
Standard Operating Procedure

SOP Identifier: 8.3.5.1
Revision Number: 3
Effective Date: December 15, 2011

Subject Matter Expert: R. Alber (ralber@fnal.gov)

Title: **Document Reviews**

I Applicability

This procedure applies to document reviews for projects managed by FESS/Engineering and is intended to provide a framework for the review and distribution of design and construction documents with the following goals:

- Agreement and documentation of Customer requirements and FESS/E response to those requirements;
- Review of developing designs by Fermilab divisions/sections/centers for:
 - Appropriateness of proposed systems;
 - Impacts on existing systems and operations;
 - Specific technical requirements to be incorporated into the design;
 - Compliance with best and required practices of authority having jurisdiction.
- Reviews are performed in accordance with the Fermilab Engineering Manual
- Reviews are performed in compliance with the Director Policy No.18 – Construction Modification Policy
- Notification of affected Fermilab divisions and sections when a project is released for proposals.

For the purposes of this procedure definitions are summarized below:

- “Fermilab” is Fermi National Accelerator Laboratory;
- “FESS/E” is Facilities Engineering Services Section, Engineering department;
- “Customer” is the Fermilab group that tasked FESS/E to develop the design and construction documents.
- “SPOC” is the Single Point Of Contact.
- “Building modifications” are defined as any modification which modifies any structural element of the building, adds or removes additional interior walls, or modifies any of the existing high voltage electrical, HVAC, fire protection, sanitary sewer, potable water, or industrial water services.
- “Construction” is any combination of engineering, procurement, erection, installation, assembly, or fabrication activities involved in creating a new facility or altering, adding to, or rehabilitating an existing facility. It also includes the alternation and repair (including dredging, excavating and painting) of buildings, structures, or other real property, as well as any construction & excavation activities conducted as part of environmental remediation efforts.

II Responsibilities

The following responsibilities have been identified:

Division/Section/Center Head

- Appoint a Single Point of Contact (SPOC);

Division/Section/Center (D/S/C) SPOC

The Single Point Of Contact within each D/S/CC will be responsible for the following:

- Control distribution of documents to be reviewed within each Division/Section;

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- Ensure that the documents to be reviewed are routed to the correct groups or individuals within the Division/Section/ Center;
- Review the documents to determine the appropriate internal Division/Section/ Center routing, considering the specific Division/Section/ Center requirements to ensure that the appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements in the design is acceptable.
- Ensure that internal D/S/C comments are reviewed for appropriateness and internal conflict resolution prior to being entered into the comment database;
- Coordinate submission of review comments into the review database.

FESS/E Project Engineer

- Establishing the number and type of reviews based on the project requirements and the Fermilab Engineering Manual Risk Assessment Worksheet;
- Establishing distribution list;
- Coordinate the development of the distribution cover sheet;
- Coordinate the establishment of an electronic file;
- Initiate a review notification;
- Coordinate the response to comments received.

FESS Engineering Head

- Maintain Standard Distribution Templates;
- Maintain current CCR_List

FESS Site Services

- Maintain FESS/Engineering Comment and Compliance Review database and revise as necessary

III Procedure

1.0 Establish Review Criteria

The review criteria will be tailored to each specific project and be driven by the project requirements and the Engineering Risk Assessment Worksheet of the Fermilab Engineering Manual. Listed below are general guidelines for reviews:

1.1 Review Types

Reviews commonly used are listed below

1.1.1 A Comment and Compliance Review (CCR) is used to determine the appropriateness of 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 of the authority having jurisdiction.

1.1.2 Other reviews, driven by project specific requirements and outcome of the Engineering Risk Assessment may be undertaken. The type, distribution and length of these reviews should be based on the project specific requirements and the Fermilab Engineering Manual.

1.2 Number of Reviews

At least one (1) CCR is generally required for each phase of the project. For example, a General Plant Project (GPP) usually has a review during the Conceptual Design phase

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and another during the Final Design Phase. One (1) CCR may be appropriate for smaller scale projects. In the event that a project is not subject to a CCR, documentation should be included in the project file noting the circumstances surrounding this decision.

1.3 Review Timing

The review should occur when a project is sufficiently developed to a point where reviewers are able to determine the impacts on existing systems and operations.

1.4 Review Length

In general, a CCR is ten (10) working days in duration. In the event that a shorter time is provided by project driven requirements, documentation should be included in the project file noting the circumstances surrounding this decision.

2.0 Distribute Review Documents

In general, review documents are distributed, reviewed and commented upon electronically. A standard review list of SPOCS and required recipients is maintained as a Listserv by (an) appointee(s) of the FESS Engineering Department. The listing of the members of the current Listserv **FESS_CCR** is located on the FESS Engineering file server at Shared Files/CCR Listserv.

2.1 Standard Distribution List (FESS_CCR)

The distribution list for reviews should contain, as a minimum, the following:

- 2.1.1 FESS/Engineering
FESS/E Quality Control Representative
Project Engineers
- 2.1.2 FESS
Section Head
Department Heads
Senior Safety Officer
Budget Officer
Site Services Head
Facilities Management Head
Logistics and Property Control Head
Wilson Hall Building Manager
- 2.1.3 Accelerator Division
Division Head
Deputy Head
Operations Department Head
Senior Safety Officer
Radiation Safety Officer
- 2.1.4 Single Point of Contact
Computing Division
ES&H Section
Workforce Development and Resources Section
Particle Physics Division
Technical Division

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Directorate Chief Operating Officer

- 2.1.5 Integrated Project Team (not included in **FESS_CCR** – should be addressed separately)
Customer Contact
Project Engineer/Project Manager
Project Coordinator
FS/Procurement

2.2 Create Electronic File

The electronic review files should consist of the documents to be reviewed and the distribution cover sheet in an Adobe pdf format. These documents will be uploaded for review in the FESS/Engineering Comment and Compliance Review database.

2.3 Issue Review Notification

Electronic notification of a review should be issued via the FESS/Engineering Comment and Compliance Review database and should contain, as a minimum, the following information

- Project Name;
- FESS/E Project Number;
- FESS/E Contact;
- Review Start Date;
- Review End Date;
- Project Description;
- List of Review Documents.

3.0 Comment Collection

Comments that result from reviews are entered by the reviewer into the review database.

3.1 The comment form will contain, as a minimum, the following information

- Reviewer Name;
- Comment Date;
- FESS/E Project Number;
- Drawing or Specification Reference;
- Comment.

3.2 Reviewers are encouraged to enter “No Comment” in the database for projects reviewed without any exception taken in order to document the review process.

4.0 Comment Response

The integrated project team will respond to comments entered into the review database.

5.0 Issue Construction Phase Notification

When a project is sent out for proposals during the construction phase notification is sent to the distribution list that received the reviews. This notification is performed via e-mail and is shown in Appendix 3.0.

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IV **References**

The following references have been identified:

- FESS/Engineering Policy FEP 9, Consultant Support
- Fermilab Engineering Manual

V **Revision History**

Version Number	Date	Author	Change Summary
0	04/15/2008	S. Dixon	Initial Release
1	12/15/2011	R. Alber	Triennial Review
2	04/15/2015	R. Alber	Triennial Review
3	10/11/2016	R. Alber	Revised to incorporate the FESS/Engineering Comment and Compliance Review Database

VI **Other**

- 1.0 Example of Review Notification Form
- 2.0 Example of Notification Email
- 3.0 Example of Comment Form
- 4.0 Example of Proposal Notification Form
- 5.0 Example of Engineering Risk Assessment Worksheet

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1.0 – Example of Review Initiation Form

FESS/Engineering Comment and Compliance Review

*Please ensure that your review included a review of the project for appropriateness of the proposed systems. Impacts on existing systems and operations and specific technical requirements to be incorporated into the design. (Note that * indicates a required field)*

Successfully Authenticated

Project Information

Date:

*Project/Activity Title:

*Project Number/Identifier:

*Project Engineer (Fermi ID):

Project Description

Please describe the scope of the project including project location. Upload site map, plans, specifications, cut sheets, photos, etc. below.

* Environmental Review Project ID:

[Browse or Generate Environmental Review](#)

Comment Close Date:

Copy List - List of Individuals to Copy

Add to Copy List:

Name	Link
No Individuals on CC List	

Add Link Attachment

Attachments

Link Attachment

Add attachment name and link

Link Name:

Attachment Link:

Add File Attachment

Attached Links and Documents

Name	Link
No Linked Attachments	

File Name	Content Type	Size(bytes)	Action
No Attachments Found			

Successfully Authenticated

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2.0 – Example of Notification Email



FESS Engineering Comment and Compliance Review

Please review the referenced information for appropriateness of 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 of authority having jurisdiction.

Utilities Upgrade Project

FESS/Engineering Project No. 3-5-163K

Review Start Date: 08/19/2016
Comments Due Date: 09/02/2016
Contact: 12699N

Description:

New ICW System and Electrical Substation Building

The FESS Environmental Review Form can be found at:

[\\${erfLink}](#)

Comments:

Please enter comments in the Review Comment Database. The link is below:

[Utilities Upgrade Project](#). Once it has been approved then it become searchable and it will appear in the form listing.

Please note that the form cannot be modified until it is approved, and you will need to log into the application in order to modify the form.

This message has been sent from the Engineering Comment and Compliance Review application, if you believe that this message was sent in error, please send mail to the application administrator using: fess-it@fnal.gov

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3.0 – Example of Comment Form

FESS/Engineering Comment and Compliance Review

Please ensure that your review included a review of the project for appropriateness of the proposed systems. Impacts on existing systems and operators and specific technical requirements to be incorporated into the design.
(Note that * indicates a required field)

Successfully Authenticated

Project Information

Date: 09/19/2016

*Project/Activity Title: Utilities Upgrade Project

*Project Number/Identifier: 3-5-163K

*Project Engineer (Fermilab ID): 12699N - Russell Alber

Project Description

Please describe the scope of the project including project location. Upload site map plans, specifications, cut sheets, photos, etc. below.

New ICW System and Electrical Substation Building

* Environmental Review Project ID: 3-5-163 - UTILITIES UPGRADE PROJECT

Comment Close Date: 09/02/2016

Project Comments

Expand row to see any comment responses. Those line items in ORANGE indicate there was a response.

Comment Date	Type	Commenter	Comment	Action
No Project Comments				

Enter new comment text

Submit Comment

Copy List - List of Individuals to Copy

Add to Copy List: Enter FERMI ID, or type LAST NAME or FERMI ID and then choose from drop-down list that appears below

Submit CC

Name
No Individuals on CC List

Add Link Attachment

Attachments

Link Attachment

Add attachment name and link

Link Name: Provide a name for the link

Attachment Link: Example: http://www.fnal.gov

Add

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4.0 – Example of Proposal Notification Form

From: owner-fess_ccr@listserv.fnal.gov on behalf of Odarka A Jurkiw <ojurkiw@fnal.gov>
Sent: Thursday, April 09, 2015 2:08 PM
To: fess_ccr
Cc: Tom Powers; Joseph T Pathiyil; Daniel A Wolff; Steven L Hays; Ryan A. Crawford
Subject: Issued for Proposals - Utilities Upgrade Project – High Voltage Electrical Work

Issued for Proposals

The following project has been forwarded to the Finance Section/Procurement Department for procurement activities. This serves as notification only. No action is required.

Utilities Upgrade Project – High Voltage Electrical Work FESS/Engineering Project No. 3-5-163G/H/I

****Please note – This is a sub-project of the Utilities Upgrade Project.**

Contact: Randy Wielgos, FESS Engineering (x4720, rwielgos@fnal.gov)

Comment & Compliance Review: Concurrent – Comments Due April 23, 2015
DP-18: Completed, April 9, 2015

Description:

Construction and installation of a new Master Substation switchgear/control building, installation of a new 345KV gas circuit breaker and the replacement of the 13.8 KV oil distribution switches.

Files:

An electronic version of the files can be found at:

<ftp://fess-ftp.fnal.gov/public/Projects/UUP/95%25%20Drawings%20Addendum%20A%20Exhibit%20A/LDP>

(this site is available from both on-site and offsite locations)

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5.0 - Example of Engineering Risk Assessment Worksheet

Engineering Risk Assessment

Interpreting the Graded Approach Worksheet

The purpose of this chapter is to define a risk-based graded approach for use in engineering projects. This process helps the lead engineer and department head evaluate project risks and determine the appropriate level of documentation and review a project needs. The project manager may add additional requirements, as defined in **Chapter 1: Requirements and Specifications**.

The lead engineer and department head complete the graded approach worksheet as part of the specification process. Completion of the graded approach worksheet is a way to quantify project risk early in a project. If a project carries a high level of risk, the engineer needs to complete further risk analysis based on guidelines from other governing organizations.

Definitions

Graded Approach: *A graded approach uses a list of factors to establish the appropriate level of formality a project requires.*

Risk-Based Graded Approach: *A risk-based graded approach evaluates the level of risk in various risk elements in order to establish the appropriate level of controls a project requires.*

Risk Element: *A risk element is an aspect of a project that could prevent its successful completion, without appropriate control measures.*

Risk Assessment

The Engineering Policy Manual Team has identified 15 potential risk elements to evaluate for each project.

The department head and lead engineer determine the level of risk for each element and document it using the graded approach worksheet. The department head and lead engineer can use the guidelines in this chapter to determine the overall level of risk and to highlight high-risk categories. This risk assessment applies to the engineering subproject at hand, not the overall project. A subproject is a self-contained engineering task, component or system that generally falls under the responsibility of a single department. Subprojects do not take on the risk level of the larger project.

The engineer should record, in Tables 1 and 2 below, risk assessment integer values between 1 and 5, as follows:

1 low risk

2 low to medium risk

3 medium risk

4 medium to high risk

5 high risk

Definitions of the risk levels are given below with criteria for risk levels 1, 3 and 5. Levels 2 and 4 are implied to fall between those provided.

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Interpreting the Graded Approach Worksheet

The lead engineer fills out an engineering and project risk element table for his or her project or subproject. If the project or subproject has a risk score of 5 in any engineering risk element (A - G), it requires formal control as described within the Engineering Manual chapters indicated in the table below. If the subtotal of the risk scores for the elements related to one chapter is higher than the high risk score indicated in the table below, the topic covered in that chapter requires formal control. If the project or subproject has a risk score of 5 in any project risk element (A - O), or the project management risk (H - O) subtotal is 25, notify the project manager. The project manager may choose to elevate formal control requirements to address elevated project management risk (H - O).

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Engineering Risk Assessment

Project: Liquid Argon Test Facility (LArTF)
Lead Engineer: C. Federowicz
Department: FESS/Engineering
Date: July 28, 2011

Chapter	Engineering Risk Element							High Risk	Subtotal	Assessment
	A	B	C	D	E	F	G			
1 Requirements and Specifications	1	2				2		≥ 10	5	Standard Risk
3 Requirements and Specification Review	1	2		2	1	2		≥ 16	8	Standard Risk
4 System Design	1	2	2		1	2	1	≥ 19	9	Standard Risk
5 Engineering Design Review	1	2	2		1	2	1	≥ 19	9	Standard Risk
6 Procurement and Implementation		2		2	1	2	1	≥ 16	8	Standard Risk
7 Testing and Validation	1				1	2	1	≥ 13	5	Standard Risk
8 Release to Operations						2		≥ 4	2	Standard Risk
9 Final Documentation		2				2		≥ 7	4	Standard Risk

Project Risk Element								High Risk	Subtotal	Assessment
H	I	J	K	L	M	N	O			
3	2	1	2	1	3	1	2	≥ 25	15	Standard Risk

Engineering Risk Elements	
A	Technology
B	Environmental Impact
C	Vendor Issues
D	Resource Availability
E	Safety
F	Quality Requirements
G	Manufacturing Complexity

Project Risk Elements	
H	Schedule
I	Interfaces
J	Experience / Capability
K	Regulatory Requirements
L	Project Funding
M	Project Reporting Requirements
N	Public Impact
O	Project Cost

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Engineering Risk Assessment

Project: Liquid Argon Test Facility (LARTF)
Lead Engineer: C. Federowicz
Department: FESS/Engineering
Date: July 28, 2011

Technology

This defines the degree of technical complexity the Lead Engineer or engineering team will face in executing the project.

- 1 The project will use off-the-shelf technology.
- 3 Engineers will purchase and modify off-the-shelf technology.
- 5 The project will require the development of new technology.

Score	
1 - Low Risk	1

Environmental Impact

This defines the potential level of environmental impact.

- 1 There will be no environmental impact.
- 3 The project may have some environmental impact but will not require an environmental assessment, as determined by FESHM.
- 5 The project will require an environmental impact statement.

2 - Low to Medium Risk	2
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Vendor Issues

This defines the degree of complexity to be expected with vendors. Complicating factors may include long-lead-time items and issues with vendor qualification and reliability.

- 1 Vendors could cause minor issues.
- 3 Vendors could cause manageable complications.
- 5 Vendor issues could result in significant schedule delays or cost overruns or could otherwise jeopardize the successful completion of the project.

2 - Low to Medium Risk	2
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Resource Availability

This defines the availability of internal and external resources to plan and execute the project.

- 1 Resources will be readily available.
- 3 Resources could be somewhat restricted.
- 5 The difficulty of obtaining resources puts the project schedule at high risk.

2 - Low to Medium Risk	2
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Quality Requirements

This determines the effort required to achieve the quality level the customer assigns to the final product.

- 1 The quality requirements can be met easily with existing infrastructure.
- 3 The quality requirements are challenging but can be met with existing infrastructure.
- 5 The quality requirements are beyond the capability of existing infrastructure.

1 - Low Risk	1
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Safety

This defines the safety issues the project team will encounter while completing the project.

2 - Low to Medium Risk	2
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- 1 The project will require standard safety considerations.
- 3 The project will require increased diligence due to its location, the configuration of the product or the type of work required. This includes work requiring review according to FESHM.
- 5 The project will require very restrictive safety considerations. This includes work requiring review and personnel safety systems.

Manufacturing Complexity

1 - Low Risk	1
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This defines the degree of complexity to be expected when combining the elements of technology, operations and schedule in product manufacturing.

- 1 The manufacturing processes will be routine.
- 3 The project will require an existing technology that the manufacturer has not previously used.
- 5 The project will require new or complex manufacturing methods.

Schedule

3 - Medium Risk	3
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This defines how much time the Lead Engineer or engineering team will have to complete the schedule.

- 1 Time will be unlimited.
- 3 The schedule will be somewhat constrained.
- 5 The subproject will be on the overall project critical path and has no schedule contingency.

Interfaces

2 - Low to Medium Risk	2
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This defines the risk associated with the complexity of integrating multiple subprojects.

- 1 One department at Fermilab will be involved with a standalone project.
- 3 Project success depends upon contributions from multiple departments at Fermilab.
- 5 Project success depends upon contributions from multiple institutions.

Experience/Capability

1 - Low Risk	1
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This defines the level of experience and capability project team members will have.

- 1 Only experts will participate.
- 3 A blend of experts and inexperienced personnel will participate.
- 5 Only inexperienced personnel will participate.

Regulatory Requirements

2 - Low to Medium Risk	2
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This identifies the degree to which oversight by governmental or other regulatory agencies will impact the project.

- 1 Regulatory agencies will have minor to no involvement.
- 3 The Department of Energy, DOE, will have direct regulatory involvement.
- 5 DOE, as well as state or federal government, will have regulatory involvement.

Project Funding

1 - Low Risk	1
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This defines the availability and approval status of project planning and execution funds.

- 1 A single source within Fermilab will fund the project.
- 3 A source outside of Fermilab will fund the project.
- 5 Multiple sources outside of Fermilab will fund the project.

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Project Reporting Requirements

3 - Medium Risk	3
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This indicates the level of reporting to the senior management the project requires.

- 1 Reports to senior management about the project will not be required.
- 3 The project will require quarterly performance reports.
- 5 The project will be highly visible. Top management or outside agencies will schedule visits and issue monthly performance reports.

Public Impact

1 - Low Risk	1
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This indicates how much the project will affect the public or public opinion.

- 1 The public will not be affected.
- 3 The public may be somewhat affected and should be informed with news releases.
- 5 The project may have an impact on the public. The public should be involved through public forums and may participate in advisory councils.

Project Cost

2 - Low to Medium Risk	2
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This defines how much the project is projected to cost.

- 1 The project will be within the department operating budget.
- 3 The project will require divisional budget planning.
- 5 The project will require laboratory or DOE budget tracking and reporting.