

CONDUCTING THE JOB / TASK ANALYSIS

Electrical Systems and Safety Oversight

Step 1 Identify and evaluate tasks

- Develop a comprehensive list of tasks that define the job.
 - o A great starting point is the list of Duties and Responsibilities from the FAQs.
 - o Give careful thought to additional tasks that could be considered.
 - o Don't worry about deleting tasks at this point – that is a part of the process further down.
- List the tasks (and their sources, e.g., Duties and Responsibilities #1) in the chart below.
- Discuss each task as a group and come to a consensus pertaining to Importance and Frequency of the task (i.e., each team member can consent to the assigned value, even if they don't exactly agree with it).
- When all values have been assigned, consider as a group deleting tasks that receive low scores for Importance.

Job Analysis Worksheet for Tasks

Task	Source	Importance	Frequency
A. Oversee the contractor's electrical work activities and programs.	FAQS Duties and Responsibilities	4	3
B. Identify electrical problem and analyze trends; identify and classify electrical hazards; implement appropriate codes and standards [Occupational Safety and Health Administration (OSHA); National Electrical Code (NEC); National Fire Protection Association (NFPA) 70-series; Institute of Electrical and Electronics Engineers (IEEE), including the C-2 National Electrical Safety Code (NESC); DOE-HDBK-1092-2004, <i>Electrical Safety Handbook</i> ; etc.]; oversee electrical inspection programs and electrical safety and system assessment programs; and oversee electrical safety, operational systems and facilities.	FAQS Duties and Responsibilities	4	2
C. Review the management and oversight of the design and construction process.	FAQS Duties and Responsibilities	4	1
D. Review and provide oversight of the electrical equipment maintenance management (safety & systems) program.	FAQS Duties and Responsibilities	4	2
E. Maintain and update knowledge and skills in electrical codes and technology as	FAQS Duties and	4	1

used at a given site. Site-specific electrical codes are normally defined in the contract(s).	Responsibilities		
F. Prepare and review contracting mechanisms (cost plus award fee, cost plus fixed fee, etc.), contractor performance evaluations, contract specifications, etc.	FAQS Duties and Responsibilities	2	1
G. Serve as a subject matter expert and technical resource for electrical personnel in training and other technical matters.	FAQS Duties and Responsibilities	4	2
H. Inspect/evaluate electrical systems for safe and efficient operation, maintenance, and testing.	FAQS Duties and Responsibilities	4	3
I. Conduct/perform accident investigations, root cause analysis, and problem-solving activities.	FAQS Duties and Responsibilities	3	1
J. Participate in establishing and/or reviewing DOE electrical policy (as defined by applicable codes, standards, and Orders) and requirements.	FAQS Duties and Responsibilities	2	1
K. Evaluate contractor compliance with relevant DOE Orders, standards, codes, Management and Operating (M&O) contractor maintenance procedures, etc.	FAQS Duties and Responsibilities	3	3
L. Evaluate electrical programs/operations/safety.	FAQS Duties and Responsibilities	5	3
M. Review safety documentation.	FAQS Duties and Responsibilities	4	2
N. Verify the application of quality assurance principles to electrical systems and safety.	FAQS Duties and Responsibilities	3	1
O. Verify that safety documentation and design documentation are coordinated.	FAQS Duties and Responsibilities	3	2

Importance Scale	Frequency
How important is this task to the job?	How often is the task performed?
0 = Not Performed	0 = Not Performed
1 = Not Important	1 = Every few months to yearly
2 = Somewhat Important	2 = Every few weeks to monthly
3 = Important	3 = Every few days to weekly
4 = Very Important	4 = Every few hours to daily

5 = Extremely Important	5 = Hourly to many times each hour
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Step 2 Identify and evaluate competencies

A competency is a measurable pattern of knowledge, skills, abilities, behaviors and other characteristics that an individual needs in order to perform work roles or occupational functions successfully.

- Identify the competencies directly related to performance on the job.
- Discuss each competency as a group and come to a consensus pertaining to Importance and When Needed for the competency. (The “When Needed” column is typically used in the hiring process and may be deleted for the purposes of this JTA.)
- When all values have been assigned, consider as a group deleting tasks that receive low scores for Importance.

Job Analysis Worksheet for Competencies

Competency	Source	Importance
Electrical personnel shall demonstrate a working level knowledge of electrical and circuit theory, theorems, terminology, laws, and analysis.	FAQS Comp #1	5
Electrical personnel shall demonstrate a working level knowledge of basic AC theory.	FAQS Comp #2	5
Electrical personnel shall demonstrate a working level knowledge of the construction and operation of AC generators (such as operating characteristics, method of torque production, and the advantages of specific motor types).	FAQS Comp #3	3
Electrical personnel shall demonstrate a working level knowledge of the construction and operation of AC motors (such as operating characteristics, method of torque production, and the advantages of specific motor types).	FAQS Comp #4	3
Electrical personnel shall demonstrate a working level knowledge of AC reactive components, including inductive and capacitive reactance and phase relationships in reactive circuits.	FAQS Comp #5	4
Electrical personnel shall demonstrate a working level knowledge of electrical transmission and distribution systems (IEEE Brown Book; reference IEEE Std-399).	FAQS Comp #6	3
Electrical personnel shall demonstrate a working level knowledge of transformers.	FAQS Comp #7	5
Electrical personnel shall demonstrate a working level knowledge of Uninterruptible Power Supplies (UPS).	FAQS Comp #8	3

Competency	Source	Importance
Electrical personnel shall demonstrate a working level knowledge of Variable Frequency (speed) Drives (VFDs).	FAQS Comp #9	2
Electrical personnel shall demonstrate a working level knowledge of electrical test instruments and measuring devices.	FAQS Comp #10	3
Electrical personnel shall demonstrate a familiarity level knowledge of the principles and concepts of natural phenomena hazards such as static electricity (NFPA 77) and their effects on personnel and electrical systems.	FAQS Comp #11	3
Electrical personnel shall demonstrate a working level knowledge of DC generators.	FAQS Comp #12	3
Electrical personnel shall demonstrate a working level knowledge of DC motors.	FAQS Comp #13	3
Electrical personnel shall demonstrate a working level knowledge of battery construction, voltage production, and hazards (IEEE Std-450, etc.).	FAQS Comp #14	4
Electrical personnel shall demonstrate a working level knowledge of surveillance and assessment techniques, reporting, and follow up actions for electrical systems and programmatic elements of an electrical safety program, such as management systems, problem remediation and trends processes, inspection programs, training and qualification programs, and oversight of contractor assurance systems.	FAQS Comp #15	5
Electrical personnel shall demonstrate the ability to communicate technical issues (both orally and written) when working or interacting with the contractor, stakeholders, and other internal and external organizations.	FAQS Comp #16	5
Electrical personnel shall demonstrate a familiarity level knowledge with the Environmental Safety and Health (ES&H) reporting requirements as noted in DOE M 231.1-1A, Environment, Safety and Health Reporting Manual.	FAQS Comp #17	3
Electrical personnel shall demonstrate a working level knowledge of problem analysis principles and the ability to apply the techniques necessary to identify problems, determine potential causes of problems, and identify corrective action(s).	FAQS Comp #18	4
Electrical personnel shall demonstrate the ability to perform electrical safety and system walkdowns, and observe and report nonconformance to OSHA 29 CFR 1910, 29 CFR 1926, NFPA-70 (National Electrical Code), NFPA-70E, and IEEE C2- NESC.	FAQS Comp #19	4

Competency	Source	Importance
Electrical personnel shall demonstrate a working level knowledge of how electrical hazards are addressed via the Integrated Safety Management System (ISMS) process, including applicable site contractor(s) job planning (job hazard analysis and identification and integration of hazard controls within work package) and application of hazard controls during the work control process.	FAQS Comp #20	4
Electrical personnel shall demonstrate a working level knowledge of 29 CFR 1910. 331-335; 29 CFR 1910.269; and NFPA 70E, Article 110, Electrical Safety-Related Work Practices.	FAQS Comp #21	5
Electrical personnel shall demonstrate a working level knowledge of the site contractor’s procedure/work control program, how electrical work performed by the site contractor is within planned controls, and the specific work control requirements for each job observed. The level of rigor of these jobs should allow the candidate to review the functional areas, requirements, and workscope for compliance with 29 CFR 1910, 29 CFR 1926, and NFPA 70E.	FAQS Comp #22	4
From the jobs observed in Competency 22 above, electrical personnel shall demonstrate the ability to assess how well contractor management systems (lessons learned and other feedback processes) are integrated with the work planning and ISMS process and how lessons learned are addressed by each contractor’s ISMS feedback process (DOE P 450.4, Safety Management System Policy).	FAQS Comp #23	3
Electrical personnel shall demonstrate a working level knowledge of 29 CFR 1910; 29 CFR 1926; and NFPA 70E, Article 420 requirements.	FAQS Comp #24	4
Electrical personnel shall demonstrate a working level knowledge of the safety requirements in DOE-HDBK-1092-2004, Electrical Safety Handbook.	FAQS Comp #25	3
Electrical personnel shall demonstrate a working level knowledge of the requirements related to safe work practices for laser operations (NFPA 70E, Chapter 3, etc.).	FAQS Comp #26	3
Electrical personnel shall demonstrate a familiarity level knowledge of the DOE maintenance management requirements as defined in DOE O 433.1A, Maintenance Management Program for DOE Nuclear Facilities, and DOE Guide 433.1-1, Nuclear Facility Maintenance Management Program Guide for Use with DOE O 433.1 (IEEE Yellow Book; reference IEEE Std-902).	FAQS Comp #27	4

Competency	Source	Importance
Electrical personnel shall demonstrate a familiarity level knowledge of the safety requirements for electrical equipment maintenance as defined by NFPA 70B, manufactures requirements, American Society for Testing and Materials (ASTM), ANSI, etc.	FAQS Comp #28	4
Electrical personnel shall demonstrate a familiarity level knowledge of safety-related maintenance requirements as defined in 29 CFR 1910.269 and NFPA 70E, Chapter 2.	FAQS Comp #29	4
Electrical personnel shall demonstrate a working level knowledge of the current National Electrical Code and the requirements for wiring design and protection (NFPA 70 and NFPA 70E, Chapter 4).	FAQS Comp #30	5
Electrical personnel shall demonstrate a familiarity level knowledge with the requirements for the installation of lightning protection systems (NFPA 780; UL 96, Lightning Protection Components; and UL 96A, Installation Requirements for Lightning Protection Systems).	FAQS Comp #31	3
Electrical personnel shall demonstrate a working level knowledge of electrical diagrams, such as one-line diagrams, schematics, construction drawings, as-built drawings, and wiring diagrams.	FAQS Comp #32	5
Electrical personnel shall demonstrate a familiarity level knowledge of the configuration management process as applied to electrical documentation (e.g., documenting, controlling, revising, and issuance of electrical drawings) and drawings that are updated and issued “as built” (DOE-STD-1073-2003, Configuration Management Program and DOE O 414.1C, Quality Assurance).	FAQS Comp #33	5
Electrical personnel shall demonstrate a familiarity level knowledge with battery installations, maintenance, testing, and replacement as described in NFPA 70E, Chapter 3; IEEE Std-450; IEEE C2 - NESC; manufactures recommendations; etc.	FAQS Comp #34	3
Electrical personnel shall demonstrate a familiarity level knowledge with ventilation and battery room requirements as cited in 29 CFR 1910; 29 CFR 1926; NFPA 70E, Chapter 3; IEEE Std-450; IEEE C2 – NESC; etc.	FAQS Comp #35	3
<p data-bbox="185 1629 987 1814">Mandatory Performance Activity: Electrical personnel shall demonstrate a familiarity level of knowledge of 10 CFR 830, Nuclear Safety Management, and DOE O 414.1C as related to electrical safety programs, processes, and systems, to include:</p> <ul data-bbox="185 1814 987 1900" style="list-style-type: none"> <li data-bbox="185 1814 987 1900">• Knowledge of site VSS interfaces for electrical, software, and instrument and control systems (complete 	FAQS Comp #36	3

Competency	Source	Importance
<p>competency 38);</p> <ul style="list-style-type: none"> • The basic purpose of the Unreviewed Safety Question (USQ) process; • General purpose and constitution of the DSA; • Purpose and content of Technical Safety Requirements (TSR) documentation. • Review and evaluate a USQ determination, including walking down the proposed change/potential inadequacy with the cognizant contractor electrical VSS system engineer or DOE Facility Representative (FR). • Review and evaluate an authorization agreement, and then discuss TSRs (and/or other controls) with the cognizant contractor electrical VSS system engineer. • Review and evaluate a Safety Evaluation Report (SER) and discuss with the cognizant contractor electrical VSS system engineer. • Walkdown a facility with Safety System Oversight (SSO) person, safety analyst, or cognizant contractor electrical VSS engineer and identifying the safety controls contained in a TSR. • Complete a review of a hazard analysis or accident analysis, including walking down the scope of work area or accident scenario with the cognizant contractor electrical VSS system engineer or DOE FR. 		
<p>Electrical personnel shall demonstrate a familiarity level knowledge of all assigned electrical power VSS and how they are addressed during the design, construction, and operation of nuclear facilities.</p>	FAQS Comp #37	5
<p>Electrical personnel shall demonstrate a familiarly level knowledge of the possible functional interfaces/relationships between all electrical VSS and instrument and control safety software, analysis safety software, and design safety software.</p>	FAQS Comp #38	3
<p>Mandatory Performance Activity: Electrical personnel shall demonstrate the ability to perform a quarterly walkthrough, bi-annual status walkthrough, or an assessment and generate a report identifying observations and/or findings.</p>	FAQS Comp #39	4
<p>During a walkthrough of assigned electrical VSS, the electrical personnel shall demonstrate a familiarity level knowledge of functional classifications for safety systems and the design expectations associated with all assigned electrical systems that carry these functional classifications, as described in DOE O 420.1B, Facility Safety, and its associated guide DOE G 420.1-1.</p>	FAQS Comp #40	4

Competency	Source	Importance
Electrical personnel shall demonstrate a familiarity level knowledge of electrical safety systems criteria for VSS (IEEE Stds-308-2001, 323-2003, 379-2000, 384-1992, and 603-1998; DOE O 420.1B; DOE G 420.1-1; etc.)	FAQS Comp #41	4
Electrical personnel shall demonstrate a familiarity level knowledge of electrical safety design requirements for emergency, standby, and UPS systems for VSS (IEEE Stds-387-1984, 650-1990, and 944-1986; DOE O 420.1B; DOE G 420.1-1; etc.).	FAQS Comp #42	5
Electrical personnel shall demonstrate a familiarity level knowledge of electrical safety design requirements for VSS accident monitoring instrumentation (IEEE Std-497-2002, DOE O 420.1B, DOE G 420.1-1, etc.).	FAQS Comp #43	4
Electrical personnel shall demonstrate a familiarity level knowledge of electrical safety design requirements for VSS Motor Control Centers (MCC) (IEEE Std-649-1991, DOE O 420.1B, DOE G 420.1-1, etc.).	FAQS Comp #44	3
Electrical personnel shall demonstrate a familiarity level knowledge of electrical safety design requirements for digital computers supporting VSS (IEEE Std-7-4.3.2-2003, Annex E; DOE O 420.1B; DOE G 420.1-1; etc.).	FAQS Comp #45	3
Electrical personnel shall demonstrate a familiarity level knowledge of electrical safety design requirements for VSS protection systems (IEEE Stds-741-1997 and 833-1988, DOE O 420.1B, DOE G 420.1-1, etc.).	FAQS Comp #46	4
Electrical personnel shall demonstrate a familiarity level knowledge of electrical safety design requirements for Instrumentation and Control (I&C) equipment grounding of VSS (IEEE Std-1050-1996, DOE O 420.1B, DOE G 420.1-1, etc.).	FAQS Comp #47	4
Electrical personnel shall demonstrate a familiarity level knowledge of electrical safety design requirements for VSS Motor Operated Valves (MOV) (IEEE Stds-1290-1996, DOE O 420.1B, DOE G 420.1-1, etc.).	FAQS Comp #48	4
Electrical personnel shall demonstrate a familiarity level knowledge of electrical safety requirements and practices in the following list of regulatory and consensus standards documents, including the relationship between these documents and which are “enforceable” in your site’s contractors contract such as OSHA (29 CFR 1910 and Subpart S, and 29 CFR 1926 Subparts K and V); NFPA 70E, Standard for Electrical Safety in the Workplace/Maintenance; NFPA-70B, Recommended Practice of Electrical Equipment Maintenance; DOE-	FAQS Comp #49	5

Competency	Source	Importance
HDBK-1092-2004, Electrical Safety Handbook; and 10 CFR 851, Worker Safety and Health Program.		
Electrical personnel shall demonstrate a familiarity level knowledge of DOE O 414.1C, Quality Assurance, as it pertains to electrical systems.	FAQS Comp #50	3
Electrical personnel shall demonstrate a familiarity level of knowledge of DOE O 430.1B, Real Property Asset Management, with regard to life cycle asset management.	FAQS Comp #51	3

Importance Scale	When Needed Scale
How important is this competency for effective job performance?	When is this competency needed for effective job performance?
1 = Not Important	1 = Needed the first day
2 = Somewhat Important	2 = Must be acquired within the first 3 months
3 = Important	3 = Must be acquired within the first 4-6 months
4 = Very Important	4 = Must be acquired within the first 12 months
5 = Extremely Important	5 = Must be acquired prior to qualification

Step 3 Evaluate linkages between tasks and competencies

This step demonstrates that there is a clear relationship between the tasks performed on the job and the competencies required to perform the tasks.

- Evaluate each competency for its importance in effective performance of each task.
- When finished, verify that each competency is important to the performance of at least one task.

Job Analysis Worksheet For Task And Competency Linkage

Task Letter	Competency Number											
	1	2	3	4	5	6	7	8	9	10	11	12
A	4	4	4	3	3	3	4	3	2	3	3	3
B	3	3	3	4	4	4	3	4	3	3	3	4
C	2	2	2	4	2	4	5	4	3	3	3	4
D	4	4	4	3	3	3	4	3	4	3	3	4
E	3	3	3	4	3	4	3	4	3	3	3	4
F	N/A	N/A	N/A	3	N/A	N/A	3	3	2	N/A	N/A	3
G	4	4	4	3	3	3	4	3	4	3	3	4
H	1	1	1	3	1	1	3	3	2	1	1	3
I	1	1	1	3	1	1	3	3	2	1	1	3
J	4	4	4	4	3	3	4	3	4	3	3	4
K	3	3	3	4	3	4	5	4	3	3	3	4
L	2	2	3	4	3	3	5	4	3	3	3	4
M	1	1	1	3	1	1	3	3	2	4	4	3
N	1	3	1	3	1	1	4	3	2	2	4	3
O	1	1	3	3	1	4	4	3	2	2	4	3

Task Letter	Competency Number											
	13	14	15	16	17	18	19	20	21	22	23	24
A	3	3	5	5	3	4	5	5	5	5	5	5
B	3	3	5	5	4	4	5	4	5	5	5	5
C	3	3	5	5	4	4	5	4	5	5	5	5
D	4	4	5	5	4	4	5	4	5	5	5	5
E	2	2	5	5	5	4	5	4	4	3	3	5
F	2	2	3	3	5	4	5	4	4	4	3	5
G	3	3	5	5	4	4	5	4	5	5	5	5
H	4	4	5	5	4	4	5	4	5	3	3	5
I	2	2	4	4	4	5	5	5	4	5	5	4
J	4	4	4	4	4	3	4	5	5	4	4	5
K	2	2	4	4	4	5	5	5	4	5	5	4
L	2	2	5	5	4	5	5	4	4	5	4	4
M	2	2	5	5	5	4	3	4	5	5	5	5
N	1	2	4	3	2	2	3	3	2	2	2	4
O	1	1	3	3	4	4	4	3	4	2	4	5

Task Letter	Competency Number		
	49	50	51
A	5	4	3
B	5	4	3
C	4	4	3
D	4	4	3
E	5	4	3
F	3	3	3
G	5	3	1
H	5	3	N/A
I	5	3	N/A
J	5	3	2
K	5	3	2
L	5	2	N/A
M	5	3	1
N	4	5	N/A
O	4	5	2

Linkage Scale

How important is this competency for effective task performance?

1 = Not Important

2 = Somewhat Important

3 = Important

4 = Very Important

5 = Extremely Important

N/A = Not Applicable