

MOC-PWRI Statement of Work

March 28, 2013

Company Information:

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The starting date for on-site work to commence at the MOC-PWRI Shaking Table Facility in Tsukuba City, Japan is tentatively set for May 2013 through October 2012. Several trips to the site are envisioned. Invoicing shall take place at the end of each trip to facilitate expense recovery.

Deliverables:

1. This project is going to require continuous on-site engineering management of the project. Some of the time, Far East Controls will represent MTS on-site to Hitachi, the customer and local vendors installing the new actuators.
2. During actuator replacement, the large size of the actuators requires that the shaking table controls are needed to position the new actuators for hook-up to the foundation and the shaking table. This is a very delicate procedure that requires great care to prevent accidents.
 - Determine exact sub-set of 469D controls to use for actuator installation. This may include only manual hydraulic controls.
 - Verify that the uniaxial control function of the 469D controls works properly.
 - Define operating procedure to communicate actuator movement commands from personnel in the pit and the control room.
 - Carefully restrict possible motion for any move, no matter how large a motion.
 - Constant monitoring of hydraulic supply status to warn personnel of imminent pressure loss that could endanger personnel.

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Deliverables, Cont'd:

3. A new control system for the multi-pump hydraulic supply system is being installed. This system needs careful checkout and testing to provide quality operation and confidence in these new controls. This site also has a high pressure oil-on-demand system called a Blow-Down system that needs careful checkout to ensure system safety.
 - Test all digital inputs/outputs to electro-mechanical controls of the hydraulic supply system.
 - Test all digital inputs/outputs to control room and 469D Control software.
 - Check out-of-sequence operator actions to prevent accidental change of hydraulic power supply due to operator mistakes.
 - Verify that actual mechanical hydraulic supply start/stop sequences are compatible with the 469D Control software and that all important hydraulic events are reported to the 469D Controller..
4. The 469D Control software shall also be upgraded to the latest revisions. Full checkout of the new features is required.
 - Prior to hydraulic startup for the first time, the 469D signal polarities are checked for proper orientation to seismic system standards.
 - Proper servovalve control is tested prior to application of main pressure. This includes tuning and calibration of the servovalves.
 - TVC gains are set for safe levels (low gain condition) and low main pressure is applied. Basic table motions are tested for correct operation. Parking and Normal table positions are verified.
 - High pressure is applied to the table system and 6-DOF TVC tuning proceeds.
 - Special attention is concentrated on new panels and features of the 469D Upgrade. This shall include, but not be limited to –
 - a. Multi-Channel Oscilloscope
 - b. AIC Training Wizard
 - c. Digital Readout Panel
 - d. 3rd-Stage Servovalve Balance Integrators
 - e. Zero of 497 DC Conditioners
5. There are 2 main sets of acceptance tests required on this project. Bare Table tests and Rigid Body tests shall be performed. These tests are a large part of the official acceptance of the work done.
6. Customer training of the new hydraulic controls and shaking table controls are required after system acceptance tests are performed.
7. Provide system engineering support to solve installation problems and assistance to the other subjob engineers on the project.
8. It is expected that this project shall require 10 weeks of on-site work to adequately perform the installation, testing, acceptance and customer training functions.

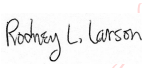
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Because of the multiple trip nature of this project, the deliverables completed shall be detailed in each trip invoice:

Typical 2-Week Trip Rates/Payment Terms:

Payments	Amount	When
Airfare + Hotel	(work with MTS Travel Representative)	Billed after successful completion of trip
Deliverable 1 (week 1)	\$4250 + per diem for 5-10hour-day work week + 1 day travel per diem	Billed after successful completion of trip
Deliverable 2 (week 2)	\$4250 + per diem for 5-10hour-day work week + 1 day travel per diem	Billed after successful completion of trip

Presented by: 
Rod Larson, FEC LLC

Submitted by: _____
David Kusner, PE