Statement of Work

NCSX CS 30 Ton Crane Upgrade

NCSX-SOW-75-01-00

April 26, 2004

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Controlled Document

This is a controlled document. Check the NCSX Manufacturing Web prior to use to assure that this document is current.

REVISIONS

Revision No.	Description of Change	Date
Rev. 0	Initial Release	4/26/04

Table of Contents

List of Attachments

1 GENERAL INFORMATION

1.1 INTRODUCTION

This statement of work is for upgrading an existing Whiting 30/5 ton crane serial number 8285 located in the CS high bay area of Princeton Plasma Physics Laboratory (PPPL). The new National Compact Stellarator Experiment (NCSX) is planned to be installed in this high bay area.

1.2 BACKGROUND

This Whiting crane is approximately 44 years old and has recently been brought into OSHA compliance. Limit switches, new control paddles and a new Cattron MP-96 remote control radio interface including transmitter and receiver have been recently installed. There is a transfer switch between the radio control and the existing cab and pendent control.

1.3 SCOPE

This upgrade project shall include:

1.3.1 Increased Rated Capacity

Structural modifications and/or part replacement required to increase the rated capacity as specified in the purchase document. New components (e.g. complete trolley, end truck assemblies, etc.) prefabricated at the subcontractors facility should be considered to reduce down time and cost. A new Variable Frequency Drive (VFD) control system including any required interface to the new Cattron MP-96 system or existing cab and pendent controls mentioned above. Each hoist shall have an Electromotive Systems closed loop flux vector control system with standard open loop VFD for bridge and trolley control. Micro speed control shall also be provided for the main and auxiliary hook, bridge, and trolley travel. A micro switch and channel has already been provided on the radio in anticipation of this feature.

1.3.2 Fire Protection Interface

An interface with our fire protection system shall be provided that meets the fire protection code and our fire protection engineer's approval. This interface will temporarily disable the electric eye smoke detection system. A double pole double throw relay shall be provided which is activated when the radio is active. This way, when the crane is idle for a short period of time, the radio turns off thereby deactivating the relay. Also, this relay must provide the contacts available off of **the crane bridge so that the signal can be made available to the fire protection panel located in a nearby hallway.**

1.3.3 Subcontract Plan for Accomplishing Work

Subcontractor shall submit a plan for each crane modification showing the total time the crane will be out of service as well as access requirements, the nature of the work so proper support may be provided by PPPL, and other customer provided support. Specific scheduling of these modifications shall be mutually coordinated between PPPL and the subcontractor. This crane upgrade shall be completed no later that September 1, 2004. Adherence to the schedule is of utmost importance.

2 WORK REQUIREMENTS

2.1 Statement of Work Activity

The Subcontractor shall provide the upgrade and functionality listed in paragraph, 1.3 Scope. The subcontractor shall verify, by test, that all crane controls are functioning correctly from the cab, the pendant, and the radio and perform and document a full periodic inspection per ASME B30.2 including load test of the crane. Finally, the subcontractor shall submit the deliverables listed in Paragraph 8 of this SOW.

All work at PPPL must occur Monday through Friday between 0700 hours and 1700 hours.

2.2 Material and Equipment

The Subcontractor shall provide all necessary labor and equipment to complete the job.

Material(s) and/or product(s), including those components, parts, and materials, which are permanently installed into systems, sub-systems, and/or assemblies, etc. furnished under this purchase order/subcontract, shall be new and unused. Parts and components that have been rebuilt, refurbished, or modified are specifically prohibited unless approved by PPPL in writing.

High strength fasteners shall exhibit grade marks and the manufacturer's identification symbol (head-mark) as specified in the referenced Material Specification. Fasteners having a head-mark, which is displayed on the attached suspect fastener list (see Attachment 1), will not be accepted.

PPPL will provide access to 110v or 480v receptacles as required.

2.3 Safety

A Subcontractor shall submit a Health and Safety Plan (HASP) that addresses all work covered under this subcontract. A draft Health and Safety plan has been prepared by PPPL and provided in Attachment II to assist the subcontractor in the development of their plan. The draft is intended to clearly demonstrate the

policy and philosophy of Integrated Safety Management (ISM) and the mechanics of hazard analysis and preventive action. The subcontractor shall build on this plan using their unique expertise and experience to ensure that all hazards and preventive actions for the work covered by this subcontract have been identified. The HASP must be approved by PPPL prior to the start of any work. PPPL is OSHA compliant and this subcontract shall comply 100% with all OSHA rules including ASME Standards included by reference. Particular attention shall be given to NFPA 70E-2000 requirements for working in the 480-volt control cabinets including appropriate arc rated face shields and any other required personal protective equipment (PPE).

All work shall be in accordance with PPPL ESHD 5008 Section 9.0 - Occupational Safety Chapters 1, 4, 5, 7, 8, 12, 15, and 16.

http://www.pppl.gov/eshis/ESHD_MANUAL/sm.html#Sect9

Subcontractor employees performing work on the PPPL site must take and pass PPPL General Employee Training (GET) (approximately a 4 hour course) if they are to be on-site for more than 40 hours over the duration of the work . Arrangements will be made through the PPPL Technical Representative.

All persons performing installation operations shall wear hard hats and steel-toed shoes.

All work shall be performed in accordance with all OSHA regulations.

A PPPL fire permit is required prior to welding, grinding or any other hot work. The Subcontractor shall inform the PPPL Technical Representative if welding will be needed who will in turn make the required arrangements.

2.4 Codes & Standards

The crane upgrade shall comply with Crane Manufacture Association of America (CMAA) 70 and 78, American Society of Mechanical Engineers (ASME) B30.2, National Fire Protection Association (NFPA 70E), Occupational Safety & Health Administration (OSHA) standards 1910 and 1926, National Electrical Code (NEC) as interpreted by the CMAA 70, and the American Institute of Steel Construction (AISC) as it applies to crane design.

2.5 Identification & Marking

Serial and Model numbers shall be provided for new equipment that typically has individual identification.

2.6 Workmanship

If any welding is to be used, Subcontractor shall propose, as part of the bid package, standards to be used for qualification of personnel and procedures, as well as those used for inspection acceptance criteria.

3 TEST REQUIREMENTS

The Subcontractor shall perform appropriate inspections and test to verify that the completed item(s) meet PPPL's requirements. At minimum, the Subcontractor shall verify, by operation, that all crane controls function correctly on completion of the reconnection of the crane controls. A satisfactory periodic inspection report as defined by ASME B30.2 and a load test certificate shall be delivered to PPPL upon completion.

4 QUALITY ASSURANCE REQUIREMENTS

4.1 Inspection/Surveillance/Audit by PPPL

Authorized representatives of PPPL and the U. S. Government shall have the right at all reasonable times to visit the Subcontractor's premises and those of Subcontractor's suppliers during the performance of the Subcontract for the purposes of inspection, surveillance, audit and/or obtaining any required information as may be necessary to assure that items or services are being furnished in accordance with specified requirements. Such visits shall be coordinated with the Subcontractor's personnel to minimize interference with the normal operations of said premises. The Subcontractor shall make available records and documentation necessary for this function and shall provide all reasonable facilities and assistance for the safety and convenience of PPPL and/or U. S. Government representatives in the performance of their duties. PPPL and the U. S. Government recognize the Subcontractor's right to withhold information concerning proprietary processes. The Subcontractor agrees to insert the paragraph above in each lower-tier procurement issued hereunder.

4.2 Subcontractor's Responsibility for Conformance

Neither PPPL review and/or approval of Subcontractor's documents nor PPPL inspection of Subcontractor's items or services shall relieve the Subcontractor of responsibility for full compliance with requirements of the subcontract. The Subcontractor is responsible for assuring that all requirements and restrictions are imposed on any sub-tier suppliers.

4.3 Subcontractor's Quality Assurance Program

The Subcontractor shall establish and maintain an effective Quality Assurance Program to assure that the Subcontractor's work meets the required quality and is performed in accordance with contractual requirements. Subcontractor's quality assurance function shall be organized to have sufficient authority and independence to identify quality problems, verify conformance of supplied items or services to specified requirements and obtain satisfactory resolution of conflicts involving quality.

4.4 Control of Special Processes

Subcontractor shall use trained and qualified personnel and qualified written procedures in accordance with specified requirements for the performance of certain special processes, including but not limited to, soldering, electronic assembly, brazing, welding, plating, heat treatment, nondestructive examination, etc. Copies of special process procedures shall be available for review by Princeton and submitted to Princeton for review and approval if requested.

4.5 Inspection and Test Equipment

Inspections and tests shall be performed using measuring and test equipment calibrated within the previous year. Subcontractor shall provide the necessary equipment to perform the required inspections and tests. Calibration standards shall be traceable to the National Institute for Standards and Technology (NIST) or equivalent.

5 DOCUMENTATION REQUIREMENTS

5.1 Health and Safety Plan

Subcontractor shall submit the Health and Safety Plan (HASP) per SOW paragraph 2.3.1 as part of this task. The HASP must be approved by PPPL prior to commencement of any work at PPPL. A sample HASP is provided in attachment II.

5.2 Work Schedule

Subcontractor shall submit a detailed work schedule per SOW paragraph 1.3.2 proposal as part of their quotation, which, upon approval by PPPL, will govern the work performed under this Subcontract. Crane downtime shall be kept to a minimum and included as part of the schedule.

5.3 As-Built Drawings

Subcontractor shall submit hard-copy, reproducible, black-on-white, as-built drawings documenting any variations from the original approved drawings. The as-built drawings shall be submitted to PPPL upon completion of the work.

5.4 Calculations and Parts Lists

Subcontractor shall submit all engineering calculations and parts lists associated with this upgrade for PPPL approval prior to field work.

5.5 Operating and Repair Manuals

Subcontractor shall provide operating manuals and repair manuals for each installed component/system including a maintenance/service manual for the service life of the crane.

5.6 Final Inspection, Operational Test, and Load Test Documentation

Subcontractor shall provide written documentation of the final inspection, operational test, and load test. At a minimum, a periodic inspection report and load test certificate as defined by the ASME B30.2 standard is required.

6 SHIPPING & HANDLING

Subcontractor shall be responsible for shipping, handling and temporary storage of any equipment associated with this upgrade.

7 DELIVERABLES

The contractor shall provide the following deliverables:

7.1 Fully Functional Dual Hook Crane

Fully functional (Capacity TBD) dual hook crane as noted in the paragraph 1.3 Scope.

7.2 Technical Reports and Deliverable Documentation

Three printed copies of all technical reports and deliverable documentation described in section 5.0 of this SOW within 2 weeks of job completion and/or by the dates specified in the Subcontract.

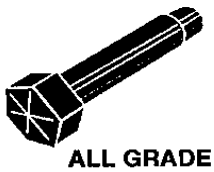
8 WARRANTY

The warranty period shall, at a minimum, be one year for parts and six months for labor from the date of installation and acceptance.

ATTACHMENT I – DOE HEADMARK LIST

DOE Headmark List

ANY BOLT ON THIS LIST SHOULD BE TREATED AS DEFECTIVE WITHOUT FURTHER TESTING.



ALL GRADE 5 AND GRADE 8 FASTENERS OF FOREIGN ORIGIN WHICH DO NOT BEAR ANY MANUFACTURERS' HEADMARKS:

 **GRADE 5**  **GRADE 8**

GRADE 5 FASTENERS WITH THE FOLLOWING MANUFACTURERS' HEADMARKS:

MARK	MANUFACTURER	MARK	MANUFACTURER
 J	Jinn Her (TW)	 KS	Kosaka Kogyo (JP)

GRADE 8 FASTENERS WITH THE FOLLOWING MANUFACTURES' HEADMARKS:

MARK	MANUFACTURER	MARK	MANUFACTURER
 A	Asahi Mfg (JP)	 KS	Kosaka Kogyo (JP)
 NF	Nippon Fasteners (JP)	 RT	Takai Ltd (JP)
 H	Hinomoto Metal (JP)	 FM	Fastener Co of Japan (JP)
 M	Minamida Sleybo (JP)	 KY	Kyoei Mfg (JP)
 MS	Minato Kogyo (JP)	 J	Jinn Her (TW)
 Hollow Triangle	Infasca (CA TW JP YU) (Greater than 1/2 inch dia.)		
 E	Dalai (JP)	 UNV	Unytite (JP)

GRADE 8.2 FASTENERS WITH THE FOLLOWING HEADMARKS:

MARK	MANUFACTURER
 KS	Kosaka Kogyo (JP)

GRADE A325 FASTENERS (BENNETT DENVER TARGET ONLY) WITH THE FOLLOWING HEADMARKS:

	MARK	MANUFACTURER
Type 1 	A325 KS	Kosaka Kogyo (JP)
Type 2 		
Type 3 		

Key: CA-Canada, JP-Japan, TW-Taiwan, YU-Yugoslavia

ATTACHMENT II

***SAMPLE* INTEGRATED SAFETY PLAN FOR THE CS CRANE UPGRADE**

The CS Crane Upgrade Health and Safety Plan

PRINCETON PLASMA PHYSICS LABORATORY

SITE D

PLAINSBORO, NJ

DATE

Prepared by: Contractor designee

NAME - Contractor

Reviewed by: _____

Mike Viola, Lift Manager

Reviewed by: _____

Jerry Levine, Environmental Safety & Health

Reviewed by: _____

Bill Slavin, Industrial Hygiene

Approved by: _____

Erik Perry, Construction Manager

SAMPLE HEALTH and SAFETY PLAN (HASP)

A. INTRODUCTION

This document describes the structure and implementation of our Integrated Safety Management Plan for the CS Upgrade project: Reference guides for this project shall be the contract specifications, PPPL Construction Safety Policies, PPPL ES&H Respiratory Protection Directive, DOE Hoisting and Rigging Manual. Herein is our site specific Health and Safety Plan for this project.

B. INTEGRATED SAFETY POLICY AND PHILOSOPHY

The Integrated Safety Management Objective of this project is:

1. To integrate safety into all work management and work activities.
2. To follow the policies, programs and procedures that have been developed and are the structure for workers to fulfill Contractor's environment, safety, and health responsibilities on this project.

The following (7) principles are incorporated into the planning and performance of this work and all PPPL projects:

1. Line Management Responsibility for Safety
2. Clear Roles and Responsibilities
3. Competence Commensurate with Responsibilities
4. Balanced Priorities
5. Identification of Safety Standards and Requirements
6. Hazard Controls Tailored to Work Being Performed
7. Operations Authorization

This Integrated Safety Management Plan describes the mechanisms, responsibility assignments, and implementation of ISM established for the work to be performed on this project based on the specific nature and hazards of the activities. Included are the PPPL policies, procedures and documents that outline how PPPL and subcontractors implement ES&H and perform the core functions of ISM.

C. HAZARDS, PROCEDURES, CONTROLS AND REQUIREMENTS

C.1 Scope of Work

The work to be performed is as specified within the subcontract dated _____ between Subcontractor and PPPL. Subcontractor shall furnish all labor and equipment for: the Princeton Plasma Physics Laboratories CS Crane Upgrade; per SOW.

D. RESPONSIBILITIES, AUTHORITIES, COMMUNICATIONS

The table below shows the organizational structure for this project and depicts the chain-of-command for the project. The telephone numbers for each are indicated.

Position Title	Work Authority	Name	Telephone Number	Page Number
PPPL Project Manager	Complete Authority	Erik Perry	x3016	%592
PPPL Construction Safety	Stop-Work Authority	Bill Slavin	x2533	%546
PPPL Lift Manager	Stop-Work Authority	Mike Viola	X3655	%243
Subcontractor Project Manager	Complete Authority	TBD	TBD	TBD
Subcontractor Site Superintendent/Safety Officer	Decision-Making Authority	TBD	TBD	TBD
Subcontractor Safety Director	Stop-Work Authority	TBD	TBD	TBD

Note: all contractor employees have stop-work authority in regards to safety issues.

Daily coordination of activities shall occur between Subcontractor's site superintendent and Erik Perry or Mike Viola.

A site plan and floor plan is attached to this HASP, indicating access points and emergency egress. Plant (in-house PPPL) telephone access will be provided. Upon mobilization, Subcontractor personnel will be

granted security access to the work area through PPPL Security and alternate access/egress will be determined and marked on the plans.

E. HAZARDS

It is imperative that all activities for this project be performed safely. Several hazards have been identified and are indicated in the following Hazard Analysis. Employing the principles and functions of Integrated Safety Management, all hazards that are encountered during this project must be identified, analyzed and controlled by engineering and/or administrative controls. Where additional hazards are identified during the course of this project, a hazard analysis will be performed prior to commencement of any related work activity. The hazards and analyses will be documented into the plan for record and review.

E.1 Hazard Analyses

E.1a Task: Welding

Possible hazards:

1. Falling

2. Welding arc flash

Preventive actions required:

1. 100 % fall protection

2. Face Shield, eye protection, Fire rated clothing

E.1b Task: Disconnect Existing Crane Controls

Possible hazards:

1. Contact; electric shock

2.Falling

3.Electrical fire

Preventive actions required:

1. Safing and Lockout/Tagout per ESH-016 and NFPA 70E-2000

2. 100 % fall protection

3. Flame resistant clothing, gloves, and face shields when live work is required

E.1c Task: Install New Crane Controls

Possible hazards:

1. Contact; electric shock

2. Falling

Preventive actions required:

1. Safing and Lockout/Tagout per ESH-016 and NFPA 70E-2000

2. 100 % fall protection

E.1d Task:

Possible hazards:

Preventive actions required:

F. Hazard Controls, Performance of Work within Controls, Oversight and Lessons Learned.

The following is a list of general controls and responsibilities relating to these hazards and to our general operational procedures.

1. Operation of the overhead crane will be by a qualified overhead crane operator.

2. A PPPL Safety Coordinator shall periodically inspect the work site to determine that sufficient safety practices and equipment are in use. Work activities shall be subject to frequent surveillance by PPPL and DOE personnel to assure protection of the environment, safety and health. Toolbox safety meetings will be held each week to discuss general safety issues. When a new task is begun and prior to each lift, a short meeting will be held to discuss procedures.

3. Electric hazards are present in the work area and shall be controlled in accordance with Contractor and PPPL lockout/tagout procedures and general electrical safety procedures. GFCI extension

cords shall be used for all 110v power tool connections. The site supervisor shall identify the known electric hazards and inform our crew of the existence of each hazard.

4. We anticipate the use of welding. A special PPPL hot work permit is required before any and each open flame cutting operation.

5. Chemical substances shall not be brought to the site unless Material Safety Data Sheets (MSDS) have previously been submitted for each substance and reviewed by Industrial Hygiene at least 24 hours in advance. The PPPL Construction Safety representative shall receive the MSDS information and shall forward it to PPPL Industrial Hygiene for review.

6. Required Personnel Protective Equipment (PPE) shall be as follows:

   a. Hard hats

   b. Standard welding protective clothing/gear

   c. Steel-toed safety shoes

   d. Signs and Barricades

   e. Safety Glasses

7. Subcontractor personnel must complete General Employee Training (GET).

8. Efforts will be made to avoid all unnecessary trip hazards.

G. GENERAL INFORMATION:

1. Work hours shall be between 7:30 AM and 3:15 PM, Monday through Friday. Start-time for this project shall be 7:30 AM, normal finish-time 3:15 PM with extended hours if necessary.

2. Debris and salvage materials shall be loaded into containers and disposed of in accordance with all federal, state and local regulations. C&D demolition debris shall be transported to G.R.O.W.S. landfill in Morrisville, PA.

3. A daily briefing shall be held with the PPPL Construction Safety Field Coordinator at the start of each shift or at the earliest possible convenience. If there is a change in supervisory personnel or procedures, such change shall be introduced and reviewed at the daily briefing.

4. New employees shall receive orientation training upon arrival to the site and shall be briefed by Subcontractor's field supervisor on the particulars of this project.

5. Nonconformance occurrences, safety and health issues, incidents and/or accidents shall be promptly reported to the PPPL Construction Safety Field Coordinator for appropriate resolution, documentation and notifications.

6. The use of backup alarms on all construction equipment is required.

7. Subcontractor personnel shall attend PPPL safety orientation during mobilization to receive information about emergency procedures, plant telephone communications, proper procedures for permitted work, fire safety and any specific training pertaining to the work.

7. Upon completion of the project, Subcontractor will conduct a safety audit of the work to determine and compile lessons learned. This information shall be available to PPPL and DOE if requested.

H. EMERGENCY ACTION PLAN

In the event of an emergency during the course of this Project the following steps shall be taken and procedures implemented:

1. Emergency occurs

2. Personnel gather at designated safe haven for head count and to receive further instructions from supervisor. In the event that the supervisor is unavailable, his designee shall step in.

3. Crew will follow the PPPL established Emergency Action Procedures in the event of a major emergency.

If a medical emergency occurs while working on this project, all work shall immediately stop. Contractor's supervisor shall evaluate the injury and determine its severity. If emergency assistance is required, he shall first call Emergency Services at extension 3333 and follow their instructions. While working at this site we will follow PPPL established procedures for medical emergency response. In the event that an employee must be transported by our personnel to a medical center, a map shall be provided. We have determined the nearest facility to be Princeton Medical Center. All injuries must be reported to the PPPL Construction Safety Representative and to the PPPL Occupational Medicine Office.

I. LIFT PLAN

The Contractor shall evaluate each proposed lift and complete the PPPL Critical Lift Procedure document. This will be performed either prior to requesting lift review by the PPPL Lift Engineer or in conjunction

with him. A qualified crane operator will operate the overhead crane. Lifts designated as Critical shall not be performed without the presence of the PPPL Lift Engineer or his designee. Contractor will provide method for lifting control cabinet into place, provide a lift plan (per enclosed sample lift procedure and lift data sheet), and obtain PPPL approval.

H. LIST OF CHEMICALS

The following commercially available chemicals are anticipated to be utilized on this work:

1. "Fast Orange" hand cleaner

2. "WD40" lubricant

Note: We do not anticipate the use of any solvents or other chemicals during the course of this project. MSDS sheets will be incorporated into the overall HASP and copied to the Industrial Hygienist for approval prior to being brought on site.