

<b>SUBJECT:</b>	Fermilab Assessment Manual – Chapter 4 Independent QA Assessment Procedure – Form 2	<b>NUMBER:</b>	3902.1004 FORM 2
<b>RESPONSIBILITY:</b>	Quality Assurance Manager	<b>REVISION:</b>	001.2
<b>APPROVED BY:</b>	Head, Office of Quality and Best Practices	<b>EFFECTIVE:</b>	12/09/2010

### **Fermilab Independent QA Assessment Report**

**Assessment Number & Title:** 11-IA-QA-005 FESS Suspect/Counterfeit Item (S/CI) **Version: 0001**  
And Inspection and Acceptance Testing

**Date(s) of Assessment:** 01/10/11 – 01/18/11

**Performing Organization:** Office of Quality & Best Practices

**Assessed Organization(s):**

Facilities Engineering Services Section (FESS):

- Engineering Department
- Operations Department, Inventory Management
- Operations Department, Mechanical/Electrical
- Operations Department, Engineering Fire Protection
- Operations Department, Electrical Engineering
- Operations Department, Mechanical Engineering
- Site Services Department, FESS IT Group
- Site Services Department, Roads & Grounds

**Report content**

The main body of this report contains the following sections:

- Assessment Activities & Scope
- Scope Limitations
- Activities Reviewed Within this Assessment
- Description of the Implementation & Effectiveness of Observed Activities
- Conclusions
- Findings
- Observations & Recommendations
- Commendable Practices

**Assessment Activities & Scope:**

The implementation & effectiveness of Inspection and Acceptance Test and S/CI controls applied to the FESS Departments listed above were examined via interview, document review and observation relative to the Integrated Quality Assurance (IQA) and Fermilab Integrated Contractor Assurance Program (FICAP).

**Scope Limitations:**

The scope of this assessment was limited to those activities or services associated with S/CI and Inspection and Acceptance Testing within Fermilab’s Facilities Engineering Services Section. Procurement activities and IQA section 8.5 “Control of Measuring and Test Equipment (M&TE)” were not within the scope of this assessment.

<b>SUBJECT:</b>	Fermilab Assessment Manual – Chapter 4 Independent QA Assessment Procedure – Form 2	<b>NUMBER:</b>	3902.1004 FORM 2
<b>RESPONSIBILITY:</b>	Quality Assurance Manager	<b>REVISION:</b>	001.2
<b>APPROVED BY:</b>	Head, Office of Quality and Best Practices	<b>EFFECTIVE:</b>	12/09/2010

**Activities Reviewed Within this Assessment:**

During the course of this assessment the following S/CI and Inspection & Acceptance Testing activities were reviewed, and when possible, observed:

- Determining the Requirements for the Architectural and Engineering (A&E) Contracts
- Inspection and Review of the A&E Compliance
- A&E Subcontractor Evaluation
- Construction Signoff Documentation
- Final Inspection and Acceptance and Beneficial Certifications
- Fire Protection Engineering Activities
- Construction Coordinator Activities
- Mechanical and Electrical Maintenance Activities
- Operations Electrical and Mechanical Engineering Inspection and Test
- Operations Fire Protection Inspection and Test
- FESS Operations Inventory Management and Storeroom Activities
- Engineering Discrepancy Reporting
- Crane Services and Inspections
- FESS IT Group Activities
- Roads & Grounds
- Control of Nonconforming Items
- S/CI Coordinator Activities

**Description of the Implementation & Effectiveness of Observed Activities:**

Inspection and Acceptance Testing:

The requirements for IQA Chapter 8, Inspection and Acceptance Testing are met and effectively implemented within the FESS organizations assessed. Although no evidence of noncompliance within the selected IQA criteria was observed, a number of observations and one commendable practice were identified. The level of inspection and testing performed is commensurate with the risk associated with product failure, the complexity, importance and cost of the product. The higher the risk and more complex the product, the more comprehensive are the inspections and tests conducted.

For regular and repetitive inspections FESS uses tools such as checklists. Files 01 and 02 are examples of Daily Vehicle Check-out and Daily Tractor and heavy Equipment check-out by the Roads & Grounds group in the Site Services department.

The Operations Department’s weekly, monthly and annual preventive maintenance (PM) contain tests and inspections which are initiated through issuing work orders. These work orders satisfy IQA’s inspection and test records requirements by documenting the equipment information, location information, task list and response information (File 03). The Task List section identifies required test and inspection processes while the Response Information section identifies who performed the work. In this example since the inspection revealed some problems, another work order, WO #48076, (File 04) was issued to address the problems discovered. This section satisfies the IQA requirements for control of nonconforming items. Work Orders for weekly (File 05), monthly (File 06) and annual inspections (File 07) were observed. Test and Inspection processes and procedures and documentation for the Electrical Engineering and Mechanical Engineering within the Operations Department were examined and observed. Both groups were compliant

<b>SUBJECT:</b>	Fermilab Assessment Manual – Chapter 4 Independent QA Assessment Procedure – Form 2	<b>NUMBER:</b>	3902.1004 FORM 2
<b>RESPONSIBILITY:</b>	Quality Assurance Manager	<b>REVISION:</b>	001.2
<b>APPROVED BY:</b>	Head, Office of Quality and Best Practices	<b>EFFECTIVE:</b>	12/09/2010

with IQA requirements; however as is indicated in File 08, the crane operator’s monthly inspection requirements were not consistently documented in their report. This document states the acceptable range of changes in hook dimensions. However the acceptable range of changes in the diameter or length of the chain/rope is not recorded in this inspection report.

A portion of Fess Engineering work generally is contracted out to Architectural and Engineering (A&E) firms. These firms are required to have corporate and project-specific quality plans. Quality Assurance/Quality Control Plan Burns & McDonnell (File 09) and Quality Assurance procedure Quality Control Reviews HDR Engineering Inc. (File 10) are examples of these plans.

FESS’s Standard Operating Procedures (SOP) are documented and contain the following sections; applicability, responsibilities, procedures, references, revision history and other. An example SOP is the attached A/E Consultant Quality Assurance (File 11). The Procedure section of this SOP indicates that the consultant submits the corporate Quality Control Plan prior to establishment of a master subcontract and they also shall include with tasking proposals a Project Specific Quality Control Plan. In the same document in section II all roles and responsibilities are well defined. Other SOPs with similar formats define the procedure for Document Reviews (File 12), Construction Document Signoff (File 13) and A/E Consultant Invoicing (File 14).

FESS Engineering’s requirements are documented in the” Reviewing the Engineering documentation Exhibit A - Architectural & Engineering (A/E) Services” (File 15). The schedule and additional terms and conditions are documented in “Schedule and Supplementary Terms and Conditions Exhibit B - Architectural & Engineering (A/E) Services; Scope of Work” (File 16). The reply to a Request For Proposal (RFP) or Request For Quotation (RFQ) documents the requirements and work the contract company has agreed to. The Primera RFP is attached as File 17. In this document the contractors commit to provide the requirements, basis of design, completed contractor startup and initial checkout sheets, completed function performance test sheets, any non-compliance issues and summary of commissioning findings in their final commissioning report. The proposed systems, impacts on existing systems and operations, specific technical requirements to be incorporated into the design, and compliance with best and required practices is reviewed in Comment & Compliance Reviews (CCR) and any discrepancies are addressed and communicated with the selected contractor. An example of a CCR used for upgrading the fire alarm system at FCC is attached as File 18. The A/E consultants provide a discrepancy report which addresses the disposition and corrective action and the verification of corrective action if required. The two examples of Burns & McDonnell discrepancy reports are attached as File 19. These reports contain all required information.

Construction Coordinators are responsible for regular inspection of the work done by contractors and verification of compliance with the requirements. A list of approved FESS Task Managers and Construction Coordinators is attached as File 20. The contractor conducts tests and inspection based on the contractual agreement and a test plan provided by FESS Engineering. Generally, a Fermilab Construction Coordinator or other designated representative observes the testing. The test plan and test result for the FCC Fire Alarm Commissioning are attached as Files 21 and 22. Discrepancies or additional work are addressed in a Work Order. After the work is completed by the contractor FESS follows Fermilab’s Final Acceptance Procedure dated January 20, 2011 attached as File 23, which requires the Construction Coordinator to initiate the final Inspection and Acceptance, solicit the necessary signatures and present it to the Project Engineer for distribution. A final Inspection and Acceptance Certificate is issued and signed off by all parties after the work has been completed by the hiring contractor (File 24).

To ensure quality parts, materials and services are received, all of the departments in FESS use reputable

<b>SUBJECT:</b>	Fermilab Assessment Manual – Chapter 4 Independent QA Assessment Procedure – Form 2	<b>NUMBER:</b>	3902.1004 FORM 2
<b>RESPONSIBILITY:</b>	Quality Assurance Manager	<b>REVISION:</b>	001.2
<b>APPROVED BY:</b>	Head, Office of Quality and Best Practices	<b>EFFECTIVE:</b>	12/09/2010

organizations, firms and dealers. The Operations, the Site Services stockroom, and the Engineering departments, all make purchases from manufacturers and authorized dealers.

In order to prevent use of nonconforming items in the laboratory, FESS conducts incoming inspection of items entering the stockroom. The assessment team inspected several bolts from stock bins and did not find any non-conforming items. However, interviewees in the Operations Department stockroom indicated that nonconforming pipe fittings taken from stockroom storage bins were found to be threaded incorrectly and therefore were not used in the field. These nonconforming items should have been segregated as required by the IQA. These observations have been integrated into Finding 1 below.

The Fire Protection group in the Operations Department complies with regulated inspection and test requirements. Test procedures are incorporated into a software checklist on a handheld device. The data from tests and inspection are entered into this device. This device has access to databases to ensure complete sets of tests and inspections are executed dependent on the location of interest. The inspection and test schedules are kept on FESS's Computerized Maintenance Management System (CMMS) and hard copies of the schedules are posted in the fire protection office in case access to the CMMS is not possible. The Fire Protection group also keeps a set of binders with the test and inspection procedures, schedules and completion status.

#### Suspect Counterfeit Items:

The requirements of IQA Chapter 10, Suspect and Counterfeit Items and *Controlling Suspect/Counterfeit Items Procedure*, 1006.1001 have not been effectively implemented within the FESS departments assessed.

Although FESS S/CI prevention, detection and identification are compliant with quality requirements, the S/CI program is not fully implemented. The assessment team observed S/CI items such as shackles were identified and segregated according to the S/CI procedure and program. The risks associated with these items were assessed by qualified Fermilab engineers or third party vendors and then they were processed accordingly. However there was no log or documentation for these activities and S/CI reporting requirements were not fully implemented since some of the line managers and area supervisors did not know who the current FESS S/CI coordinator is.

#### **Conclusions:**

The FESS departments in the scope of this assessment employ an effective system of inspection and acceptance test controls to ensure that the proper level of evaluation is performed on incoming products and items. A variety of methods are used to ensure that genuine, quality items are received including purchasing from manufacturers and authorized dealers, incoming visual inspection and test. The levels of controls are commensurate with the complexity of items being appraised, with sufficient formality being used for the more complex items being received.

Suspect/Counterfeit Items requirements are compliant and have been successfully implemented within many FESS departments assessed. FESS personnel interviewed were aware of S/CI procedures and received the required S/CI trainings. Nonconforming pipe fittings that are possibly Suspect/Counterfeit were present in the Operations Department storage bins as described in finding1. Lack of documentation and awareness of many personnel as to the identity of their current S/CI Coordinator is described in

<b>SUBJECT:</b>	Fermilab Assessment Manual – Chapter 4 Independent QA Assessment Procedure – Form 2	<b>NUMBER:</b>	3902.1004 FORM 2
<b>RESPONSIBILITY:</b>	Quality Assurance Manager	<b>REVISION:</b>	001.2
<b>APPROVED BY:</b>	Head, Office of Quality and Best Practices	<b>EFFECTIVE:</b>	12/09/2010

finding 2.

**Findings:**

1. Evidence that non-conforming material was not segregated from good material was discovered during interviewing the Operations Department personnel.

IQA Chapter 8, Inspection and Acceptance Testing section 8.3.1, Control of Nonconforming Items paragraph 1 states “Divisions/sections/centers are responsible for control of nonconforming items. Controls include identification, documentation, evaluation, segregation (when practical), item disposition (reject, repair, rework, use-as-is), and notification to affected organizations.” Interviewees in the Operations Department stockroom indicated that nonconforming pipe fittings taken from stockroom storage bins were found to be threaded incorrectly and therefore were not used in the field. These nonconforming items should have been segregated as required by the IQA.

2. The S/CI program is not fully implemented.

*Controlling Suspect/Counterfeit Items Procedure*, 1006.1001 section 5.4 states: “The D/S/C S/CI Coordinator coordinates the investigation with line management and other staff, updates and ensures the S/CI log and supporting materials contain adequate information.” However, although FESS identified and segregated the nonconforming items there is no log file or any record of the destruction of the items described in item 1. Also the majority of the interviewees could not identify their previous or current S/CI coordinator.

**Observations and Recommendations:**

1. **Observation:** In one instance the requirements for crane inspection were not consistently recorded  
**Recommendation:** FESS should avoid the hard copying of their standards or industry requirements into their procedures. This creates multiple copies of the requirements which then need to be maintained and updated.

**Commendable Practices:**

1. The proxy hand held device used by Site Operation Fire Protection is a location-based tool which not only has all of the preventive maintenance checklists and requirements for the fire protection devices, but it also actively returns the status of Fermilab’s fire and utility monitoring system (FIRUS) and other useful network-based information. This may be useful to anyone who utilizes checklists to routinely perform unique checks and measurements at a variety of locations, while at the same time, monitoring overall system status and behavior.

**Names of Person Interviewed:**

Steve Dixon  
Jim Niehoff  
Michael Bonkalski  
Tim Trout

<b>SUBJECT:</b>	Fermilab Assessment Manual – Chapter 4 Independent QA Assessment Procedure – Form 2	<b>NUMBER:</b>	3902.1004 FORM 2
<b>RESPONSIBILITY:</b>	Quality Assurance Manager	<b>REVISION:</b>	001.2
<b>APPROVED BY:</b>	Head, Office of Quality and Best Practices	<b>EFFECTIVE:</b>	12/09/2010

Pat Marsh  
Greg Gilbert  
Matthew Besch  
Brian Petersohn  
Larry Sliwa  
Joe Pathiyil  
Roger Slisz  
Mike Becker  
Gary Konen

**Documents Reviewed:**

- Exhibit A - Architectural & Engineering (A/E) Services; Schedule and Supplementary \_Terms and Conditions
- Quality Assurance/Quality Control Plan Burns & McDonnell
- Quality Assurance procedure Quality Control Reviews HDR Engineering inc.
- Third Party Structural inspection acceptance ( Done by TGRWA to Determine the structural acceptance of the loading on the base building structure)
- Comment & Compliance Review for Fire Alarm System at FCC
- Standard Operating Procedure A/E Consultant Invoicing
- Standard Operating Procedure A/E Consultant Quality Assurance
- Standard Operating Construction Document Signoff
- Standard Operating Procedure Document Reviews
- Discrepancy Report Burns & McDonnell
- Daily Vehicle Check-out
- Daily Tractor and Heavy Equipment Check-out
- Work Order WO 458702
- Work Order WO 48076
- Work Order (Weekly) WO 480647
- Work Order (Monthly) WO 414380
- Work Order (Annually) WO 0391976
- Crane Operator’s Monthly Inspection Report
- Schedule and Supplementary \_Terms and Conditions Exhibit B - Architectural & Engineering (A/E) Services; Scope of Work
- Reply to a Request For Quotation (RFQ) by Primera
- CCR used for upgrading the fire alarm system at FCC
- QUALIFIED-TAS- MANAGERS-AND-CONSTRUCTION-COORDINATORS
- FCC Fire Alarm Test 10-23-2010
- PPD-DO-FA-Test
- Siemens Cerberus Division-Certificate of Completion and Operation
- Fermilab’s Final Acceptance Procedure dated January 20, 2011
- Final Inspection and Acceptance Certificate (FCC Fire Alarm Upgrade)

(See also “Attachments” section below)

**Standards, Regulations, and Other Program Requirements Applied:**

<b>SUBJECT:</b>	Fermilab Assessment Manual – Chapter 4 Independent QA Assessment Procedure – Form 2	<b>NUMBER:</b>	3902.1004 FORM 2
<b>RESPONSIBILITY:</b>	Quality Assurance Manager	<b>REVISION:</b>	001.2
<b>APPROVED BY:</b>	Head, Office of Quality and Best Practices	<b>EFFECTIVE:</b>	12/09/2010

The specific criteria applied to this assessment were:

- 1001 Fermilab Integrated Quality Assurance (IQA)
  - Chapter 8 – Inspection and Acceptance Test (IQA)
  - Chapter 10 – Suspect and Counterfeit Items (IQA)
- Other relevant requirements applicable to this assessment:
  - 1006 Suspect/Counterfeit Items Program
  - 1006.1001 Controlling Suspect/Counterfeit

**Describe or List Any Other Assessment Methods Used:**

None

**Corrective Action Plans Issued:**

FESS-20110127- 01 Segregation of nonconforming items is not adequately in accordance with IQA Chapter 8 requirements.

FESS-20110127- 02 S/CI program is not adequately implemented in accordance with IQA Chapter 10 and QA 1006 S/CI Program requirements.

**Assessors' Names (asterisk indicates team leader):**

- Susan Rahimpour\* - OQBP
- Don Rohde - AD

**Submitted by:** Susan Rahimpour

**Date:** MM/DD/YY

**Distribution (Distribute to assessed organizations' management, OQBP head, and other interested parties):**

Randy Ortgiesen	Bob Grant
Kent Collins	Ed Vokoun
Jolie Macier	Jed Heyes
Bill Shull	
Michael Bonkalski	
Rod Walton	

**Attachments:**

- File01 – Daily Vehicle Check-out
- File02 – Daily Tractor and Heavy Equipment Check-out
- File03 – Work Order WO 458702
- File04 – Work Order WO 480760
- File05 – Work Order (Weekly) WO 480647
- File06 – Work Order (Monthly) WO 414380
- File07 – Work Order (Annually) WO 0391976
- File08 – Crane Operator's Monthly Inspection Report
- File09 – Quality Assurance/Quality Control Plan Burns & McDonnell

<b>SUBJECT:</b>	Fermilab Assessment Manual – Chapter 4 Independent QA Assessment Procedure – Form 2	<b>NUMBER:</b>	3902.1004 FORM 2
<b>RESPONSIBILITY:</b>	Quality Assurance Manager	<b>REVISION:</b>	001.2
<b>APPROVED BY:</b>	Head, Office of Quality and Best Practices	<b>EFFECTIVE:</b>	12/09/2010

- File10 – Quality Assurance procedure Quality Control Reviews HDR Engineering Inc.
- File11 – SOP A/E Consultant Quality Assurance
- File12 – SOP Document Reviews
- File13 – SOP Construction Document Signoff
- File14 – SOP A/E Consultant Invoicing
- File15 – Reviewing the Engineering documentation Exhibit A - Architectural & Engineering (A/E) Services
- File16 – Schedule and Supplementary \_Terms and Conditions Exhibit B - Architectural & Engineering (A/E) Services; Scope of Work
- File17 – Reply to a Request For Proposal (RFP) or Request For Quotation (RFQ) by Primera
- File18 – CCR used for upgrading the fire alarm system at FCC
- File19 – Burns & McDonnell discrepancy
- File20 – QUALIFIED-TAS- MANAGERS-AND-CONSTRUCTION-COORDINATORS
- File21 – FCC Fire Alarm Test 10-23-2010
- File22 – Siemens Cerberus Division-Certificate of Completion and Operation
- File23 – Fermilab’s Final Acceptance Procedure dated January 20, 2011
- File24 – Final Inspection and Acceptance Certificate (FCC Fire Alarm Upgrade)