certify that the following people are qualified per OSHA § 1926.1400 for performing lifts with the following equipment:

Mobile Crane Make and Model: _____

Owner: _____

Qualified Rigger(s) and Qualified Signal Person per OSHA § 1926.1400

Qualified Rigger(s) (Print): _____

Qualified Signal Person (Print): _____

The above listed people are employees of

Company Name
and certified to meet the qualification standards listed in OSHA § 1926.1400

Signature: _____ Date: _____

Company position: _____

Please sign and FAX back to Mike Viola (609) 243-3091

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Partial Qualified Rigger, Signal Person, and Employer Training references

§ 1926.1400 Rigger qualifications.

§ 1926.1401 Definitions.

Qualified person means a person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, successfully demonstrated the ability to solve/resolve problems relating to the subject matter, the work, or the project.

Qualified rigger is a rigger who meets the criteria for a qualified person.

§ 1926.1403 Assembly/Disassembly – general requirements (applies to all assembly and disassembly operations)...

(r) *Rigging*. In addition to following the requirements in 29 CFR 1926.251 and other requirements in this and other standards applicable to rigging, when rigging is used for assembly/disassembly, the employer must ensure that:

- (1) The rigging work is done by a **qualified rigger**.

§ 1926.1428 Signal person qualifications.

(a) The employer of the signal person must ensure that each signal person meets the Qualification Requirements (paragraph (c) of this section) prior to giving any signals. This requirement must be met by using either Option (1) or Option (2) of this section.

(4) Know and understand the relevant requirements of § 1926.1419 through § 1926.1422 and § 1926.1428.

(5) Demonstrate that he/she meets the requirements in paragraphs (c) (1) through (4) of this section through an oral or written test, and through a practical test.

§ 1926.1419 Signals – general requirements.

§ 1926.1420 Signals – radio, telephone or other electronic transmission of signals.

§ 1926.1421 Signals – voice signals – additional requirements.

§ 1926.1422 Signals – hand signal chart.

§ 1926.1424 Work area control.

§ 1926.1425 Keeping clear of the load.

§ 1926.1430 Training.

The employer must provide training as follows:

(a) Overhead powerlines. The employer must train each employee specified in § 1926.1408(g) and § 1926.1410(m) in the topics listed in § 1926.1408(g).

(b) Signal persons. The employer must train each employee who will be assigned to work as a signal persons who does not meet the requirements of § 1926.1428(c) in the areas addressed in that paragraph.

(c) Operators.

(d) Competent persons and qualified persons. The employer must train each competent person and each qualified person regarding the requirements of this subpart applicable to their respective roles.

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SAMPLE LIFT PROCEDURE

Procedure No. L - _____

TITLE: _____

Note: LIFT DATA SHEET NEEDED TO PERFORM THIS LIFT

PREPARED BY (Qualified Engineer): _____ DATE _____

A. INTRODUCTION

Describes component to be lifted, classification and reason for classification.

B. PREREQUISITES

1. PIC will attest on the Lift Data Sheet that any installation, disassembly, or removal procedures required to allow the equipment to be moved have been completed.

C. PRECAUTIONS

Include in the procedure only those precautions that are directly applicable:

1. Protection of slings and equipment from edges.
2. Protection of finished surfaces from damage.
3. Areas needed to be roped off.
4. Security guards, if necessary.
5. Adjacent equipment protection needed.
6. Ensure the items in the lift are free from any connection or obstruction.

D. PROCEDURE FIELD CHANGES

Procedure field change can be made on site if approved by the PPPL Lift Engineer by revising an existing or developing a new Lift Data Sheet. Revised lift data sheets also require written approval of the Lift Manager.

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E. LIFT DATA SHEET INSTRUCTIONS

The Lift Data Sheet provides the specification for the hoisting and rigging aspects of the lift and shall be initiated by a qualified engineer.

Reference any drawings/sketches in Lift Data Sheet. Include as attachments any required drawings. These can be marked up blue prints or a sketch. Sketch inclusions: (see attached example also)

Identification of the items to be moved, the weight, dimensions, and center of gravity of the load, and any hazardous or toxic materials that are present.

Identification of operating equipment to be used by type and rated capacity.

Rigging sketches that include (as applicable):

Identification and rated capacity of slings, lifting bars, rigging accessories, and below-the-hook lifting devices. Calculate and provide the rated capacity of equipment in the configuration in which it will be used.

Load-indicating devices.

Load vectors.

Lifting points.

Sling angles.

Boom and swing angles.

Methods of attachment.

Crane orientations.

Other factors affecting equipment capacity (e.g. load path sketch, key point heights, floor or soil bearing capacity).

Operating procedures and special instructions to operators including rigging precautions and safety measures to be followed as applicable. Show floor plan with path of intended travel. Note lift points and travel (by cart/fork lift) path.

If the rigging team is an outside contractor, provide the names and copies of qualification of team members.

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F. PROCEDURE

Assure all prerequisites and precautions have been completed. Indicates the technical requirements to protect the equipment and personnel during the lift and QC shall assure that all Prerequisites are complete. List steps and order if applicable.

LIFT DATA SHEET

LIFT TITLE: _____ LIFT PROCEDURE NO. L - _____ AREA: _____ Sheet No (if applicable) _____	Effective Date: _____ Repetitive Lift Expiration Date: _____	Date Performed: _____	Approved: _____ <p style="text-align: center;">LIFT MANAGER</p>
DISASSEMBLY PROCESS COMPLETED (Print and Initial) _____		PIC: _____	
DESCRIPTION: WEIGHT: _____ DETERMINED BY: _____ Sketch of rigging shall include: Crane Capacity, Hook Load, All Rigging, Lift Height, Flight Plan Sketch of equipment shall include: Dimensions, Bolts Removed, Allowable Tilt			
(Print & Initial) _____	Crane Operator(s) _____ _____	Rigging Team _____ _____	
APPROVED: (Print and Initial) _____	Crane Operator (Rigged to sketch)	PIC (Equipment ready to lift)	

SAMPLE COMPLETED LIFT DATA SHEET

LIFT TITLE: _____	Effective Date: _____	Date Performed: _____	
LIFT PROCEDURE NO. <u>L-</u> _____	Repetitive Lift Expiration Date: _____	Approved:	
AREA: _____		LIFT MANAGER	
Sheet No (if applicable) _____			
DISASSEMBLY PROCESS COMPLETED (Print and Initial)		PIC: _____	
DESCRIPTION: WEIGHT: _____ DETERMINED BY: _____ Sketch of rigging shall include: Crane Capacity, Hook Load, All Rigging, Lift Height, Flight Plan Sketch of equipment shall include: Dimensions, Bolts Removed, Allowable Tilt			
(Print & Initial)	Crane Operator(s) _____	Rigging Team _____	
APPROVED: (Print and Initial)	_____ Crane Operator (Rigged to sketch)	_____ PIC (Equipment ready to lift)	

**Checklist of Requirements for
Procured Hoisting and Rigging Services**

Note: Failure to abide by the suggested advance notice
may result in disallowance of the crane onsite.

Contract Number: _____
Work Planning Number: _____ PPPL
Technical Representative: _____
Subcontractor contact Person: _____
Phone: _____ FAX: _____

1 Week in advance

Prejob onsite discussion (>1 week in advance): _____
Site underground survey performed: _____
Item Being Lifted: _____ Value: _____
Lift Plan Provided: _____
Special (e.g. electrical) considerations: _____
Weight: _____ Dimensions: _____ CG Known: _____
Radius: _____ Height: _____ Obstructions: _____

3 Days in advance

Crane Make and Model: _____
Owner: _____ Periodic
Inspection (copy provided) Date: _____
Monthly hook and wire rope form (copy provided) Date: _____
Load Chart pertinent to this lift (copy provided): _____
Operator: _____ NJ License
Expiration Date: _____
NCCCO Expirations Date: _____
Medical: _____
Rigging supplied by: _____
OSHA § 1926.1400 Form Provided
Qualified Rigger(s): _____ Qualifie
d Signal Person(s): _____

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ATTACHMENT No.4

PPPL

Technical Specifications

For

REPLACE D-SITE LEC BUILDING CANOPY ROOF

TECHNICAL SPECIFICATIONS
for
REPLACE D-SITE LEC BUILDING CANOPY ROOF

1.1 SUMMARY OF WORK AND GENERAL REQUIREMENTS

1.2 General

- A. The Roof Replacement Project for the D-Site LEC Building Canopy Roof includes, but is not limited to, the following major elements:
1. Removal of existing roof system including membrane, insulation, cant strips and tapered edges.
 2. *Removal of asbestos containing flashings in accordance with the requirements of 29 CFR 1926 (g) (11)*
 3. Off-site disposal of all removed materials.
 4. Removal and replacement of deteriorated blocking and curbing.
 5. Installation of roof membranes, cover boards and rigid insulation.
 6. Provide new flashings, coping, reglets, and other trim metal work as specified and required.
 7. Provide and install new roof drains

1.3 Subcontractor Responsibility

- A. The Subcontractor shall supply all labor, materials, equipment and construction supervision services to complete the demolition and replacement of existing roofing, and the installation of approximately 5,000 square feet of Sure-White FleeceBack EPDM roofing on the building designated.
- B. The Subcontractor shall provide all shop drawings, to be reviewed and approved by the Roofing Manufacturer as part of warranty requirement compliance. Subcontractor shall submit product data, material sample and construction details and listing of the Sure-White FB EPDM Membrane Manufacturer, necessary to satisfy the specifications set forth herein.
- C. The work required under the Subcontract includes the demolition, removal of all existing roofing material consisting of roofing, cover board, rigid insulation, flashing, coping, wood blocks and replacement as required of any damaged decking. To protect the structural integrity of the existing roof support system, demolition debris cannot be stockpiled on the building roof but must be removed on a continuous basis as the demolition progresses. A temporary chute to dumpsters is advisable.
- D. Mechanical and electrical equipment within the re-roofing project limits must be protected to prevent damage during the performance of demolition and construction activities, since the equipment must remain in service during the term of the subcontract.
- E. The Subcontractor shall provide a fall protection system around the edge of the existing roof which meets the requirements of OSHA, and the PPPL Construction Safety Officer.
- F. *Asbestos materials are present in the existing perimeter flashing. Asbestos removal shall be performed in accordance with the requirements of 29 CFR 1926.1101 (g) (11) as follows:*
- a) *a Competent Person;*
 - b) *eight hour training for workers per 1926.1101 (k) (9) (viii);*
 - c) *material shall not be sanded, ground, or abraded (need manual methods for removal);*
 - d) *material must be carried or passed to the ground by hand or it must be lowered to the ground via covered, dust-tight chute, crane, or hoist;*
 - e) *all such material must be removed from the roof as soon as practicable but no*

later than the end of a work shift;
f) *all asbestos removal has to be performed using wet methods.*

- G. PPPL requires an Asbestos Supervisor, with documented training, be at the job-site at all times during the removal of any asbestos containing materials.
- H. Subcontractor shall schedule work sequence so roof openings are closed and sealed at the close of each work day. Weather sealing of roof shall be verified to PPPL by the Subcontractor at the close of each work day.
- I. The Subcontractor shall be responsible for the proper installation of new insulation, and roofing membrane. The existing roof drains may require adjustments to insure conformance with the minimum insulation requirements previously described. New replacement of roof drain fixtures shall be supplied and installed by the Subcontractor.
- J. The Subcontractor shall be responsible for flashing at all parapets, equipment post bases and equipment blocking in accordance with the details provided by the membrane manufacturer.
- K. The Subcontractor shall remove all standing water from the roof during construction with pumps or vacuum to scuppers and/or roof drains. Provisions shall be made for rainfall runoff on weekends or other non-working time if the normal flow to the roof drains is impeded in any way. Subcontractor shall keep existing drain lines free of debris and open at all times.
- L. The fully adhered EPDM roofing system including insulation and cover boards shall be installed as per roofing membrane manufacturer's requirements. All rough carpentry for blocking, edging and other uses shall be performed by the Subcontractor.
- M. Upon completion of construction, the Subcontractor shall be responsible for the submittal to PPPL of the manufacturer's 20 year warranty, and reproducible as-built drawings with a CAD file approved by the roofing membrane manufacturer.
- N. Safety Training -The Subcontractor and any subcontractor's employees shall be required to attend the PPPL General Employee Basic Safety, which lasts for approximately two (2) hours, and Fire Watch Training, if required which also lasts for approximately two (2) hours.
- O. PPPL shall designate to Subcontractor the lay down areas for roof waste, new materials, toilets, cranes and other miscellaneous work tools, etc.
- P. All crane operators working on the site shall provide proper Operator Certificates to PPPL for review and approval (See Attachment No. 2).
- Q. Subcontractor shall provide all workers on roof the ability to communicate with workers on the ground by cell phone or of other means at all times workmen are on the roof. *Minimum number of persons on roof at any time - 2 persons.*
- R. No welding or burning of any kind shall be allowed. All fastening of materials shall be by mechanical means. All cutting of materials shall be by electric saws.
- S. The lightning protection system including rods, wiring, etc. shall be temporarily removed, reinstalled and reset by an experienced Subcontractor in this type of work. Certification of the final reconnection system shall be provided to PPPL after completion.
- T. Prior to start of work the Subcontractor shall remove all existing loose debris and materials from the roof and properly dispose of off site.

1.2 Experience

- A. The Subcontractor performing the construction and installation of fully adhered FleeceBack EPDM Sure-White total roofing system including cover board and insulating system is required to have Manufacturer's approved and certified

experience in such installations. In addition, the Subcontractor must provide written documentation in the form of a Certification to PPPL from the FleeceBack EPDM Sure-White membrane manufacturer that the INSTALLERS ARE EXPERIENCED WITH THE MATERIALS, INSTALLATION AND CONSTRUCTION OF THE PARTICULAR ROOFING SYSTEM COMPONENTS PROPOSED for construction on the project as contained in his Materials and Equipment Compliance Statement which accompanies the Subcontractor's bid for construction.

1.3 Manufacturer's Responsibility

- A. The Manufacturer of the specified membrane roofing system must provide the review and approval of all the submittals including the shop drawings as required as per Technical and Performance Specifications. All Approved shop drawings shall bear the date and signature of the membrane manufacturer representative who approved the shop drawings.
- B. The roof manufacturer's representative shall review and approve all shop drawings for Roofing System conformance prior to the start of any work.
- C. All checked and approved shop drawings must be submitted to PPPL for review.
- D. The manufacturer of the roofing system membrane shall provide all technical data, conduct all inspections, and issue all approvals to the Subcontractor as required in these Specifications and as required by PPPL.
- E. Carlisle/roof manufacturer will conduct periodic/weekly inspections. Inspections will commence at the start of roof removal and continue on a once a week basis at minimum. Brief reports of progress, etc. will be forwarded to PPPL for review.

1.4 Material And Performance Requirements

- A. The Technical and Performance Specifications describe materials supplied by a particular manufacturer and the construction procedures and practices necessary to produce a particular level of performance for the quality of materials provided by the manufacturer. The procedures and practices established by the manufacturer are further intended to permit the manufacturer to issue a warranty with specific conditions of liability for an extended and defined duration.
- B. The Technical and Performance Specifications for the roofing system proposed for this project have been derived from those of a particular manufacturer; namely the Carlisle FleeceBack EPDM Sure-White, Adhered Roofing System specification (latest revision) developed by Carlisle SynTec Inc. The named manufacturer's specification has been appropriately modified by PPPL to satisfy the particular conditions associated with the identified project.
- C. Attention is directed to the bid requirements regarding the information which must be included as part of the Construction Materials and Equipment Compliance. The Subcontractor shall be responsible for providing appropriate documentation to PPPL that the materials proposed for use on the project by the Subcontractor and the roofing system resulting from said materials satisfy the criteria *for a UL and FM Class I Approval*.

1.5 Roofing System Warranty

- A. Upon completion of all construction related to the roofing system, the Subcontractor shall provide PPPL with a warranty executed and issued by an authorized representative of the manufacturer of the FleeceBack EPDM Sure-White fully adhered roofing membrane which provides the following minimum

warranty conditions:

1. A 20 year Total System Warranty for materials warranting that the manufacturer will supply materials due to material failure or disintegration and that the manufacturer will repair all leaks which occur in the roofing system.
2. Certification is required such that the system is a Class A roofing system and that the roofing system conforms to UL requirements and FM Class I Approval; 1-90 roof with 100 mph peak wind speed.

1.6 Owner Occupancy

1. Full Owner Occupancy: PPPL will occupy the site during the entire roofing demolition and construction period. Cooperate with PPPL during the construction operation to minimize conflicts and facilitate PPPL usage as required. Perform the work as not to interfere with PPPL's operations.
2. Coordinate scheduling with PPPL in order to protect the building contents from damage during construction operations.

1.7 General Site Requirements

- A. Access to job site must be strictly controlled.
- B. PPPL is surrounded by wetlands and is subject to strict environmental requirements. Material must not be allowed to enter storm drains. An Environmental Specialist from PPPL will periodically inspect the work site.
- C. Roof removal operations must be performed in a safe manner with all material leaving the roof under controlled conditions. Windblown material must be promptly collected. Daily cleanup of the ground level perimeter is required.
- D. Fall protection must meet OSHA requirements and conditions must be diligently monitored.
- E. PPPL Industrial Hygienist will periodically inspect the work site to determine if sufficient safety practices and equipment are in use.
- F. Removal operations may uncover undocumented abandoned utilities. All unplanned utility or structural contracts must be promptly reported to PPPL Project Coordinator. Work must stop if contact is made with an unknown utility.
- G. Heavy equipment is to be operated by qualified operators when the immediate work area is secure and when all personnel are within view of the operator or designated safety watch.
- J. The qualifications of Crane Operators, and lifting procedures and techniques shall be submitted to PPPL Lift Engineer for review.
- K. Electrical hazards are present at the job site. Be aware of:
 1. Medium voltage power line above the roof line (under 500 volts).
 2. Medium voltage underground power lines (under 500 volts).
 3. GFCI must be used on all outdoor electrical tools and equipment.
- L. No welding, cutting, burning, or open flames will be permitted on the roof. Other areas require a special PPPL permit.
- M. Only chemicals required for this Project should be on site. MSDSs are required.
- N. Efficiency requires that all logistic requirements are defined and monitored:
 1. Storage of equipment and materials.
 2. *Location and positioning of asbestos and trash containers.*
 3. Timing and scheduling of all potentially conflicting activities.
 4. Parking of private vehicles.
 5. Heavy equipment routes.
- O. All Personal Protection Equipment must be used as necessary. This includes safety glasses, face shields, gloves, hard hats, safety shoes, etc.

- P. There are restrictions on work hours. Normal hours are between 7AM and 5PM. Monday through Friday. Work outside these times will require PPPL approval.
- Q. PPPL is required to have emergency access to all buildings. Blocking of building access must be pre-approved.
- R. PPPL has an active solid waste/recycle program. Regulations must be followed.
- S. Hazardous waste requires special procedure. All potential hazardous waste, such as oil contaminated soil must be immediately reported.
- T. PPPL permits all employees to issue a "STOP WORK" order, if unsafe work practices are observed.
- U. Vehicle traffic control is important. All backup alarms must be working.
- V. Training requirements are listed in the Subcontract and must be followed.
- W. Daily job briefings with the PPPL Project Coordinator are required. The briefing should be held at the start of a shift, if the weather and schedule permits.
- X. PPPL has an Emergency Services Unit (ESU). ESU must be aware of all hazards at the job site so that, if necessary, an efficient emergency response can be made.
- Y. Proper management, training and introduction of new or replacement employees is essential to ensure safe working conditions.

2.1 TECHNICAL SPECIFICATION

2.2 General

2.2.1 Description

- A. Furnish and install 20-year Total System FleeceBack EPDM Sure-White Adhered Roofing System utilizing 10' wide Sure-Seal® (WHITE) FleeceBack membrane with a total thickness of approximately 115-mil thick as manufactured and approved by Carlisle SynTec Inc.
- B. Fleece backed membrane is fully adhered to an acceptable substrate with Carlisle's two-component low rise FAST Adhesive in full coverage.

2.2.2 Design Options

- A. This Project with a specified wind speed warranty, the membrane assembly must incorporate 5/8" thick Carlisle Dens-Deck or Dens-Deck Prime as a membrane underlayment installed over a 2" base layer of Sure-Seal Polyisocyanurate insulation (standard 20 psi compressive strength) with all joints staggered. Both layers may be mechanically fastened or adhered with FAST Adhesive, where applicable.

2.2.3 Quality Assurance

- A. The installation of this roofing system must be in compliance with Carlisle's specification and the shop drawings as approved by Carlisle. There must be no deviations from Carlisle specifications or the approved shop drawings without the Written Approval of Carlisle and PPPL.
- B. Upon completion of the installation, an inspection will be conducted by a Field Service Representative of Carlisle SynTec to ascertain the roofing system has been installed according to Carlisle's specifications and details. This inspection is to determine that a Carlisle Warranty can be issued and is not intended as the final inspection for PPPL.

2.2.4 Submittals

- A. Prior to starting work, the roofing Subcontractor must submit the following:
 1. Shop drawings showing layout, details of construction and

identification of materials.

2. A sample of the manufacturer's Membrane System Warranty.
 3. Submit a letter of certification from the manufacturer which certifies the roofing Subcontractor is authorized to install the manufacturer's roofing system and lists foremen who have received training from the manufacturer along with the dates training was received.
 4. Certification of the manufacturer's warranty reserve.
 5. Furnish Roof- Uplift Analysis and calculations for metal deck and fasteners reinforcement as prepared by NJ Professional Engineer to be submitted to PPPL.
- B. Upon completion of the installed work, submit copies of the manufacturer's final inspection to PPPL prior to the issuance of the manufacturer's warranty.

2.2.5 Product Delivery, Storage and Building

- A. Deliver materials to the job site in the original, unopened containers labeled with the manufacturer's name, brand name and installation instructions.
- B. Job site storage temperatures in excess of 90° F may affect shelf life of curable materials (i.e., FAST Adhesive - Parts A and B, uncured and semi-cured Pressure Sensitive Flashing, "T" Joint Covers, adhesives, sealants, Primers, Splice Tape and Pourable Sealer).
- C. When liquid adhesives and sealants are exposed to lower temperatures, restore to a minimum of 60° F before use.
- D. Do not store adhesive containers with opened lids due to loss of solvent that will occur from flash off or potential moisture contamination.
- E. Membrane, insulation and underlayment must be stored so it is kept dry and is protected from the elements. Store membrane, insulation or underlayment on a skid and completely cover with a breathable material such as tarp or canvas. If the insulation is lightweight, it should be weighted to prevent possible wind damage.
- F. Any materials which are found to be damaged shall be removed and replaced at the Subcontractor's expense.

2.2.6 Job Conditions

- A. Material Safety Data Sheets (MSDS) must be on location at all times during transportation, storage, and application of materials. The Subcontractor shall follow all safety regulation as recommended by OSHA, EPA and other agencies having jurisdiction.
- B. A minimum roof slope of 1/4" in 12" is recommended. Projects with a roof slope of minimum 1/8" in 12" may be accepted providing adequate positive drainage is provided. Slopes may be provided by through the use of tapered insulation. A sufficient number of roof drains should also be specified and properly located to allow for positive drainage.
- C. Significant ponding that could remain after 48 hours is not acceptable and must be eliminated with crickets/saddles and/or the addition of auxiliary drains in low areas where ponding is anticipated.
- D. All existing roofing material must be totally removed.

2.2.7 Warranty

- A. The 20-year Golden Seal Total System Warranty shall be provided requiring all components utilized to be of those manufactured or marketed by Carlisle. This warranty includes coverage against incidental membrane punctures, damage from hail up to 2" in diameter and 100-mph peak gust wind speeds.

2.3 Products

2.3.1 Description

All components of the specified roofing system shall be products of Carlisle SynTec or accepted by Carlisle SynTec as compatible. All products (including adhesives, insulation, fasteners, fastening plates and edgings) must be manufactured and supplied by Carlisle and covered by the warranty.

2.3.2 EPDM Membrane

- A. Furnish Sure-White FleeceBack 115-mil membrane. The membrane shall conform to the minimum physical properties of ASTM D4637, Type III (Fabric backed membrane).
- B. Static Puncture Resistance (ASTM D120) of 19 lbf for 115-mil.
- C. Dynamic Puncture Resistance (ASTM D5635-04a) of 20 joules for 115-mil.

2.2.3 Insulation/Underlayment

- A. When applicable, insulation shall be installed in multiple layers and mechanically fastened or secured with Carlisle FAST Adhesive to the substrate in accordance with manufacturer's published specifications.
- B. Insulation shall be multi-layer with tapered (where required to provide positive drainage to existing roof drains) insulation as supplied by Carlisle SynTec. Insulation/underlayment shall be as recommended by the Manufacturer for this job conditions and requirements.

2.2.4 Adhesives and Cleaners

All products shall be furnished by Carlisle and specifically formulated for the intended purpose.

- A. Membrane and Insulation Adhesive: FAST Adhesive: A two component insulating urethane adhesive used to attach insulation and FleeceBack membrane.
- B. Low VOC Bonding Adhesive: A Low-strength, yellow colored, synthetic rubber adhesive used for bonding Sure-White EPDM membranes to various surfaces.
- C. Sure-White SecurTape: A 3" or 6" wide by 100' long splice tape used with Sure• White Systems. Complies with the South Coast Air Quality Management District Rule 1168.
- E. Low VOC EPDM Primer - A low VOC (volatile organic compound) primer (less than 250 grams/liter) for use with SecurTape or Pressure-Sensitive products.
- F. One-Part Pourable Sealer: If required use the white color, one-component, moisture curing, elastomeric polyether sealant used for attaching lightning rod bases and ground cable clips to the membrane surface and as a sealant around hard-to-flash penetrations such as clusters of pipes.

2.2.5 Fasteners and Plates

To be used for attachment of insulation in lieu of or in addition to an adhesive if specifically recommended in writing by the Manufacturer for this project:

- A. HP-X Fasteners: A heavy duty #15 threaded fastener with a #3 Phillips drive used for insulation securement into steel, wood plank or minimum 15/32 inch thick plywood when increased pullout resistance is desired.
- B. Insulation Fastening Plates: A nominal 3 inch diameter plastic or metal plate used for insulation attachment.

2.2.6 Metal Edging and Membrane Terminations

- A. General: All metal edging s shall be tested and meet ANSI/SPRI ES-1 standards and comply with International Building Code.
- B. SecurEdge 3000: A metal fascia system with a 20 gauge steel retainer bar and .050" thick aluminum fascia. Metal fascia color shall be as designated by PPPL.
- C. Drip Edge: A metal fascia/edge system with a 22 or 24 gauge continuous anchor cleat and .032 inch thick aluminum fascia. Metal fascia color shall be by PPPL.
- D. SecurEdge One Coping: A snap-on coping edge system consisting of a 24 gauge retainer bar (face side only), corrosion resistant fasteners and a 24 gauge or 0.040 aluminum Kynar finished coping cover. The coping cover is secured by clipping on the retainer bar and fastened on the backside with corrosion resistant fasteners (with rubber washer). Metal coping cap color shall be by PPPL.
- E. Termination Bar: A 1" wide and .098" thick extruded aluminum bar pre-punched 6" on center; incorporates a sealant ledge to support Lap Sealant and provide increased stability for membrane terminations.

2.2.7 Walkways

Where applicable, protective surfacing for roof traffic shall be Sure• Seal P.S. Walkway Pads (30" x 30" molded black rubber with factory applied tape) adhered to the FleeceBack membrane after priming with HP-250 or Low VOC EPDM Primer.

3.1 EXECUTION

3.2 General

- A. Comply with the manufacturer's published instructions for the installation of the membrane roofing system including proper substrate preparation, job site considerations and weather restrictions.
- B. Position sheets to accommodate contours of the roof deck and splices to avoid buckling.

3.3 Vapor Retarders

- A. Vapor Retarder is not required for this Project.

3.4 Insulation Placement

- A. Install insulation or membrane underlayment over the substrate with boards butted together. Fill joints or gaps greater than 1/4 inch with FAST Adhesive. Stagger joints both horizontally and vertically if multiple layers are provided.
- B. Secure insulation to the substrate with FAST Adhesive or mechanical fasteners in accordance with the manufacturer's specifications.

3.5 Membrane Placement and Bonding

- A. Position and unroll successive sheets and align to provide for a minimum 3 inch wide splice. At end laps (along the width of the sheet), membrane shall be butted together and overlaid with 6" wide Sure-Seal Pressure Sensitive Cured Cover Strip or Pressure Sensitive Overlayment Strip.
- B. FleeceBack Membrane shall be fully adhered to an acceptable substrate with Carlisle FAST Adhesive. The adhesive is spray applied or extruded to the substrate only and the membrane is rolled into the wet adhesive once it has foamed up and reached string/gel time (approximately 2 minutes). Roll the membrane with a weighted (100 - 150 pounds) steel roller to set the membrane into the adhesive.

NOTE: Exercise care to prevent overspray onto the membrane. If FAST Adhesive should contaminate the splice area, immediately (while the

adhesive is still in liquid form) clean with Weathered Membrane Cleaner or allow FAST Adhesive to cure and remove with a paint-type scraper.

- C. Install adjoining membrane sheets in the same manner, overlapping edges approximately 4 inches. Do not apply bonding adhesive to the splice area.

3.6 Membrane Splicing

- A. General: The FleeceBack membrane has selvage edges (the fleece-backing is discontinued) and factory-applied splice tape along the length of the sheet for membrane splicing. Selvage edges are not provided along the width of the membrane; adjoining membrane sheets are butted together and overlaid with 6" wide Pressure• Sensitive Cured Cover Strip or Pressure-Sensitive Overlayment Strip.

B. Membrane Splicing with Factory-Applied Splice Tape

1. Overlap adjacent sheets for the proper splice width.
2. Fold the top sheet back and roller-apply EPDM Primer or Low VOC EPDM Primer to the splice area of the bottom sheet with a short nap length paint roller. The primed area will be free of globs or puddles. Allow primer to dry until it does not transfer to a dry finger.
3. Allow the taped edge of the top sheet to fall freely onto the primed sheet below.
4. Pull the poly backing from the Factory Applied Tape (FAT) beneath the top sheet and allow the top sheet to fall freely onto the exposed primed surface.
5. Press top sheet on to the bottom sheet using firm even hand pressure across the splice towards the splice edge.
6. Immediately roll the splice with a 2" (50 mm) wide steel roller or Carlisle's stand-up SeamRoller, using positive pressure. Roll across the splice edge when using a 2" roller, not parallel to it. When using the SeamRoller, roll parallel to direction of the splice.
7. At all field splice intersections, apply Lap Sealant along the edge of the membrane splice to cover the exposed SecurTape 2" in each direction from the splice intersection. Install Carlisle's Pressure-Sensitive "T" Joint Covers or a 6" wide section (with rounded corners) of Sure-Seal Pressure-Sensitive Flashing over the field splice intersection.

3.7 Flashing

- A. Wall and curb flashing shall be cured membrane. Continue the deck membrane as wall flashing where practicable.
- B. Follow manufacturer's typical flashing procedures for all wall, curb, and penetration flashing including metal edging/coping and roof drain applications.

3.8 Walkways

- A. Install walkways at all traffic concentration points (such as roof hatches, access doors, rooftop ladders, etc.).
- B. Adhere walkways to the membrane per the manufacturer's specifications.

3.9 Daily Seal

- A. If the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.
- B. Use FAST Adhesive or similar material per the manufacturer's requirements.

3.10 Clean-up

- A. Perform daily clean up to collect all wrappings, empty containers, paper, and other

debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.

End of Specification