Draft

ORNL WORK PLAN

Operations, Maintenance and Services

Work Plan Name / Rev: 047496 / 1

47496

WORK SCOPE/DESCRIPTION	
Requester (Name/Badge/Division):	Proffitt, Travis / 00955087 / X126
Location of work (Bldg/Rm/Other):	8912 / / Feeder 2044/SNS CUB
Work Plan Title:	XFMR Secondary Abscence of Voltage Verification

Description of Service/Work Needed:

Performance Of Absence of Voltage Verification following isolation of power XFMR with ARC Flash hazards in access of HRC4 at the XFMR secondary terminals. Scope of work to verify the absence of voltage at a distance that will be

within ratings of the Arc Flash protection available to the individual(s) before declaring an Electrically Safe Work Condition has been achieved.

Charge Number, if required:	3SNS00SB
Work Plan Grade/Worktype:	3 / 0
Author (Name/Badge):	Proffitt, Travis / 00955087

File Attachments:

Badge	Name	Attachment Desc	File Name
00955087	Proffitt, Travis	JHE	Job_Hazard_Evaluation_Power_Distribution_permit_Rev_2 .pdf

INSTRUCTIONS

Prerequisites/Precautions:

Conduct Pre Job Briefing

Isolate transformer secondary loads.

De-energize transformer with primary disconnect, verify physical (visible break) in transformer primary circuit.

Hang protection (PDWP) to control transformer primary and any potential sources of secondary back feed. (See UT-T-ELEC-002)

Consult Arc Flash Study for specific location to verify worker protection is achievable for distances published.

Provide at work location: non-contact voltage detector, Cat IV voltmeter, and 36” lead extensions.

Directions:

Establish Arc Flash Boundary based on postings and/or Arc Flash Study.

Review PDWP and isolation points.

Using PPE appropriate for location, verify functionality of Cat IV voltmeter on a live source.

Don 100cal flash suit and associated PPE.

Expose circuit conductors and/or buss work to be tested.

Using non-contact voltage detector, verify the absence of voltage on circuit parts to be accessed; including functional test of detector before and after use.

Using a minimum of 36” extension leads and a Cat IV voltmeter, test for the absence of voltage on the circuit parts to be accessed.

Using PPE appropriate for location, verify functionality of Cat IV voltmeter on a live source.

Declare achievement of Electrically Safe Work Condition, perform tasks as directed

Post Work Testing:

Closeout:

Return Work Package for proper closeout.

JOB HAZARD EVALUATION	
HAZARDS	PERMITS / CONTROLS
See Attached JHE for Hazard analysis	JHE-UT-T-ELEC-002

DOCUMENTATION REVIEW AUTHORIZATION (Approvals are certification of hazards assessment)		
Reviewer/Approver Roles	Signature	Date
Accountable Management (Service Provider, Line, Equipment Owner, or Facility Management)	Needham Jr, Bill K	
Author	Proffitt, Travis	
Division Electrical Safety Officer (DESO)	Needham Jr, Bill K	
IS/IH	Bush, Andrew	
Other Subject Matter Experts (SMEs)	Carlberg, Jon	
Task Leader	Jackson, Joe	
Work Package Concurrence		
Facility Manager		
Operations Supervisor		
Facility Manager Approval To Start Work		
Facility Manager		
Work Start Authorization		
Task Leader		
Work Acknowledged Complete		
Task Leader		

Worker Feedback:

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PRE-JOB SAFETY REVIEW GUIDE

ID: 47496

Scope of Work: Review work package/plan to ensure all participants understand the work activity.

Hazards: Review the hazards identified in Job Hazard Evaluation (JHE) / work plan (IOP).

- Since the work package / plan was written: 1) Have conditions changed? 2) Are there new hazards? Refer to Field Notes and Focus Areas.

Hazard Controls / Permits: Review:

- Written permits for the work activity.
- Precautions, step warnings, Hold Points ...
- Personal Protective Equipment (PPE)
- Work instructions for information - e.g., steps where hazards are introduced.
- ORNL subject area requirements - e.g., non-permit hazard controls.

Performing Work:

- Discuss group/individual responsibilities for safe & effective work.
- Follow work instructions & safety procedures.
- Availability/location of materials, tools, etc.
- Any previous experiences / lessons learned?
- Response if work cannot be performed as planned.
- What is the worst thing that could happen?
- Are there *Potential error traps* with the job? → →
- Take a minute before: work start & leaving work area.
- Work Hand-off / Turnover - workers & Task Leader

→ Potential Error Traps:

- Time pressures
- Distractive environment
- High workload
- First time evolution
- First day back
- Vague guidance
- Over confidence
- Imprecise communications
- Work stress

Abnormal Situation Response:

- *Stop Work*: Observe an unsafe act, activity or condition that creates an imminent danger.
- *Emergency Response*: Discuss egress paths or other responses if problems are encountered.

Field Notes and Focus Areas: (Use this area as a work space to record notes related to new hazards identified in the field or changed conditions. Record feedback in work package/plan information systems.)

By signing below, I am indicating that I have been briefed on the potential hazards associated with completing this job.

Signature / Badge	Date	Signature / Badge	Date

Oak Ridge National Laboratory
UT Battelle

JOB HAZARD EVALUATION/PPE HAZARD CERTIFICATION		Work Plan Number: UT-ELEC-002 Rev. 1	
FACILITY: ORNL	**PROCEDURE NAME** **Power Distribution Work Permit**	**ORIGINAL DATE:** 10/4/2013	**REVISED:** **1/6/2016**
Area: **ORNL**	**ORGANIZATION** Electrical Utilities	**PURPOSE** The purpose is to define the employee protection requirements and practices for isolation and tagging of transmission and distribution lines and associated equipment.	
ANALYSIS BY: Andrew Bush	**REVIEWED BY:** Jon Carlberg, Scott Harrison, and Travis Proffitt		

NOTE TO EMPLOYEES: CONDUCT A PRE-OPERATION SAFETY INSPECTION OF WORKSTATION, TOOLS, EQUIPMENT/MACHINERY, PPE AND WORK ENVIRONMENT BEFORE PERFORMING THE JOB! REPORT OBSERVED DEFICIENCIES IMMEDIATELY!

Task/Activity	POTENTIAL HAZARDS	PREVENTATIVE MEASURES
Installing and Working on Non-Energized Electrical Equipment • Installing conduit (bending, cutting, hanging, scraping) • Install light fixtures • Install, assemble and terminate of electrical equipment such as, but not limited to disconnects, switches, receptacles, electrical wires, breakers, etc. • Pulling cable and wires • Grounding of equipment • Cutting/drilling into concrete or metal • Cutting/drilling into electrical boxes, panels, etc	Interface with Subcontractors, vendors, etc.	• Follow F&O procedure F&O-ADM-022 when interfacing with subcontractors, vendors, etc. when over tagging high voltage (600V+) systems
	Head, Hand, Eye, & Foot injuries	• Follow all area postings • Staff shall wear safety glasses with side shields, gloves appropriate for task, and sturdy steel / composite toe footwear.
	Noise	• Wear hearing protection for areas posted as “High Noise Areas” • Follow the SBMS Subject Area Hearing Protection: for additional controls and as required training and medical requirements. • Exposure Assessment (Contact Health and Safety to determine if an exposure Assessment is needed).
	Ergonomic Conditions (Contact Stress, Vibration, Posture, Force, Repetitive Motion) (Shoveling)	• Exposure Assessment (Enter or attach: Justification to classify exposure scenario as low risk, qualitative exposure assessment (QEA) or requirement to conduct quantitative exposure monitoring (QEM). No exposure assessment is needed. Shoveling has no TLV and it is not continuous. • Diversify activities • Stretch breaks/exercises • Worker rotation • Refer to the SBMS document 'Ergonomics' and note controls applicable to the job at hand.

Task/Activity	POTENTIAL HAZARDS	PREVENTATIVE MEASURES
Installing and Working on Non-Energized Electrical Equipment	Vehicle/Pedestrian Traffic	• Set up pedestrian barriers and signs. • Place barriers and signage blocking crosswalks, sidewalks, etc • Place signage to show alternate route if possible. • Notify ORNL today of any sidewalk closures. • Notify LSS of road closures • Set up road closure barricades and signs as applicable • Use of flagmen to direct traffic • Flagmen shall use high visibility vests, flags or slow/stop paddles, safety glasses and be if there is more than one flagman, there should be a means of communication between the flagmen i.e. radio.
	Slips, trips, and falls	• Clean mud and grease from your boots before mounting equipment • Always use handholds and railings. • Always maintain "3-point" contact. • Do not try to climb while carrying tools. Use a bucket to raise • Watch for slippery or uneven ground when dismounting.
	Pinch Points	• Keep fingers clear of pinch points • Wear appropriate gloves (i.e. leather or cut-resistant)
	Temperature Extremes (Heat/Cold Stress)	• Exposure Assessment See Attachment.
	Insects, snakes, bees, spiders, etc	• Use insect repellant. • Do not attempt to catch or kill snakes. • Be aware of snake habitat, i.e., brush, logs, and rock outcroppings. • Do not stick hands under stored material • Use wasp and hornet spray for sting insects
	Radiological	• Follow all postings • Contact RADCON personnel • Follow RWP requirements

Task/Activity	POTENTIAL HAZARDS	PREVENTATIVE MEASURES
Installing and Working on Non-Energized Electrical Equipment	Manual Lifting (ergonomics)	• Exposure Assessment (Enter or attach: Justification to classify exposure scenario as low risk, qualitative exposure assessment (QEA) or requirement to conduct quantitative exposure monitoring (QEM). (Exposure Assessment is not required. Lifts are not considered to be in a repetitive pattern. Contact Health and Safety for lifts outside the attached Lifting reference guide and for lifts that are that have the same weight and are performed repetitive) • 2-person lift (If load is too big or awkward - Divide load up taking into consideration that one side of object maybe heavier than the other. Ask for help.) • Lifting Aides (Use mechanical devices/equipment such as forklifts, dollies, lift tables, pallet jacks, wheel barrows etc.. Ensure individuals are trained on forklifts and pallet jacks.) • Refer to the SBMS document "Ergonomics"; for more additional information on this hazard and its potential controls. • Proper lifting Techniques (Squat/stoop and lift with the legs. Stand close to object, with feet solid and shoulder width apart. Do not reach over an obstacle to lift the load. Move whatever is in your way. Squat and bend at the hips bending your knees and not at the waist. Keep your back straight and upright. Grip the object firmly and pull it close to you. Lift with your legs in a gradual and smooth movement. Keep your back straight. Keep the load close to your body. Avoid bending and twisting your body while lifting. Use your feet to turn your body. Pace yourself. Take breaks as needed. Do not lift any material, object, tool, etc. if you have a pre-existing back or other injury (i.e. hernia, knee, etc.).Do not lift any object, material, equipment, tool, etc. in excess of a restricted weight limit given by medical.) • Use attached manual lifting reference as a guide.

Task/Activity	POTENTIAL HAZARDS	PREVENTATIVE MEASURES
Installing and Working on Non-Energized Electrical Equipment	Electrical Tools and Equipment	• Listed by a nationally recognized testing laboratory (NRTL) • Inspect tools for proper guards, electrical cords, plugs, grounds, and function • Tools shall be inspected prior to use for broken or cracked handles, mushroom heads, and bent, broken, loose heads/blades. • Tools shall be used only for their intended purpose. • Defective tools shall be tagged, removed from service, and reported to your supervisor • Corded, non-double insulated tools shall be used with a GFCI • Any tool performing "live" electrical work shall comply with NFPA 70E
	Confined/Enclosed Space Potential hazards – Hazardous Atmospheres, Hazardous energy, Heat Stress, Etc.	• Entry Permit - Staff shall follow requirements on confined space permit if space is classified as permit-required. • Follow requirements in the SBMS subject area Confined Space • Confined Space Supervisor shall classify the confined space as non-permit confined space, permit-required confined space or enclosed space • Staff entering permit-required confined spaces or enclosed spaces shall be trained per SBMS subject area Confined Space • Staff with roles of attendant and supervisor for permit required confined spaces and enclosed space shall be trained • An attendant for permit-required confined space and enclosed space shall have no other duties. • Contact Health and Safety for pre-entry and entry monitoring requirements. • Entrant and Attendant must be qualified as a High Voltage electrical Worker and trained in CPR/AED, first aid, and Bloodborne pathogen training. A Blood borne Exposure control plan shall be in place.

Task/Activity	POTENTIAL HAZARDS	PREVENTATIVE MEASURES
Installing and Working on Non-Energized Electrical Equipment	Falls	• Before climbing poles, ladders, or other such structures or before working on scaffolds, workers shall make a careful inspection to determine whether the structures are safe and are properly supported • Follow the requirements in the SBMS subject Fall Protection, Scaffolding and Aerial Lifts for use of an Aerial Lift • Staff shall be trained in the use of and fall protection (i.e. Fall Authorized Person) • Staff shall inspect fall protection prior to use, • A Fall Competent person (Andrew Bush) shall be contacted for elevated work over 4-ft unprotected. • A fall competent person (Andrew Bush) will determine the fall protection system as needed. • A fall competent person (Andrew Bush) will prepare a specific fall protection plan for each activity performed at unprotected heights at four (4) feet or above. 100% fall protection is required • A person shall be trained and qualified per 1910.269 to climb poles • Fall protection harness and connector (i.e. lanyard) shall meet ASTM F 877 requirements if an arc flash hazard is possible.

Task/Activity	POTENTIAL HAZARDS	PREVENTATIVE MEASURES
Installing and Working on Non-Energized Electrical Equipment	Aerial Lifts (Bucket trucks) ➢ Electrocution from contact with overhead electrical lines ➢ Falls from the lift ➢ Tip-overs from operating on uneven ground ➢ Caught in between an object/Struck-by ➢ Catapulted out of the bucket/basket if the boom/bucket were struck or by driving over uneven terrain	• 100% fall protection is required in bucket trucks, boom-supported or articulated lifts. • Follow the requirements in the SBMS subject Fall Protection, Scaffolding and Aerial Lifts for use of an Aerial Lift. • Staff shall be trained in the use of aerial lifts and fall protection (i.e. Fall Authorized Person) if a fall protection system is required by aerial lift type. Fall Protection is required in Bucket Trucks. • For Riding in the platform/bucket of a bucket truck in motion follow procedure F&O-ADM-076 • Staff shall inspect bucket truck prior to use. • Do not exceed slope limits listed by the manufacturer. • Look for hazards, such as, holes, drop-offs, bumps, and debris, and overhead power lines and other obstructions. • Set outriggers, brakes, and wheel chocks as required by manufacturer. • Always close lift platform chains or doors. • Stand on the floor of the bucket or lift platform. • Do not climb on or lean over guardrails. • Do not use planks, ladders, or other devices to extend working height. • Do not exceed manufacturer's load-capacity limits (including the weight of such things as bucket liners and tools). • If working near traffic, set up work-zone warnings, like cones and signs. • Follow manufacturer instructions • Maintain a minimum of 10 ft. away from overhead power lines unless aerial is insulated and designed to work near overhead power lines. • All Bucket Trucks must have lower controls.

Task/Activity	POTENTIAL HAZARDS	PREVENTATIVE MEASURES
Testing/Maintenance, Work on/near Energized Electrical Equipment/Circuits • Perform and Verify LO/TO • Inspection of electrical panels and wiring • Electrical operations • Repairs, modifications, & testing on energized electrical systems, parts, and equipment. • Apply Grounds • Etc. Note: Lost Power Distribution Permits – Suspend work and verify all protection is intact.	Electrical • Arc Blast • Electrical Shock • Burns • Arc Flash • Noise	• Only Qualified Person(s) per the SBMS Electrical Subject Area (Qualified Electrical Worker 5) • Follow requirements on Power Distribution Work Permit.. • Personnel shall wear appropriate PPE for electrical hazards as prescribed by the arc flash hazard warning label, the .ORNL-1022 Hazard Analysis for Electrical work form, or equivalent. • Apply protective grounds when required. Follow procedure UT-T-ELEC-007 for guidance on grounding. • All energized work must have an Energized Electrical Work Permit or equivalent. No work on energized high-voltage equipment unless it is absolutely not feasible to de-energize or bypass the circuit because of critical plant load requirements. • A pre-job briefing shall be conducted before the start of each job • Cover/Guard all conductors (as feasible) which provide a potential contact. Hazard. This should be done from below whenever possible. At no time shall workers pass through energized equipment before it is covered with line guards and grounded. • All conductors and grounds adjacent to working space shall be considered energized unless tagged as “non-energized”. . • When line hose is applied to vertical or sagging wires, it should be fastened to the line to prevent its slipping from position • When blankets are used for covering items such as dead ends, potheads, secondary racks, and transformers, they should be secured by wooden or plastic clamp pins or tie thongs. • Follow switching steps outlined in work plan • After the protective equipment has been placed, care should be taken to prevent damage to the rubber from tie wires, spurs, or other objects. • An energized line or equipment in excess of 600 V is removed from service to be worked on, it shall be treated as energized until it is de-energized, tagged, locked if necessary, tested, and grounded. • Maintain required safe approach distances as per NFPA 70 • Label all energized equipment that servicing and maintenance is not being performed per the LOTO subject area. Equipment must be marked as energized or flagged with labels