

NNMREC Device Testing Notes: Agreements and Environmental, Health and Safety Planning

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Purpose: To provide basic information on how NREL conducts field tests of third party machines from a planning, contracting, and environmental, health and safety perspective. This is not meant to be comprehensive, but to provide a guide for discussion and identification of areas NNMREC should focus on during test center preparation.

Outline

1. Initial Discussions
2. Pre-Contractual Phase
3. Contracts
4. During Testing
5. Questions
6. Supporting Documents

1. Initial Discussions

Objectives:

- Communicate test capabilities offered (e.g. wave environment, testing services)
- Learn about test article (e.g. Deployment and operations, mooring, TRL, prior testing)
- Learn about Company test objectives and scope
- Manage expectations on fees, schedule and liability

2. Pre-Contractual Phase

Objectives:

- Tighten scope, objectives and timeline
- Initial assessment of risks of testing Company X device
- Initial assessment of risks of Company X people working on site
- Define risks and develop Hazard Controls (see
http://thesource.nrel.gov/esh/hazard_process.html for additional information)

Work with Company X to refine scope, objectives and testing timelines. Using the NREL work plan template, we engage with Company X to define, at a high level, the test article, test procedure, instrumentation, etc. This draft plan also provides a foundation for the Risk/Hazard identification and management planning.

The partners must have a viable EHS program in place. Typically NREL requires statistical information that demonstrates their safety performance for the previous 3-years. NREL requests EMR (Insurance Company Experience Modifier Rate) OSHA TRC (Total Recordable Case) and OSHA DART (Days Away, Restricted, or Away) rates. Generally speaking NREL stays away from allowing companies that

demonstrate poor performance from conducting work in our arena. In those cases where their performance is unacceptable, we allow them to function as visitors and technical advisors, and our tech's or qualified subcontractors perform the hands-on work.

NREL requests copies of relevant EHS programs to review and verify that they are consistent with our own requirements and robust in their scope and application. NREL would provide feedback if we determined that their programs did not pass muster, and would expect them to correct the problem areas or to "fill the gap" to assure worker safety.

NEPA – NREL has a site-wide NEPA approval for work typically conducted here (e.g. field testing of wind turbines). Most testing falls under this prior approval.

Environmental Risk Assessment – Based on the proposed scope of work, an array of credible environmental incidents can be identified (e.g. gearbox oil release, hydraulic system failure and release, coolant release, etc.) The consequences of such events with respect to environmental impact will drive the need for risk management measures (spill control equipment, secondary containment, etc).

Wildlife Impacts – Determine the impact that the propose scope of work will have on wildlife. This would include the off-normal events described in the preceding bullet.

Documents relevant for exchange during this phase:

- High level test article information (materials, operation, fluids, designs, etc.)
- Planned testing objectives and requirements
- Certificate of Insurance
- Viable Environmental Health and Safety Program Information-
 - 3 years of statistics
 - EMR (Insurance Company Experience Modifier Rate)
 - OSHA TRC (Total Recordable Case)
 - OSHA DART (Days Away, Restricted, or Away)

3. Contracts

Objectives:

- Define scope, roles, deliverables and timelines
- Define liability
- Codify standard operating procedures, plans, regulatory and EHS standards, etc.
- Avoid, minimize, mitigate, etc. Risks

NREL utilizes agreements for testing (Technical Services Agreement (TSA) and Cooperative Research and Development Agreements (CRADA)s (see attachments). Both of these agreements have blanket indemnification for NREL...i.e. NREL is not liable for any damages/harm resulting from the testing of a company's device/component.

NREL develops a refined Test Plan for each test that outlines the scope of work in detail. A test plan template is included. It defines the test article, test procedure, instrumentation, responsibilities, progress reports, reporting, etc. It makes sure the testing organization and customer agree to what will

be done and who will do what. It's important because during a test a customer sometimes wants more than agreed to in the test plan like additional channels, reporting, and/or analysis. Usually the CRADA Joint Statement of Work gives a more general description in the statement of work and also covers important safety aspects.

From this Test Plan we would determine the hazards presented by the activity and distinguish what safety controls (e.g. engineering controls, work practices) will be required to achieve and maintain an acceptable level of risk throughout the test. This can be augmented by a Methods of Procedures document that identifies how a company proposes to conduct the work.

A Job Hazard Analysis (JHA) prepared by the partner that describes the hazards associated with the proposed scope of work, and identifies what controls the partner will implement to mitigate the risk. Generally speaking, the greater the hazard, the more rigorous this analysis must be. Appropriate hazard controls must be implemented and verified effective. Based on the proposed scope of work, certain "high risk" activities may require special safety permitting such as Confined Space Entry, Hot Work, Energized Electrical work. Workers participating in the activity would be trained appropriately. Spill response equipment appropriate for the most significant and credible event would have to be present and staff would have to be properly trained in this discipline.

A Safe Operating Procedure (SOP) should also be developed for the Test Center. This would be augmented by a test-specific SOP that is developed for each test, reviewed and signed by all participating in the activity. The SOPs would articulate the EHS requirements for the specific activity. Everyone participating in the activity would have to review the SOP and sign an acknowledging document.

Partners are also required to provide documentation of relevant Safety Training for specific areas of occupational safety such as Fall Protection, Lockout-Tagout, Electrical Safety, Hoisting and Rigging, etc. Anyone having hands-on exposure would be required to provide proof of training.

4. During Testing

Naturally, the extent of desired Partner involvement in the deployment, testing, maintenance, etc. of test articles needs to be determined and outlined in the agreements listed above.

Anytime a partner comes to the NWTC to perform work, they undergo an EHS Orientation. We use a checklist (see attachment) to assure the orientation is provided consistently and to provide documentation that the process has been completed. This covers things like emergency notification, access restrictions, EHS requirements, accident response and reporting, etc. This would include a site-specific orientation process to address the unique EHS aspects based on where the actual work is performed (off shore, underwater, on structure or tower, etc.).

Questions

- Is OSU OHSAS 18001 certified?
- What OSU documents/procedures are relevant (e.g. Safe Operating Procedures, EHS Plans)?
- Who will be the contracting entity with the device companies (OSU, separate org?)

Supporting Documents

1. NREL TSA terms and conditions
2. NREL CRADA terms and conditions
3. Safe Operating Procedure
4. Orientation Checklist
5. Job Hazard Analysis
6. EH&S Risk Evaluation Worksheet
7. Methods of Procedures
8. Test Plan Template
9. CRADA Joint Statement of Work Example

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