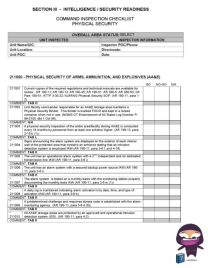
PUGET SOUND ENERGY

PSE FORM 8111 Vault Room Handout and Checklist



PSE FORM 8111 Vault Room Handout and Checklist Instructions

Contents

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SECTION III - INTELLIGENCE / SECURITY READINESS

COMMAND INSPECTION CHECKLIST
PHYSICAL SECURITY

OVERALL AREA STATUS: SELECT	
UNIT INSPECTED	**INSPECTOR INFORMATION**
Unit Name/UIC:	**Inspector POC/Phone:**
Unit Location:	**Directorate:**
Unit POC:	**Date:**

211000 - PHYSICAL SECURITY OF ARMS, AMMUNITION, AND EXPLOSIVES (AA&E)

		GO	NO-GO	N/A
211001	Current copies of the required regulations and technical manuals are available for review. AR 190-11; AR 190-13; AR 190-45; AR 190-51; AR 380-5; AR 380-53; DA Pam 190-51; ATTP 3-39.32; NJARNG Physical Security SOP. (AR 190-11, para 1-2)			
COMMENT: **TAB O**				
211002	Unit /facility commander responsible for an AA&E storage area maintains a Physical Security Binder. This binder is marked FOUO and kept in a locked container when not in use. (NGMS-OT Endorsement of All States Log Number P-96-0100, dtd 1 Oct 96).			
COMMENT: **N/A**				
211003	A physical security inspection of the entire area/facility storing AA&E is conducted every 18 months by personnel from at least one echelon higher. (AR 190-13, para 2-15 b (1)).			
COMMENT: **TAB L**				
* 211004	Signs announcing the alarm system are displayed on the exterior of each interior wall of the protected area that contains an entrance stating that an intrusion detection system is employed IAW (AR 190-11, para 3-6 f, and 4-16)			
COMMENT: **TAB K**				
211005	The unit has an operational alarm system with a 2ND independent and /or dedicated transmission line IAW (AR 190-11, para 3-6 i)			
COMMENT: **TAB K**				
211006	The unit has an alarm system with a secured backup power source IAW (AR 190-11, para 3-6 i)			
COMMENT: **TAB K**				
* 211007	The alarm system is tested on a monthly basis with the monitoring station properly documenting the monthly tests IAW (AR 190-11, para 3-6 m (1))			
COMMENT: **TAB K**				
* 211008	A daily log is maintained indicating alarm activation's by date, time, and type of activation IAW (AR 190-11, para 3-6 h).			
COMMENT: **TAB K**				
* 211009	A predetermined challenge and response duress code is established with the alarm monitoring agency. (AR 190-11, para 3-6 d (6))			
COMMENT: **TAB K**				
* 211010	All AA&E storage areas are protected by an approved and operational intrusion detection system (IDS). (AR 190-11, para 4-2)			
COMMENT: **TAB K**				

Specifications

- Product Name: PSE Vault Room Handout and Checklist (FORM
  Effective Date: 07/11/24

Product Information

Oil and Water Containment Requirements:

- The transformer room must have an oil containment system that can hold all oil from a transformer one size larger than the largest installed.
- If a floor drain is present, install an oil/water separator or a normally closed valve.
- For water sprinklers, the room must contain water for at least 30 minutes plus oil containment volume.

Ventilation
Natural Ventilation

- Preferably use perforated panels or louvers with a minimum of 7,500 square inches for ventilation.

- Ensure adequate free air space based on transformer size.

Ducts and Cable Racking
Guidelines

- PSE determines duct entry sizing and configurations.
- Install a pulling eye opposite the primary cable conduit entry point.
- Maintain a minimum bend radius of 36 inches for cables after installation.
- Use ladder type cable trays strong enough to support cables and workers.

FAQ
Q: What is the purpose of the PSE Vault Room Handout and Checklist?
A: The handout provides requirements for designing transformer vault rooms to meet safety and operational standards.

PSE vault room handout and checklist (FORM 8111)

General notes

- This handout may be provided to any customer or developer when they express interest in using a vault room.
- PSE allows vault rooms when the building is zero lot line, or the room is required by a jurisdiction.

Scope

- This handout is applicable to transformer installations of 2,500 kVA and below.
- The installation of transformers larger than 2,500 kVA will require PSE engineering approval.

Compliance

- Nothing in this handout shall be interpreted to conflict with the regulations of the state of Washington or other regulatory bodies having jurisdiction.
- All vault rooms shall comply with all applicable electrical and building codes.

Vault room requirements

1. Approval process
    - Vault room designs require PSE approval.
    - Approval drawings (see samples provided) and a completed checklist must be submitted to PSE prior to design review by the jurisdictional building authority.
2. Vault room location and access
    - The vault room should be at grade level on an exterior wall or opening into a loading dock area close to existing PSE facilities unless approved by PSE. There must be a direct access path for equipment capable of moving the transformer from its installed location to a truck nearby. The path must be strong enough to support a minimum of 16,500 pounds.
    - The vault room installation door opening shall be a minimum of 10 feet tall by 10 feet wide, unless approved by PSE, and be flush with a smooth floor with no curb built up inside the vault room.

- All access doors into the vault room shall open outward and shall be equipped with panic bars, pressure plates, or other devices that are normally latched, but open under simple pressure.
- If the door is a roll-up-type door, a second personnel access door is required for emergency ingress and egress.
- It shall provide an unobstructed escape route from the transformer to a safe area. It will open out and be equipped with crash bars.
- The vault room shall be accessible 24/7 by qualified PSE personnel and not accessible at any time by unqualified personnel.
- Note that any vault room doors or vents must not be near operable windows or emergency egress routes.
- All electrical systems, components, and elements, including supporting structures and attachments, shall be installed in accordance with the electrical codes.
- The Equipment and Equipment Transportation Agreement (Form 7043) must be signed and returned to the PSE Project Manager.

3. Vault room dimensions
    - See table below for transformer sizes.
    - There shall be a 3-foot minimum working space between the sides, back, and top of the transformer and the nearest obstruction.
    - There shall be a 10-foot working clearance in front of the transformer. This clearance can be reduced to 4 feet between the transformer and the door, as long as the remaining 6 feet of clearance is maintained when the door is open.
    - The transformer installation door shall be a minimum of 10 feet wide by 10 feet tall. The bottom of the door shall be flush with the floor surface. This opening can be reduced to 8 feet wide as long as there is a 1 foot removable section on either side of the door to obtain 10 feet.
    - Cable feed from above is preferred for both primary and service cables. In that configuration, there must be a
      3-foot minimum clearance between top of the transformer and bottom of cable trays, and a 2-foot clear space above the trays to the ceiling.
    - If cable feed from above is not used, the appropriate PSE vault and lid should be inset into the floor of the vault room. Note that no tensioning elements or rebar can be within the cable feed area of the lid cutout. List location and dimensions of the cable cutout, or refer to an example drawing.
    - The floor of the vault room should be sloped to allow for drainage (see further details in Section 4.F).
4. Equipment installation
    - No foreign/non-PSE fixtures, wires, conduit, ducting, et cetera may pass through any part of the vault room walls, ceiling, or floor.
    - No building insulation or other materials are allowed within the vault room. All interior surfaces of walls, floor, and ceiling shall be concrete and with minimum access for maintenance required. Access to the vault room is limited to PSE-qualified personnel.
    - Lighting shall be a minimum of 42 lumens per square foot. The lighting and emergency outlets shall be tied to emergency power. All four sides of the equipment shall be illuminated. The light switch shall be located inside the vault room next to the personnel access doorway. A 120-volt duplex convenience receptacle shall be provided on two opposite walls of the vault room.
    - Fire extinguishers: A standard ABC fire extinguisher shall be mounted outside each personnel access door.

- Fire detection equipment (thermal and/or smoke) and additional equipment may be required by local fire officials.
- A ground bus shall be installed along the back wall of the vault room. It may be copper wire or bar, with a minimum cross-sectional area equal to 4/0 AWG conductor. It shall be located roughly 12 inches above the floor and tied to the building's grounding electrode system. The ground bus shall be tapped to each piece of equipment (not daisy-chained), so the ground wire to one piece of equipment can be removed by PSE for maintenance without leaving other pieces of equipment ungrounded.
- The following permanent vault room marking and signage meeting ANSI Z535.5 shall be affixed outside the vault room: "Danger High Voltage," "Qualified Workers Only," and "PSE Transformer Room."
- Each transformer room shall have a lockbox (provided by PSE) installed outside the access door, and the door shall be keyed separately for PSE access only.

5. Oil and water containment
    - The transformer room shall have an oil containment system that can hold all of the oil contained in a transformer that is one size larger than the largest transformer initially installed in the room (see Table 1).
    - If the room has a floor drain within the containment system, an oil/water separator shall be installed to block the flow of oil, or the drain shall contain a valve that is normally closed. If the transformer is installed belowgrade, the drain must go to an oil water separator and be normally open.
    - if water sprinklers are installed in a transformer room, the vault room shall have a containment system that can contain a minimum of 30 minutes of water from all sprinklers in the room plus the required volume of oil containment.
6. Ventilation
    - A. Natural ventilation is preferred. Perforated panels or louvers that allow for a minimum of 7,500 square inches are required. Less area may be acceptable for smaller transformer installations, but must be approved by PSE (3 square inches per kVA of free air space of the next larger sized transformer are required).
    - If forced air ventilation is used, the airflow must be a minimum of 4,000 CFM. Lower CFM ratings may be allowed for smaller transformer installations, but must be approved by PSE (1.6 times the next size larger transformer's
      kVA rating in CFM). It must be temperature controlled so it turns on at 86°F and off at 140°F while triggering an alarm in the building fire control system.
7. Ducts and cable racking
    - Duct entry sizing and configurations are to be determined by PSE.
    - A pulling insert eye or hook shall be installed in the wall opposite the primary cable conduit entry point. The pulling eye should be rated for a minimum 15,000-pound working load.
    - All primary and secondary cables shall have a minimum bend radius of 36 inches after installation.
    - All cable trays must be ladder type with open tops, made of steel or aluminum, strong enough to carry the weight of the cables, and rigid enough to support a ladder and worker on the ladder. The tray width shall be 2 times the total diameters of the cables laid flat in one layer.

Table 1: 12,470-Volt Transformer Data

Size (kVA)	Width (inches)	Depth (inches)	Height (inches)	Weight (pounds)	Oil Volume (gallons)
500	118	106	64	12,199	350
750	118	106	84	10,350	425
1,000	118	130	84	10,500	475
1,500	118	130	84	13,000	600
2,000	118	130	84	15,000	700
2,500	118	130	84	16,650	800

PSE vault room handout and checklist

Approval drawings and plan sheet template

Provide the following information to PSE for approval as early as possible in the design drawing development process.

1. Sheet 1

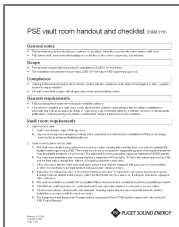
   Overall site plan to scale with existing and proposed PSE utilities
   - Standard title block with project name, owner name, date, et cetera
2. Sheet 2: Overall floor plan
   - Include the level where the vault room is located.
   - Include all other levels leading to the vault room level that would be included in the transportation agreement.
   - Indicate the conduit pathway as it enters the building, concrete encased, showing all changes in elevation/ height of the conduit.
   - Show ventilation, if to the exterior details.
   - Show PSE vehicle parking outside of the vault room.
3. Sheet 3: Enlarged floor plans
   - Include an 8-foot by 10-foot transformer vault lid and vault as dotted lines with exact cable opening dimensions.
   - Include interior elevations (all 4 walls/ceilings).
   - Include a reflected ceiling plan (RCP) showing cable trays, mechanical (if included), fire sprinklers, pulling hook location, et cetera.
   - Exterior elevations showing signage, FEC, key box (Knox).
4. Sheet 4: Details
   - Signage
   - Removable oil retention threshold
   - Minimum parking space
   - Other, as applicable
5. Sheet 5
   - Switchgear room and one line diagrams
   - Cabinet cut sheets and other details Also include as needed
   - Mechanical system for supply and return, if not to exterior

- All other information needed to convey compliance with PSE standards

Vault room approval checklist

Callout Number	Requirement	Description
	2.A	Vault room location
	2.B	Vault room door
	2.D	Second personnel door
	2.H	Transportation agreement
	3	Interior dimensions
	3.C	Working space on all sides and above
	3.D	Install door
	4.C	Lighting and outlets
	4.D	Fire extinguishers
	4.F	Ground bus
	4.G	Signage
	5	Oil and water containment
	6.A	Natural ventilation at 3 square inches per kVA
	6.B	Forced air ventilation at 1.6 CFM per kVA
	7.A	Duct entry
	7.B	Pulling eye
	7.C	36-inch minimum bend radius
	7.D	Cable racking and ladders

Documents / Resources

	PSE FORM 8111 Vault Room Handout and Checklist [pdf] Instructions FORM 8111 Vault Room Handout and Checklist, FORM 8111, Vault Room Handout and Checklist, Room Handout and Checklist, Handout and Checklist, Checklist

References

- PSE | Welcome to Puget Sound Energy
- User Manual