SECTION V – PUMPING INSTALLATIONS

G E N E R A L N O T E S - P-1

THIS SECTION REFERS TO PUMPING INSTALLATIONS ONLY.

GENERAL NOTES

1. These specifications and recommendations are for general use. For all installations, consult the local enforcing agency regarding additional requirements.

2. Three-element protection is required on all motors, (one thermal or over-current device in each phase of the starter).

3. Pump control panels and main safety switch shall be weatherproof.

4. Undervoltage, phase failure and phase reverse relays, surge capacitors and lightning arrestors are recommended for each pump motor installation.

5. When possible, the ground rod shall be connected to the well casing with a minimum #4 bare copper wire. **Note: The ground wire to the well casing shall not be substitute for, or eliminate the ground rod. The ground wire to the well casing may be connected to the ground rod with a second connector.**

6. All grounding and bonding shall comply with the NEC or prevailing local inspection agencies.

7. Across-the-line starting is normally acceptable up through 75-HP on PEU lines. There may be circumstances which require reduced voltage starting in some areas. Reduced voltage starting in some areas. Prior to planning this type of installation, contact PEU.

8. Holes for conduits and nipples in switch, meter and CT enclosure cabinets shall e made with approved knock-out cutters. (Holes cut with torch or other means are not acceptable).

9. If riser is used for point of attachment of service drop, then the minimum size shall be 1½" rigid steel conduit.

10. A 3-pole circuit breaker (interrupting all three phases) may be substituted for the main fused safety switch, provided it meets the general specifications with regard to size and fault current requirements.

11. Combination CT can and meter socket and service entrance sections shall be in accordance with PUESR (Pacific Utilities Electric Service Requirements).

12. Fault currents, including motor contribution, are based on transformer banks sized for single-pump motor installation only. If more than one motor is served from same transformer bank, contact PEU for actual fault contribution from the larger bank.

13. On self-contained meter cabinets (up through 150-HP) customers shall furnish and install the safety socket box with safety test bypass blocks.

14. On current transformer cabinets (200-HP and above) PEU will furnish and install the ring and bar, current transformers and test switch.

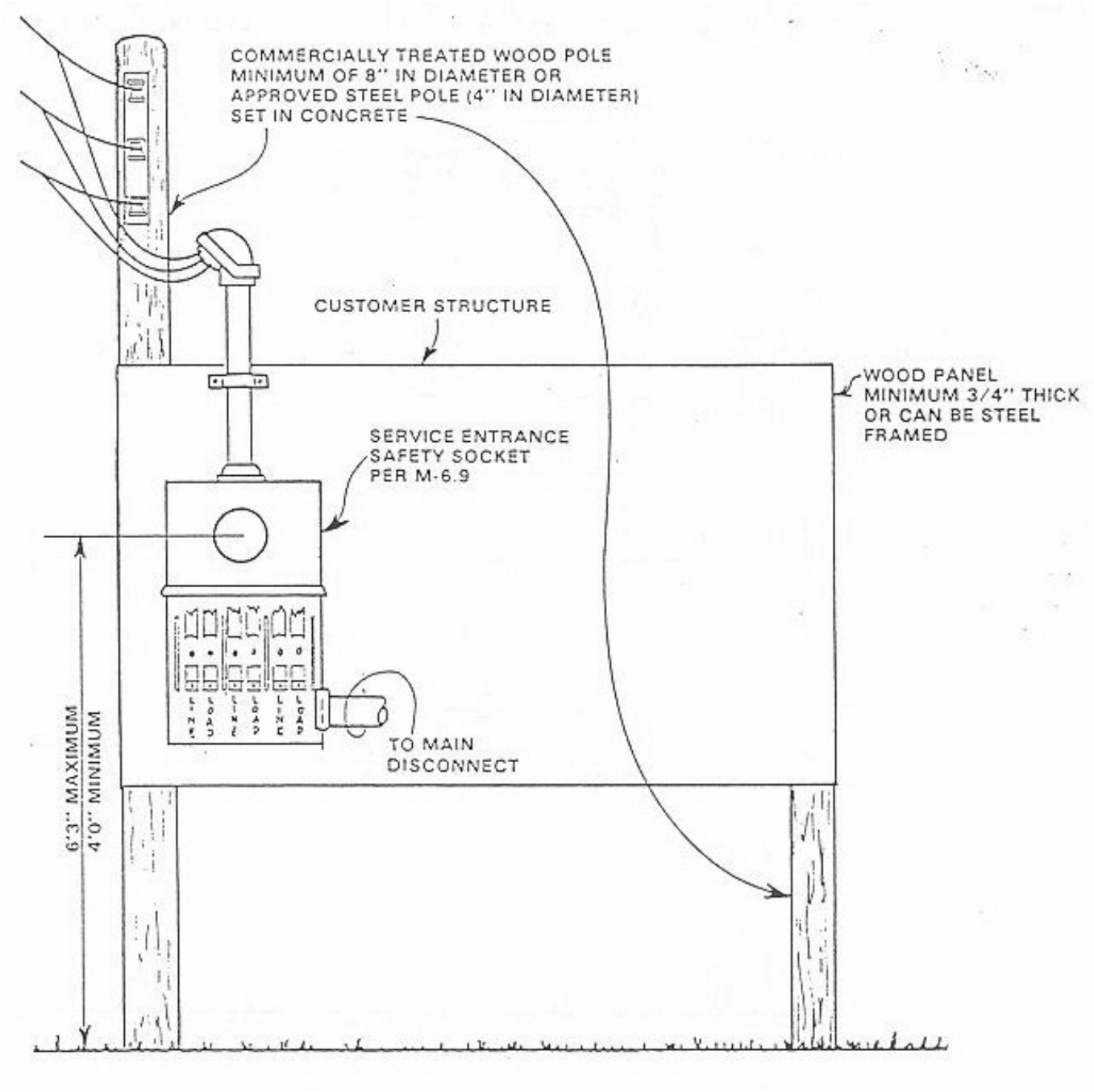
RECOMMENDATIONS & SPECIFICATIONS FOR IRRIGATION PUMPS

Motor HP	Motor Amps F.L.	Amps Corr. Per N.E.C.	Copper Wire 75° C Rating (Min.)	Riser Conduit Size (Min.)	Copper Grounding Jumper (Min.)	Copper Equip. Bonding Jumper (Min.)	Main Safety Switch Amp (Min.)	Fuse Dual-Element Amp (Max.)	Starter Size NEMA (Min.)	Sym. Fault Amps at 480 V. 3 ø (Max.) (See Note 12)	Meter And/or C.T. Cabinet Size
					(230 VOLT)						
10	28	40	8	1"	8	8	60	40	2	10,000	Self-contained meter - 7 term. socket. Power leg must be on right
15	42	60	6	1" See	8	8	60	60	2	"	
20	54	77	4	1" Note 9	8	8	100	80	3	"	
25	68	93	3	1¼"	8	8	100	100	3	"	
					(460 VOLT)						
10	14	20	12	1"	8	8	30	20	1	10,000	200 Amp safety socket
15	21	30	10	1"	8	8	30	30	2	"	
20	27	38	8	1" See	8	8	60	40	2	"	
25	34	48	6	1" Note 9	8	8	60	50	2	"	
30	40	57	6	1"	8	8	60	60	3	"	
40	52	74	4	1"	8	8	100	80	3	"	
50	65	92	3	1¼"	8	8	100	100	3	"	
60	77	109	2	1¼"	6	6	200	125	4	"	
75	96	136	1/0	1½"	6	6	200	150	4	"	
100	124	176	2/0	1½"	4	6	200	175	4	"	
125	156	222	4/0	2"	2	3	400	225	5	12,500	400 Amp combination C.T. can and meter socket
150	180	256	250 MCM	2½"	2	3	400	300	5	12,500	
200	240	340	500 MCM	3"	1/0	3	400	350	5	18,000	
250	287	408	600 MCM	3"	1/0	3	400	400	6	23,500	
300	345	490	2-250 MCM	2-2½"	1/0	2#1	600	450	6	23,500	600 Amp combination C.T. can and meter socket
350	398	565	2-300 MCM	2-2½"	1/0	2#1	600	500	6 See	33,000	
400	453	643	2-400 MCM	2-3"	2/0	2-1/0	600	600	6 Note 7	33,000	
450	508	722	2-500 MCM	2-3"	2/0	2-1/0	800	650	7	33,000	Service entrance section
500	565	802	2-600 MCM	2-3"	3/0	2-1/0	800	700	7	33,000	

TYPICAL PUMPING INSTALLATION
150-HP MAXIMUM, 3-WIRE, 3-PHASE 480V
SERVED BY OVERHEAD TRANSFORMERS - P-3

NOTE:

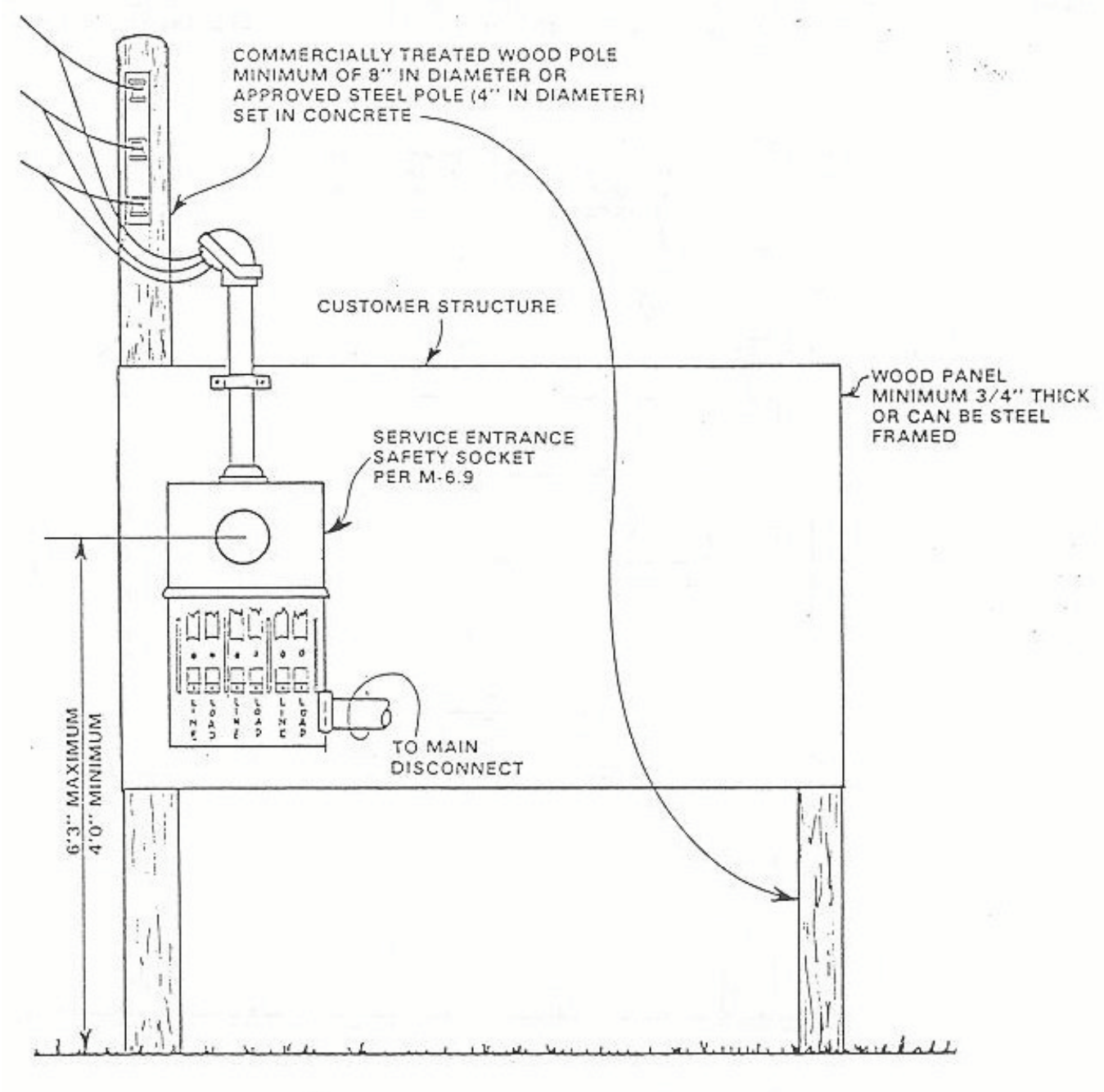
1. This 3-wire, 3-phase installation requires a 5-terminal meter socket.
2. Prior to planning this type of installation, contact PEU.
3. Refer to P-1 and P-2 (pages 116 and 117) for additional specifications.
4. Grounding shall comply with the NEC or prevailing local inspection agencies.



T Y P I C A L P U M P I N G I N S T A L L A T I O N
151-HP OR OVER, 4-WIRE, 3-PHASE 480V
SERVED BY OVERHEAD TRANSFORMERS - P-4

NOTE:

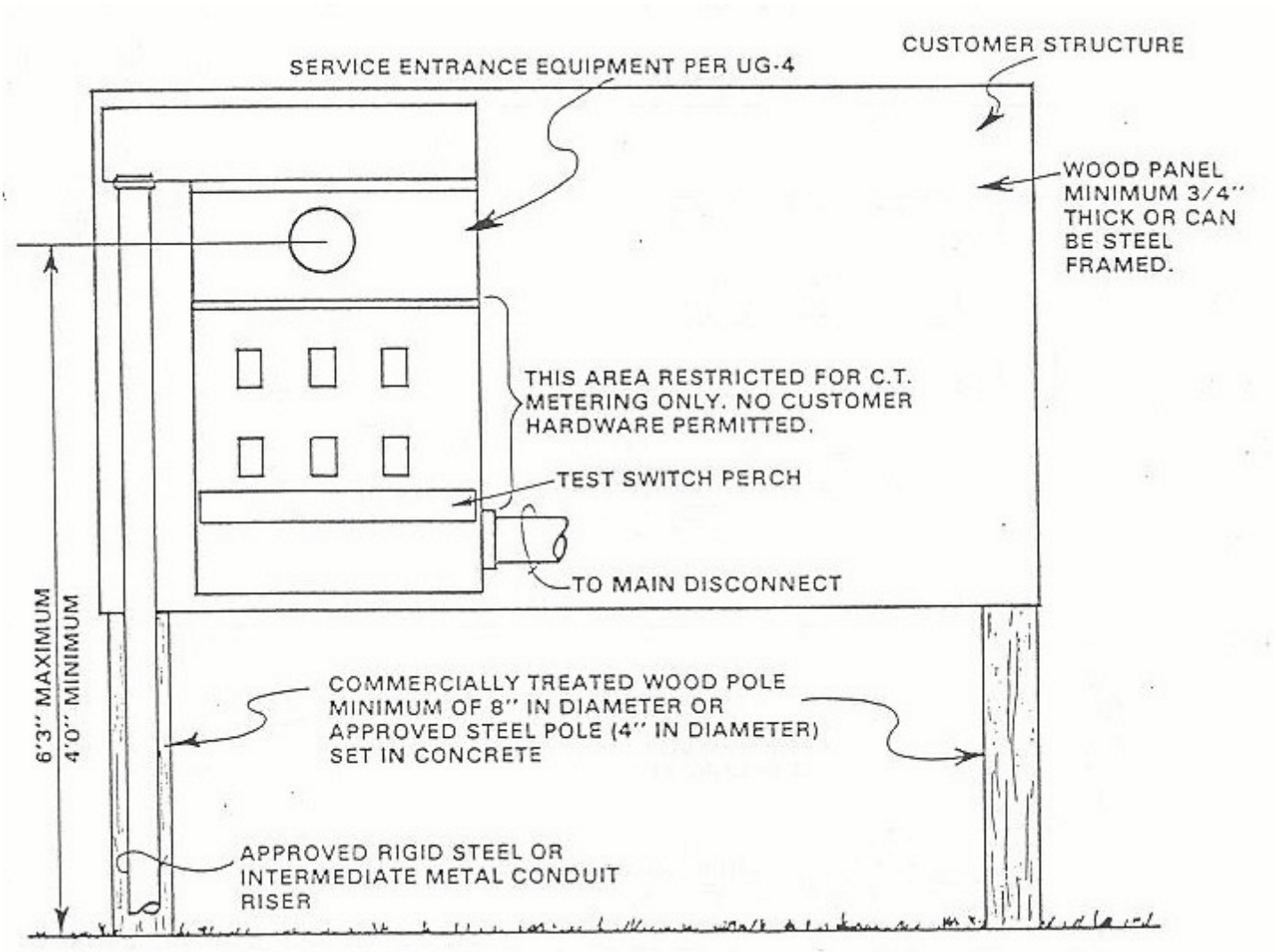
1. This 4-wire, 3-phase installation requires an 8-terminal meter socket.
2. Prior to planning this type of installation, contact PEU.
3. Refer to P-1 and P-2 (pages 116 and 117) for additional specifications.
4. Grounding shall comply with the NEC or prevailing local inspection agencies.
5. No connections shall be made in the instrument transformer box to supply any other meter and not more than one load circuit shall leave the transformer box.



TYPICAL PUMPING INSTALLATION
150-HP MAXIMUM, 3- OR 4-WIRE, 3-PHASE 480V
SERVED BY OVERHEAD OR PAD MOUNTED
TRANSFORMERS - P-5

NOTE:

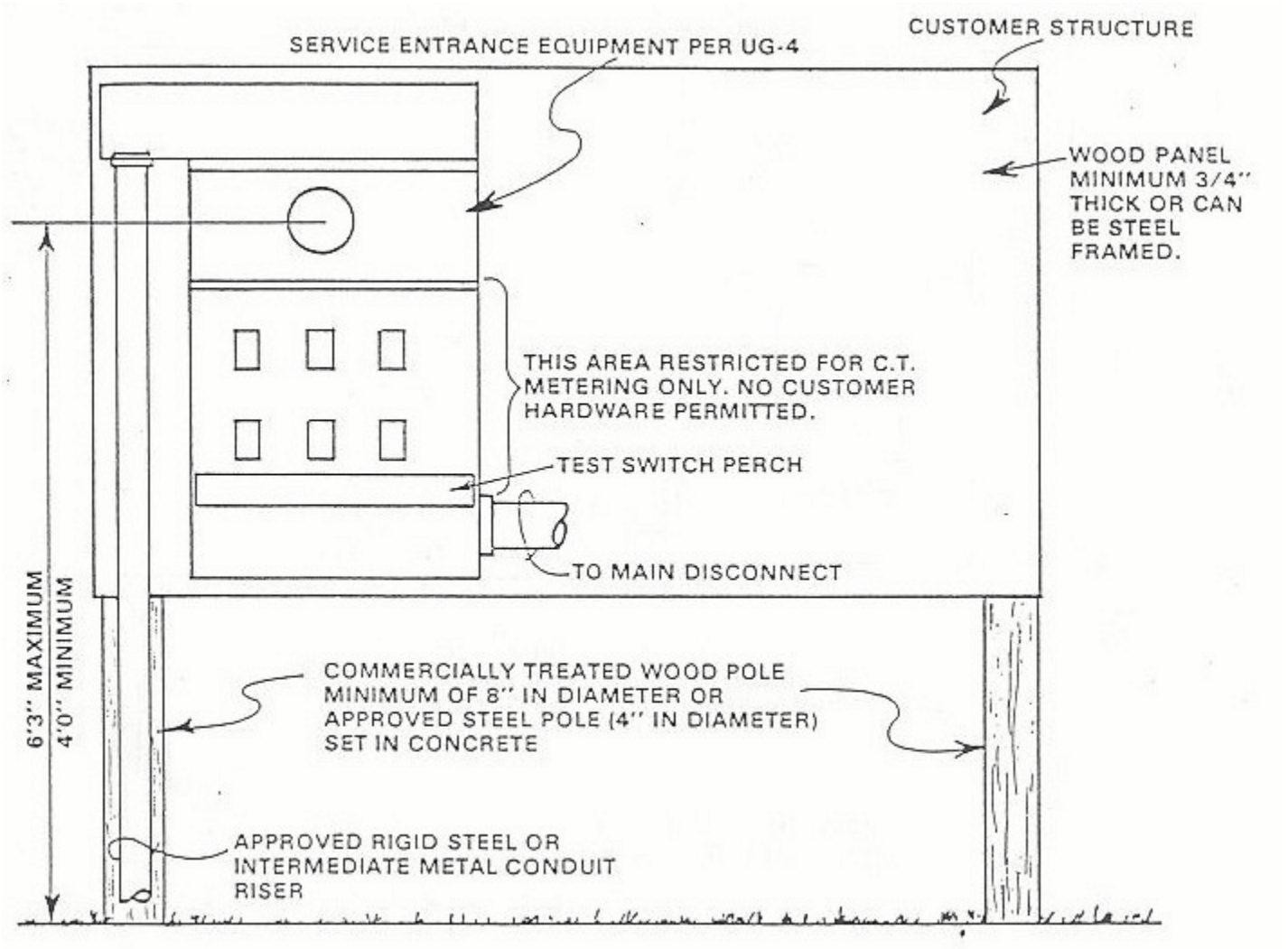
1. Install 4-wire, 3-phase service entrance equipment and a 7-terminal meter socket if installation is served through a pad mounted transformer. Install 3-wire, 3-phase service entrance equipment and a 5-terminal meter socket if installation is served through overhead transformers.
2. Prior to planning this type of installation, contact PEU.
3. Refer to P-1 and P-2 (pages 116 and 117) for additional specifications.
4. Neutral shall not be cut but shall be bonded to socket at the neutral lay-in lug. The double neutral lay-in lug must accommodate 250 MCM wire capacity and may be mounted on either sidewall.
5. Grounding shall comply with the NEC or prevailing local inspection agencies.



TYPICAL PUMPING INSTALLATION
151-HP OR OVER, 4-WIRE, 3-PHASE 480V
SERVED BY OVERHEAD OR PAD MOUNTED
TRANSFORMERS - P-6

NOTE:

1. Install 4-wire, 3-phase service entrance equipment and a 13-terminal meter socket if installation is served through a pad mounted transformer. Install 4-wire, 3-phase service entrance equipment and an 8-terminal meter socket if installation is served through overhead transformers.
2. Prior to planning this type of installation, contact PEU.
3. Refer to P-1 and P-2 (pages 116 and 117) for additional specifications.
4. Neutral shall not be cut, but shall be bonded to the enclose at the neutral lay-in lug. The double neutral lay-in lug must accommodate 250 MCM wire capacity and may be mounted on either sidewall.
5. Grounding shall comply with the NEC or prevailing local inspection agencies.
6. No connections shall be made in the instrument transformer box to supply any other meter, and not more than one load circuit shall leave the transformer box.



T Y P I C A L C U S T O M E R W E L L S I T E
CONDUCTOR CLEARANCE REQUIREMENT - P-7

Fencing shall be required if:

1. The platform or bottom of the transformer(s) is less than fourteen (14) feet above grade, or
2. The platform braces extend to less than ten (10) feet above grade.

Fencing, when required, shall consist of chain-link type fence a minimum of seven (7) feet in height with three (3) strands of barbed wire above the chain-link. No part of the fence shall be less than five (5) feet from any live parts on the transformer(s) or bare conductor. At least one (1) **"DANGER-HIGH VOLTAGE"** sign shall be on each side of the fence with 1" high minimum block letters. The fence shall be effectively grounded.

These are typical installations in conformance with the National Electric Safety Code **EXCEPT** the minimum vertical clearance between phase wires and finish grade shall be at least 25'; between neutral and finish grade shall be at least 18'.