

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

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In the Matter of:

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COMMISSION**

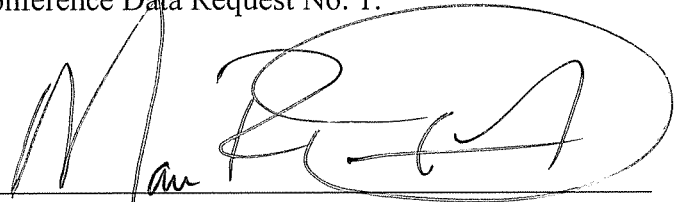
KENTUCKY POWER COMPANY )  
D/B/A AMERICAN ELECTRIC POWER )

\_\_\_\_\_ )

ALLEGED FAILURE TO COMPLY WITH )  
KRS 278.042 )

CASE NO. 2010-000317

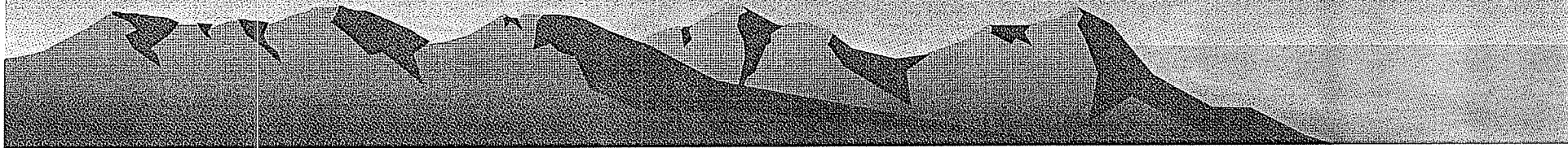
Kentucky Power Company files the original and ten copies of the training materials  
referenced in its Response to Staff Informal Conference Data Request No. 1.



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COMPANY

# PSC Inspection Program

Guidelines for Circuit Inspection



# Program Objective

The objective of this program is to visually inspect all overhead and the external, above ground portions of underground facilities on a 2 year cycle to identify and correct deficiencies necessary for the safety of employees and the public under the conditions specified in the NESC and for system reliability.

# Circuit Criteria

A list of Circuits to be inspected are identified on a biannual basis. Circuits are identified based on the circuit miles. Keeping a balance of miles in each 2 yr cycle. Planned Maintenance inspections (PM's) are generated in Storms from the list. From these PM's work requests are created for each circuit to be inspected in a cycle year. These Work Requests are assigned to the Non-exempt Service Supervisor in Each area for the Circuits to be inspected in the cycle year.

# What we are looking For

## Overhead :

Driving or foot patrol inspections are conducted as appropriate looking for obvious defects such as loose down guys, broken grounds, cracked insulators, lightning arresters with blown isolators, deteriorated crossarms having inadequate strength, low conductors, etc. Electrical and mechanical defects observed will be identified and the information will be collected so appropriate corrective action can be taken.

# What we are looking For

## Underground:

An external, visual inspection of the above ground portion of underground systems including pad-mounted equipment (transformers, switches, primary metering enclosures, junction cabinets, etc.), pedestals and the underground associated components of primary riser poles. The external inspection will be conducted to determine that the equipment is locked and secure and that there are no openings that might allow access to the interior of the equipment via soil erosion, cabinet or conduit deterioration or by other means such as vandalism.

# What to Report?

## Poles:

- Rotten Poles
- Leaning or Washed out
- Burned - Due to the rash of Cutout Failures this is becoming more of a issue.
- Broken or Split
- Pole Clearances - Poles resting against structures or through the eaves or a roof line or close enough to impede climbing. Pole being within 12" of a structure.

# What to Report?

- Transformers hanging directly over Structures or immediately adjacent to multi-story buildings (12" or less).
- UG transformers less than 10 feet without barrier walls.
- Missing Pole Grounds - Ever Increasing issue not only on distribution poles but also at Distribution stations.
- Missing grounds and Ground Grids on GOAB switches.



# What to Report?

## Guys and Anchors

- Guys and anchors loose
- Damaged guys
- Guys which may need insulators, breakers and markers.

\*KYP Co recommends to install insulators if you can take the end of a guy and walk around the pole and come in contact with energized bushings of equipment or conductors. Also refer to DS 406 notes 1,2,3

\*Guy markers shall be installed on guys in Pedestrian or Vehicular traffic areas. (DS 403 note 4,5)

# What to Report?

## Guy Insulators:

### NOTES:

1. GUY STRAIN INSULATORS ARE NOT REQUIRED IN GROUNDED GUYS BUT MAY BE INSTALLED IN THE GUY WIRE TO REDUCE GUY CLEARANCES. CLEARANCES CANNOT BE REDUCED TO METAL END FITTINGS OR GUY GRIPS ASSOCIATED WITH STRAIN INSULATORS.
2. A GUY INSULATOR IS REQUIRED ON A DELTA SYSTEM WHEN THE GUY IS NOT GROUNDED AND THE GUYED STRUCTURE SUPPORTS OPEN SUPPLY CONDUCTORS OF MORE THAN 300 VOLTS (PHASE TO GROUND), OR IF THE GUY IS EXPOSED TO SUCH VOLTAGES.
3. MULTIPLE GUY INSULATORS MAY BE USED TO ISOLATE A SEGMENT OF GUY WIRE EXPOSED TO ANOTHER CONDUCTOR OR CABLE.

### AMERICAN ELECTRIC POWER COMPANY DISTRIBUTION STANDARDS

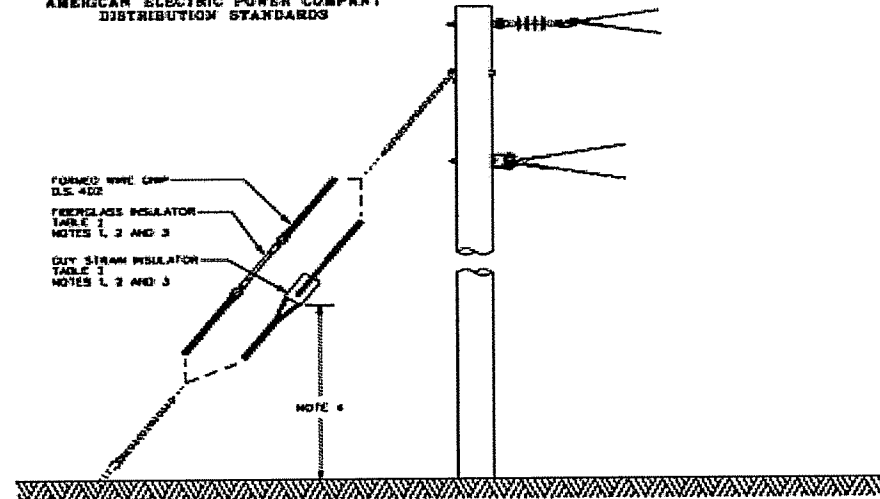


TABLE I

EXTRA HIGH STRENGTH GUY WIRE			24" FIBERGLASS INSULATOR ALL DISTRIBUTION VOLTAGES			GUY STRAIN INSULATOR "JOHNSON BALL" 15 KV AND BELOW		
MATERIAL TYPE	SIZE (INCHES)	ULTIMATE STRENGTH (LBS.)	ULTIMATE STRENGTH (LBS.)	CID NUMBER	CONSTRUCTION UNIT NOTE 5	ULTIMATE STRENGTH (LBS.)	CID NUMBER	CONSTRUCTION UNIT NOTE 5
CALV. STEEL	3/4"	25,400	27,000	48082421	GYP-38-E-24X-2K	20,000	62541000	GYP-38-N-2R-104
	1/2"	25,900	NOTE 5	—	—	—	—	—
STAINLESS STEEL	3/4"	17,200	15,000	48082475	GYP-38-E-24X-24-C	20,000	62541000	GYP-38-N-2R-104-C
	1/2"	16,200	17,000	48082421	GYP-38-E-24X-24-C	—	—	GYP-38-N-2R-104-C

### NOTES:

1. GUY INSULATORS ARE NOT REQUIRED IN GROUNDED GUYS BUT MAY BE INSTALLED IN THE GUY WIRE TO REDUCE GUY CLEARANCES. CLEARANCES CANNOT BE REDUCED TO METAL END FITTINGS OR GUY GRIPS ASSOCIATED WITH GUY INSULATORS.
2. A GUY INSULATOR IS REQUIRED ON A DELTA SYSTEM WHEN THE GUY IS NOT GROUNDED AND THE GUYED STRUCTURE SUPPORTS OPEN SUPPLY CONDUCTORS OF MORE THAN 300 VOLTS (PHASE TO GROUND), OR IF THE GUY IS EXPOSED TO SUCH VOLTAGES.
3. MULTIPLE GUY INSULATORS MAY BE USED TO ISOLATE A SEGMENT OF GUY WIRE EXPOSED TO ANOTHER CONDUCTOR OR CABLE. GUY WIRES WITH A GUY INSULATOR IN THE LOWER PORTION OF THE GUY NEED NOT BE GROUNDED.
4. GUY INSULATORS MAY BE INSTALLED IN THE LOWER PORTION OF A GUY WHERE A LOOSE GUY WIRE COULD INADVERTENTLY MAKE CONTACT WITH A PRIMARY CONDUCTOR. THIS CAN BE A CONSIDERATION WHEN A GUY WIRE IS ATTACHED ABOVE OR PASSES BY A PRIMARY CONDUCTOR. POSITION INSULATORS TO MAINTAIN A MINIMUM OF 6" FROM INSULATION TO GROUND FOR BROKEN GUY BELOW INSULATOR.
5. CONSTRUCTION UNITS INCLUDE INSULATOR AND GUY GRIPS.
6. INSULATOR NOT AVAILABLE USE 20,000 LB. 78" FIBERGLASS INSULATOR CID 48502900 GYP-32-E-24X-2K.

### GUY INSULATOR ASSEMBLIES ALL DISTRIBUTION VOLTAGES DOWN OR SPAN GUY APPLICATIONS

AA 7 13, 2003

D.S. 406

# What to Report?

## Guy Markers:

4. A GUY MARKER SHALL BE INSTALLED ON THE GROUND END OF ANCHOR GUYS EXPOSED TO PEDESTRIAN TRAFFIC. GUYS MAY BE CONSIDERED EXPOSED TO PEDESTRIAN TRAFFIC WHERE THERE IS EVIDENCE OF ROUTINE PEDESTRIAN USAGE; THAT IS, AN ESTABLISHED WALKWAY, PATH, SIDEWALK, ETC. GUY MARKERS MAY ALSO BE INSTALLED AT LOCATIONS WHERE GUYS ARE EXPOSED TO POSSIBLE VEHICULAR DAMAGE; THAT IS, PARKING LOTS, DRIVEWAYS, ETC. WHERE THERE ARE MULTIPLE, PARALLEL, DOWN GUYS, ONLY THE GUY FURTHEST FROM THE POLE NEEDS TO BE MARKED WHEN MARKERS ARE REQUIRED.

5. RESIDENTIAL GUY MARKERS MAY BE GRAY.

AMERICAN ELECTRIC POWER COMPANY  
DISTRIBUTION STANDARDS

CONNECTION TABLE 2  
NOTE 2

FRAMED WIRE GUY WIRE  
GUY WIRE  
GUY WIRE

POLE GUY ATTACHMENT  
CURVED WASHER  
DOUBLE LOCK WASHER  
MACHINE BOLT

#4 COPPER S.D.  
CID 87843600  
NOTE 1

GALV STEEL STAPLE  
SPACED 12" TO 15"  
CID 87833100

CONNECTOR  
S.S. 70-8

GUY MARKER  
YELLOW  
CID 87840000  
[CID-87840000]  
OR  
GRAY  
CID 87840000  
[CID-87840000]  
NOTES 4 & 5

TABLE II

MATERIAL TYPE	GUY WIRE SIZE	SELECT CONNECTIONS WITH WIRE OR TAP SIZES SUITABLE FOR	REFER TO
GALV. STEEL	3/8"	UO - 240 SWH	D.S. 70-8
	1 STRAND OF 1/2"	6 SOL.	
STAINLESS STEEL (CORROSION RESISTANT)	3/8"	87875004	
	1/2"		

TABLE I  
DOWN GUY ASSEMBLIES

MATERIAL TYPE	SIZE (INCHES)	ULTIMATE STRENGTH (LBS.)	POLE GUY ATTACHMENT CID NUMBER	WASHER CID NUMBER	MACHINE BOLT CID NUMBER NOTE 4	CONSTRUCTION UNIT NOTE 3
GALV. STEEL	3/8"	15,400	47084000	87823510	3/8" x 1/2" x 1/2" LENGTH 87072000 NOTE 7 87000000	GUY-38-D-1000-1000
	1/2"	21,900	47084010			GUY-12-D-1000-1000
STAINLESS STEEL (CORROSION RESISTANT)	3/8"	12,300	47084000	33828700	87072000 AND 33897215	GUY-38-D-1000-1000-C
	1/2"	16,200	47084001	87134503	87072415	GUY-38-D-1000-1000-C

NOTES:

- ALL DOWN GUYS ASSOCIATED WITH "T" MULTI-GROUNDED NEUTRAL SYSTEMS AND ON STRUCTURES CARRYING SUPPLY CIRCUITS OF MORE THAN 500 VOLTS PHASE TO GROUND ARE TO BE GROUNDED BY RUNNING TO AN EXISTING MULTI-GROUNDED NEUTRAL CONDUCTOR OR BE ELECTRICALLY INSULATED. IF IT IS DETERMINED THAT THE GUYS BE GROUNDED. FOR THE INSTALLATION OF GUY INSULATORS, REFER TO D.S. 403 AND 406.
- BOND ALL STRINGS OF GUY WIRE TO GROUNDING CONDUCTOR FOR 3/8" INCH AND 1/2" INCH GUY. BOND A SINGLE STRAND OF 1/2" INCH GUY WIRE TO GROUNDING CONDUCTOR.
- CONSTRUCTION UNITS INCLUDE GUY ATTACHMENT, GUY GRIPS AND MOUNTING HARDWARE.
- A GUY MARKER SHALL BE INSTALLED ON THE GROUND END OF ANCHOR GUYS EXPOSED TO PEDESTRIAN TRAFFIC. GUYS MAY BE CONSIDERED EXPOSED TO PEDESTRIAN TRAFFIC WHERE THERE IS EVIDENCE OF ROUTINE PEDESTRIAN USAGE; THAT IS, AN ESTABLISHED WALKWAY, PATH, SIDEWALK, ETC. GUY MARKERS MAY ALSO BE INSTALLED AT LOCATIONS WHERE GUYS ARE EXPOSED TO POSSIBLE VEHICULAR DAMAGE; THAT IS, PARKING LOTS, DRIVEWAYS, ETC. WHERE THERE ARE MULTIPLE, PARALLEL, DOWN GUYS, ONLY THE GUY FURTHEST FROM THE POLE NEEDS TO BE MARKED WHEN MARKERS ARE REQUIRED.
- RESIDENTIAL GUY MARKERS MAY BE GRAY.
- USE DOUBLE LOCK WASHER AS AVAILABLE.
- TWO MOUNTING BOLTS ARE REQUIRED FOR CID 47084010.

JUNE 15, 2006

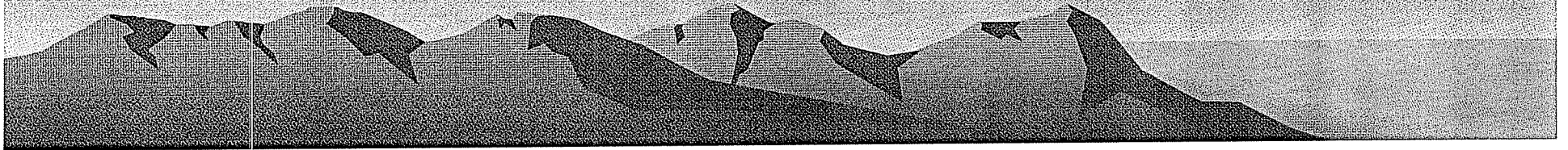
DOWN GUY ASSEMBLIES  
ALL DISTRIBUTION VOLTAGES

D.S. 403

# What to Report?

## Cross Arms:

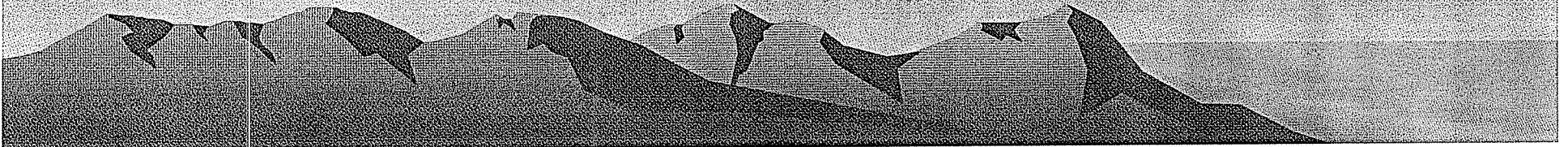
- Broken or Split
- Broken Braces
- Sagging arms in long spans
- Pins leaning or pulling out of arms



# What to Report?

## Hardware Damaged:

- Blown Lighting Arrestors
- Bad Cutouts
- Damaged Insulators -Chipped, Missing Skirts, deformed composite insulators.
- Cracked or Overloaded Cluster Brackets



# What to Report?

## Transformers / Other Equipment:

- In-Active Xfmers
- Services or Conductors Rolled up on Poles
- By-passed equipment.
- Leaking Xfmers and Equipment
- Damaged - Pad mounts dented/pushed off foundations, Pedestals broken, Conduit Risers Broken/Cracked or Pulled apart.
- Locks missing on equipment either Underground or Overhead, re: GOAB SW. Recloser Controls etc.

# What to Report?

## Conductors:

Proper Clearance - While performing inspections of existing facilities we need to take consideration of when the facilities were installed and if those facilities fall under a previous code. Generally the New code requires less clearance than previous codes requirements. While performing inspections reference should be made to the following table for Vertical/Horizontal Clearances of Neutrals, Secondary & Service conductors as defined the NESC code:

# What to Report?

<b>Minimum vertical clearances of wires/conductors above ground, roadways and other surfaces</b>				
<b>Type of Surface</b> ↓	<b>Neutral Wire, Span Guys, Messenger Wire, Telecom Cables</b>	<b>Duplex, Triplex, Quadruplex 0V to 750V L-G</b>	<b>Open Wire Secondary 0V to 750V L-G</b>  See Note 2	<b>Open Wire Primary 751V to 22kV L-G</b>  See Note 2
<b>Roads, Streets, Areas with Truck Traffic</b>  See Note 1	<b>15.5 Ft.</b>	<b>16 Ft.</b>	<b>16.5 Ft.</b>	<b>18.5 Ft.</b>
<b>Driveways, Parking Lots, Alleys</b>	<b>15.5 Ft.</b>	<b>16 Ft.</b>	<b>16.5 Ft.</b>	<b>18.5 Ft.</b>
<b>Cultivated Land, Orchards, Forests, Grazing Land</b>	<b>15.5 Ft.</b>	<b>16 Ft.</b>	<b>16.5 Ft.</b>	<b>18.5 Ft.</b>

This document is not a design guide and is to be used as a field resource only. Refer to the 2007 NESC Book for additional information on the above chart, and for clearances over railroad tracks, water, buildings, swimming pools, etc.

- If measured clearance is less than the value in this table prompt corrective action is required. If a clear and immediate endangerment to human life is found to exist, immediate safe guarding action is necessary until corrective action can be taken.
- If measured clearance is at or within 1 foot higher than the value in this table, additional review is required.
- If broken or out of sag conductors are being replaced or repaired, a one foot buffer should be added to the clearance values in the tables to determine the required clearance.

**Notes:**

1. Interstate, limited access highways, and certain other roadways may require additional clearance.
2. If current carrying conductors are not loaded to their maximum capability additional clearance is required.



# What to Report?

## Conductors:

- Clearances for Primary and Secondary and service drop conductors above roofs, Decks and porches needs to be taken into consideration.
- In general where Primary crosses directly over a Roof of a Residence or Mobile Home and the neutral is less than 3'-0" or the Primary conductor is less than 12'-6" feet above the structure, report of the issue shall be made. If the conductor is rubbing against the roof immediate action shall be taken to correct the condition.

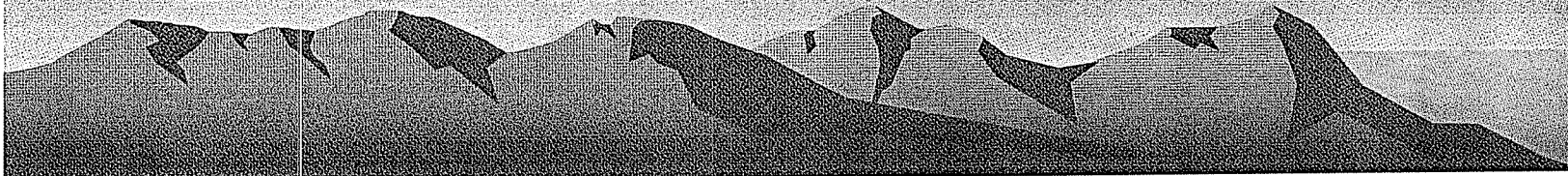
# What to Report?

- Where secondary or a service drop crosses directly over a Roof of a Residence or Mobile Home and is less than 3'-0", report of the issue should be made. If the drop is rubbing against the roof immediate action shall be taken to correct the condition.
- Where a service crosses a deck or porch and is less than 8'-0", report of the issue shall be made. If the conductor is rubbing against the deck, handrail or any portion of immediate action shall be taken to correct the condition.

# What to Report?

## Long Conductor Spans

- Report spans of 3 phase conductor exceeding 500ft on Single pole structures.
- Report any 3 phase Spans which have excessive sagging of the 3 phase conductors.



# What to Report?

## Antennas, Signs, Billboards, Tanks, Chimneys:

KYPCo recommends that customer install antennas at least  $1\frac{1}{2}$  times their height from our lines. The NESC code, Table 234-1, 750v to 22 kV, requires a clearance of 7'-6" from our lines at rest (no blow out) and 4.5 at the Blow out condition.

Antennas found during the inspection that are less than the KYPCo recommended distance of  $1\frac{1}{2}$  time their height from our lines shall be reported. A report of the approximate distance the antenna is from our facilities will be required.

# Priority for Repairs

- Immediately repair those facilities which presently are a risk to safety of the public & our employees. Repair any item that could cause an outage if not immediately attended to.

RE: A rotten pole which is badly leaning if would fall could cause an outage or is hazard to the public or may cause damage to public property.

# Priority for Repairs

- A unattached guy wire which could come in contact with energized conductors or equipment.
- Services rolled up and attached to the pole.
- NESC clearance violations where low hanging energized conductors could come in contact with vehicle or pedestrian traffic. (this could be moved to a #2 priority if deemed nonurgent).

# Priority for Repairs

- Repair those items which could become a safety or outage risk within a reasonable amount of time (3 to 6 months).

RE: A deteriorated pole which is stabilized by wires and guys and could be expected to remain in service for some time.

- Repair items which would not cause a safety or reliability concern within the next year. RE: Failed arresters, rotten crossarms.

# Priority for Repairs

- NESC clearance violations which are not a Hazard to our employees, the public or other joint users of our facilities.
- "If defects should be discovered that pose a safety risk, then timely corrective action by qualified personnel is required."



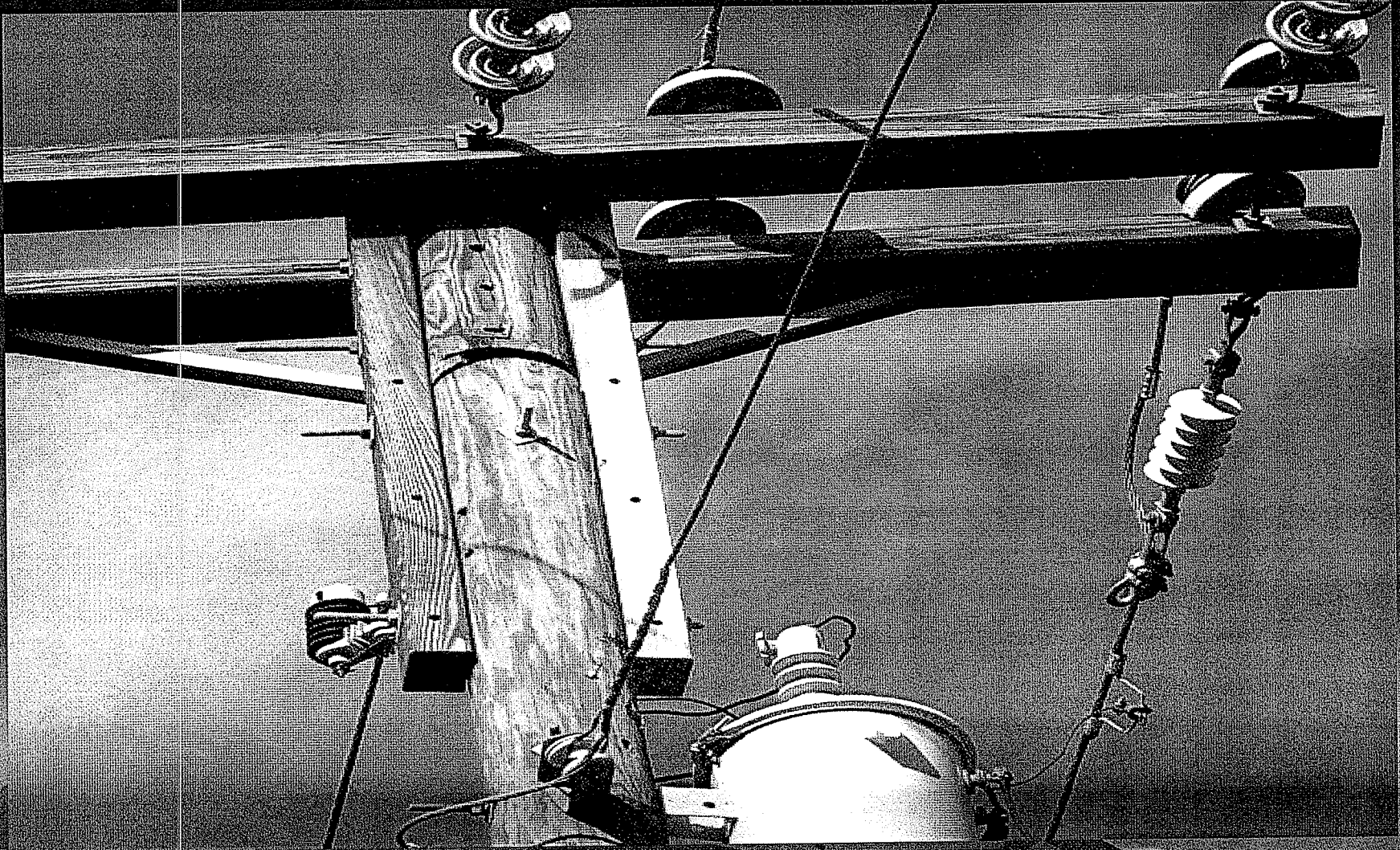
# Examples \ Pole in Slip



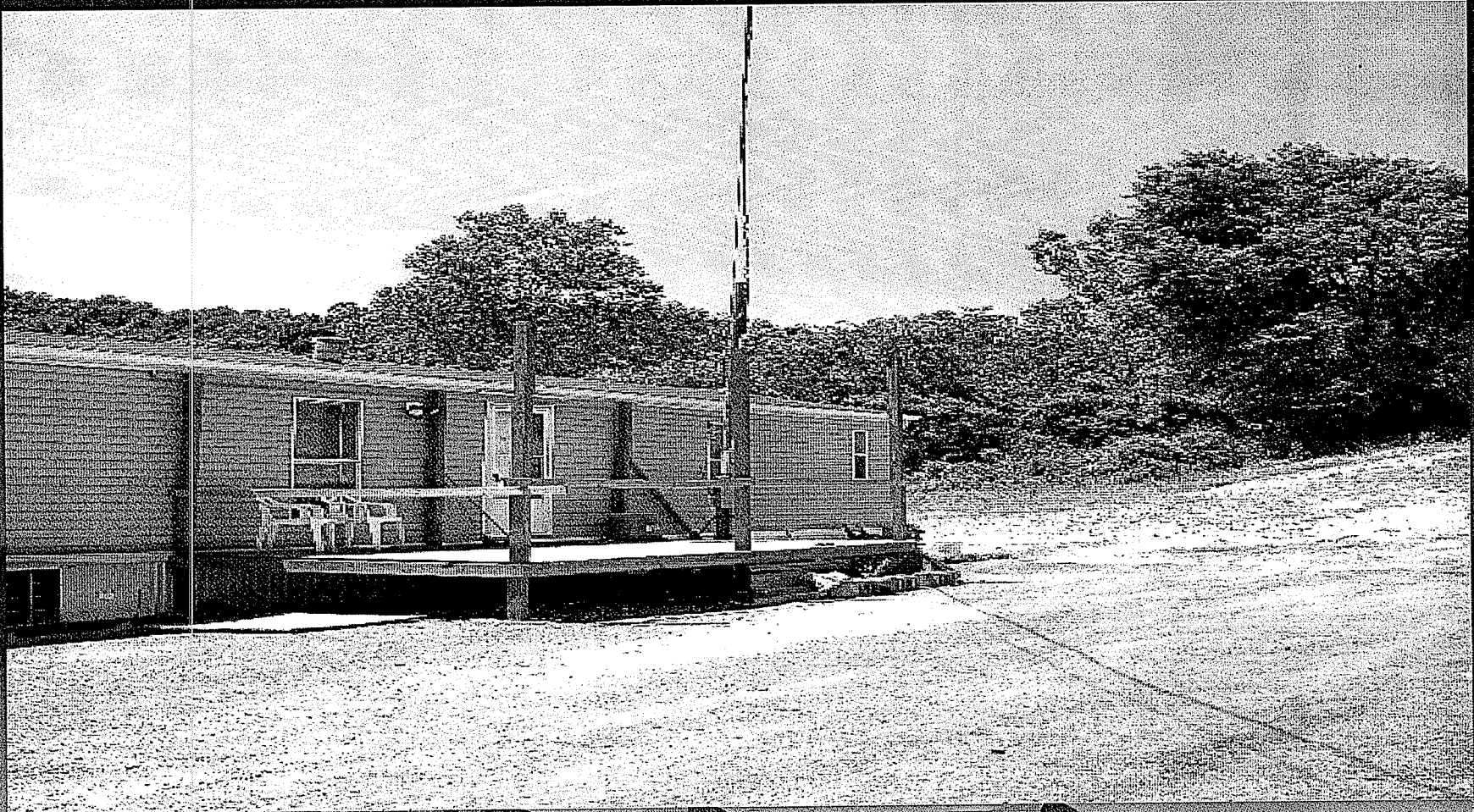
# Examples \ Broken Leaning



# Examples \ Pole Fire



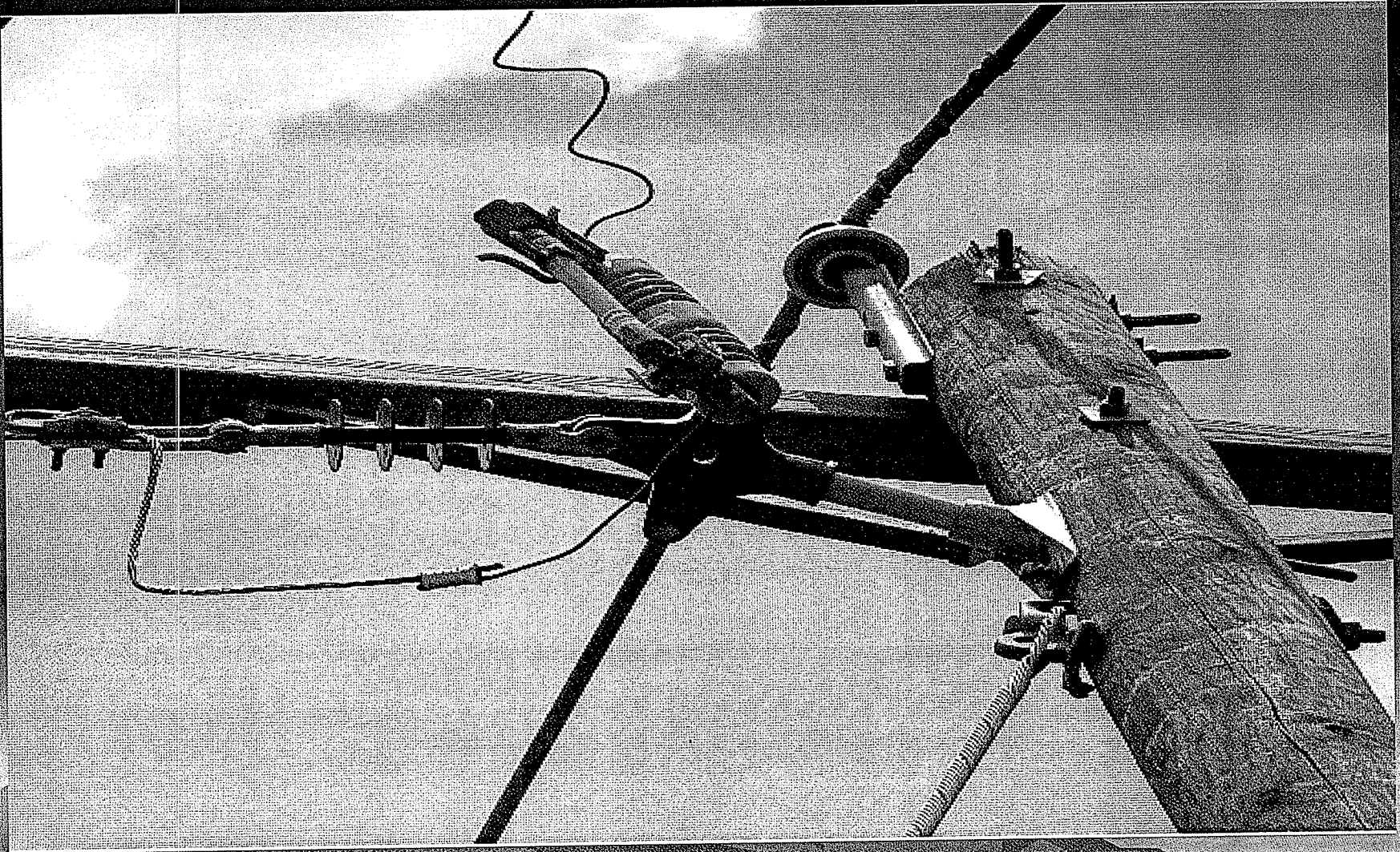
# Examples \ Drop Over Deck



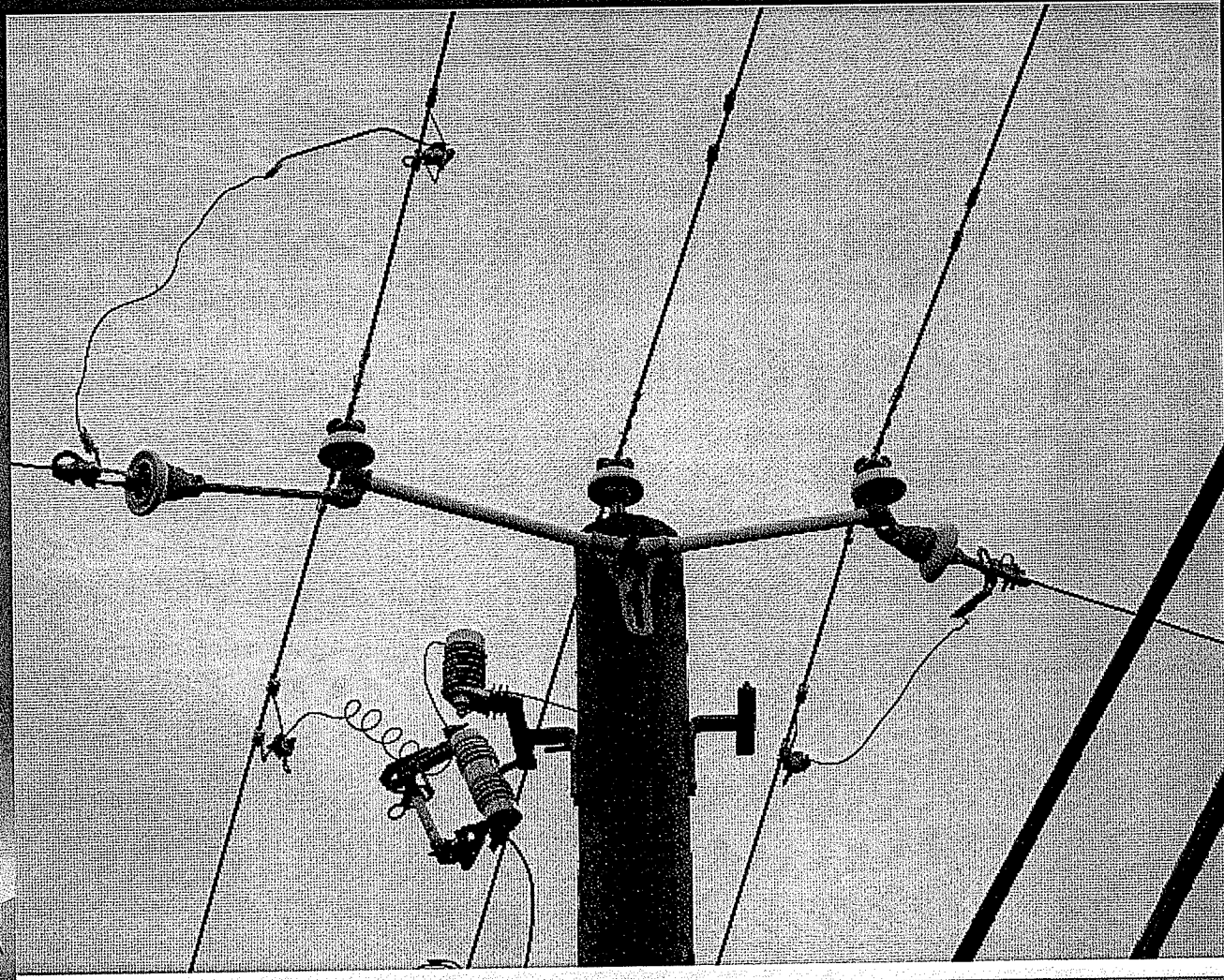
# Examples \ Bad XARM



# Examples \ Non-Standard Const.



# Examples \ Non-Standard Const.

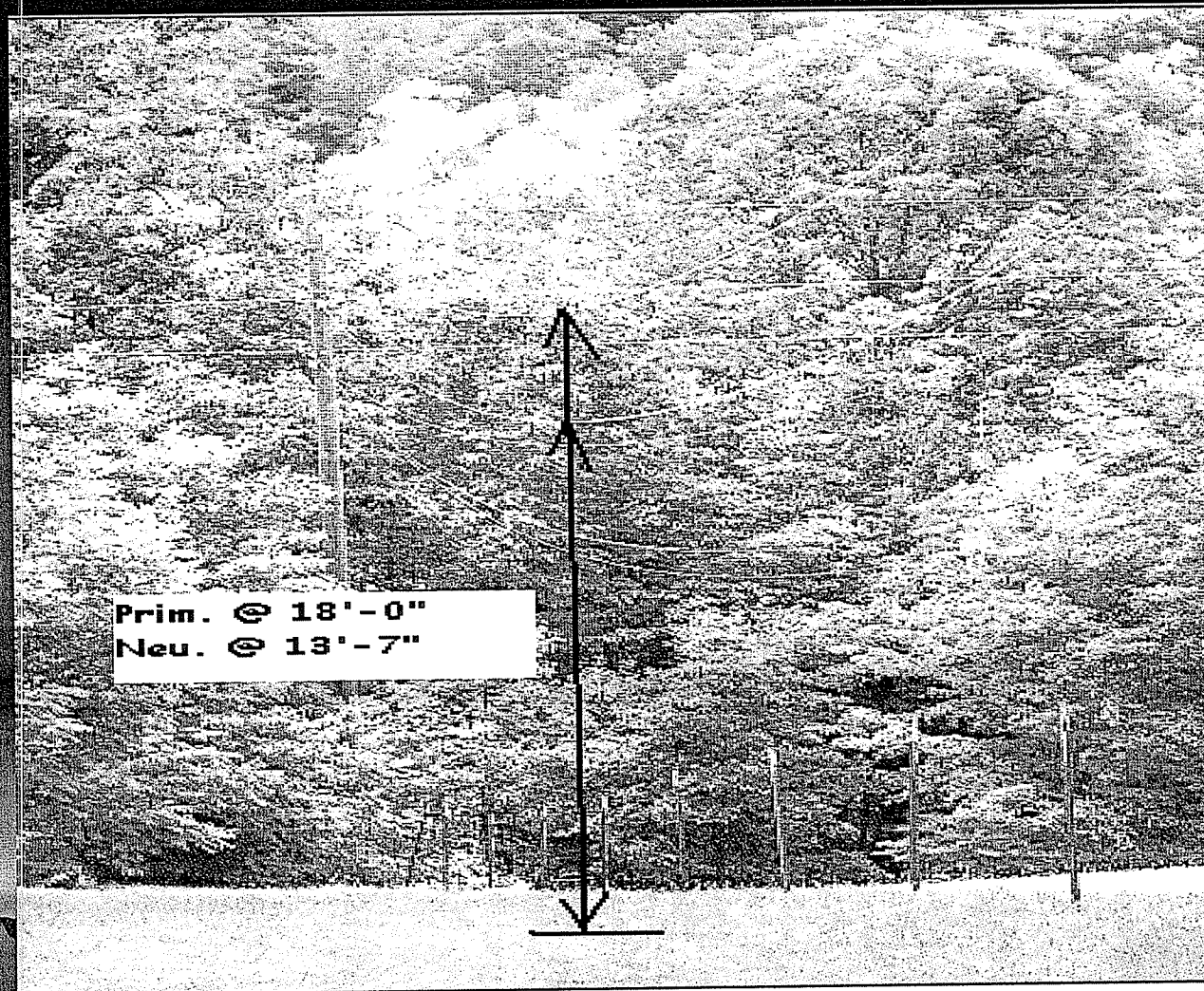


# Examples\Loose Ground

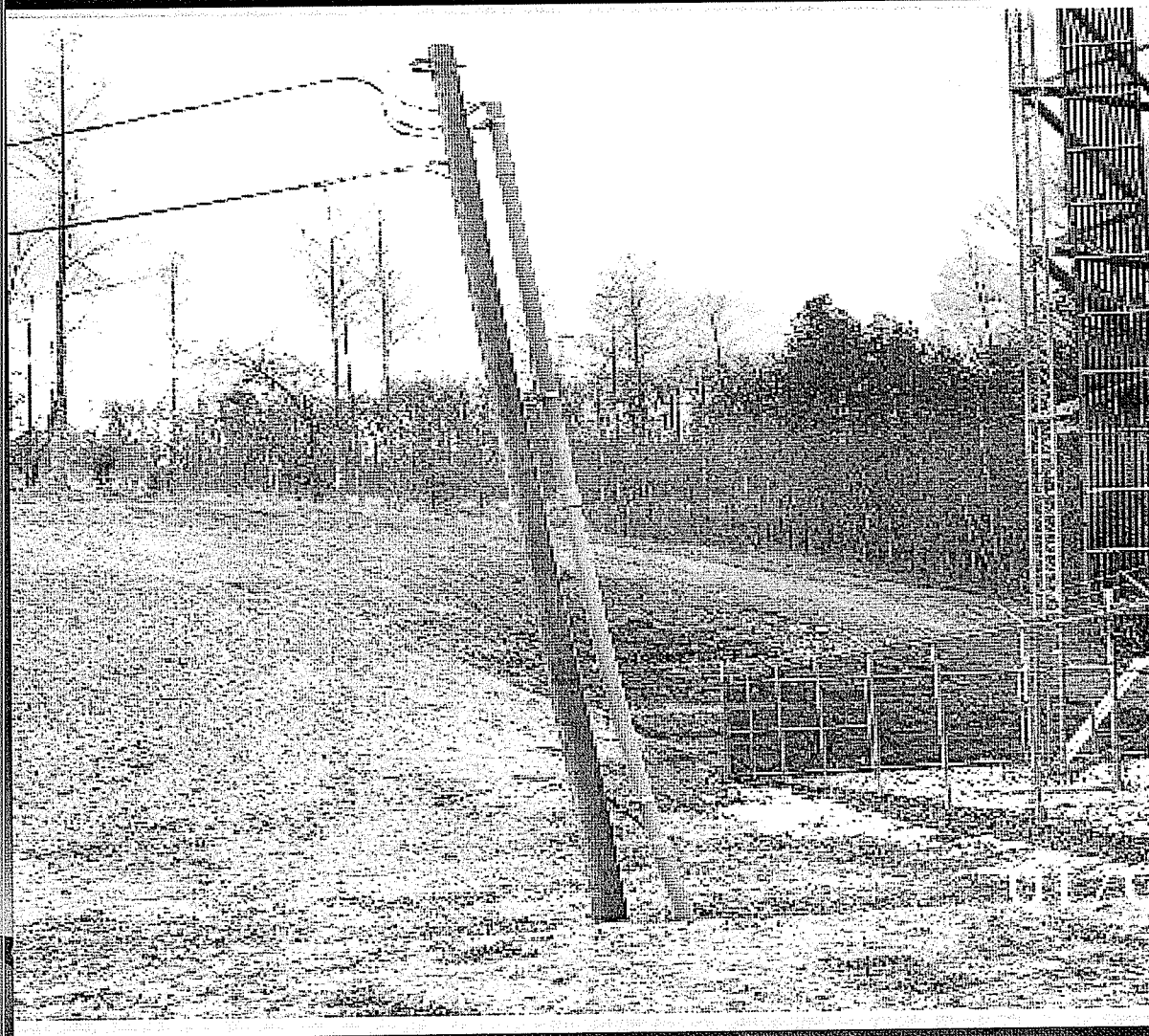




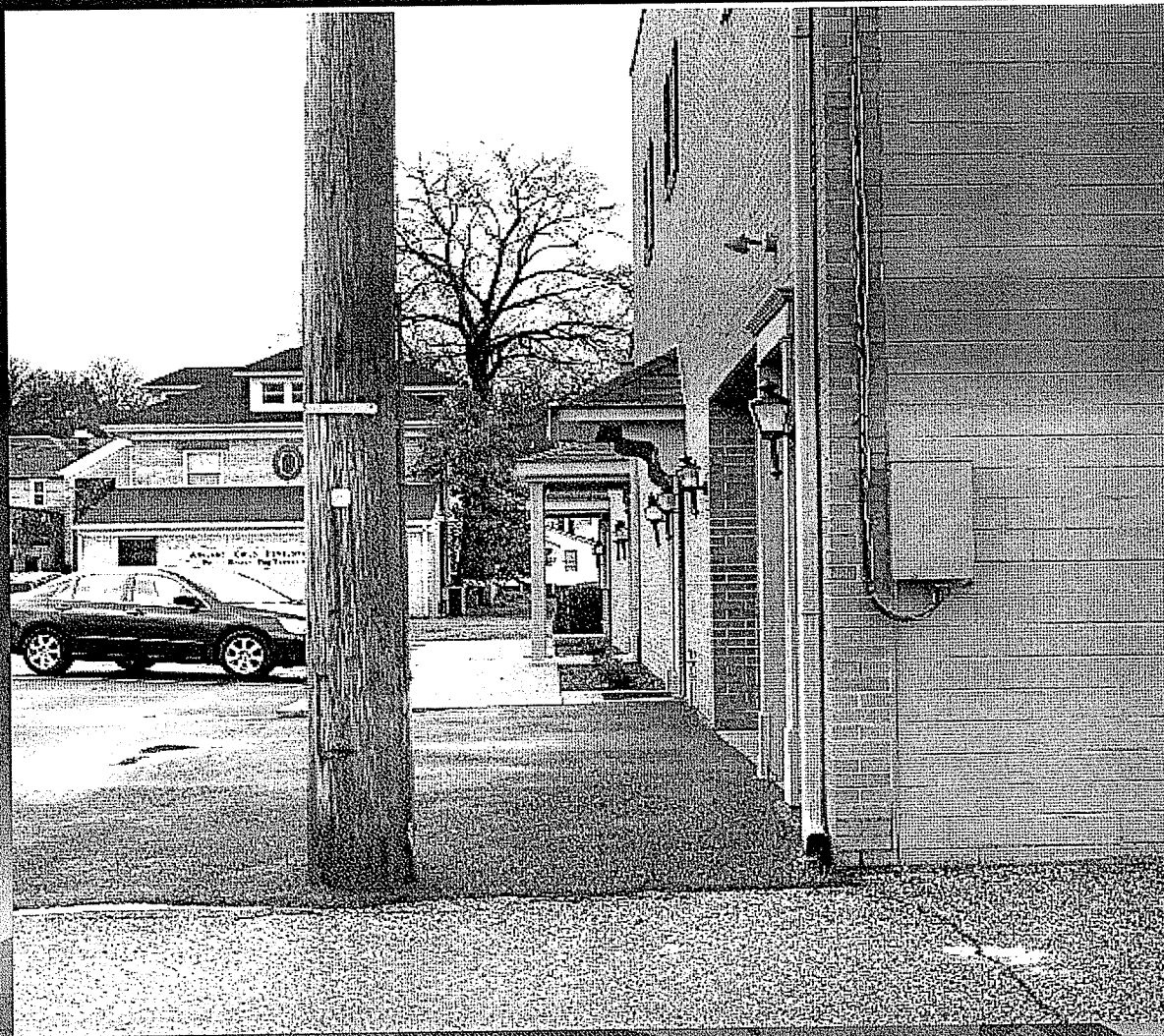
# Examples \ Low Clearance



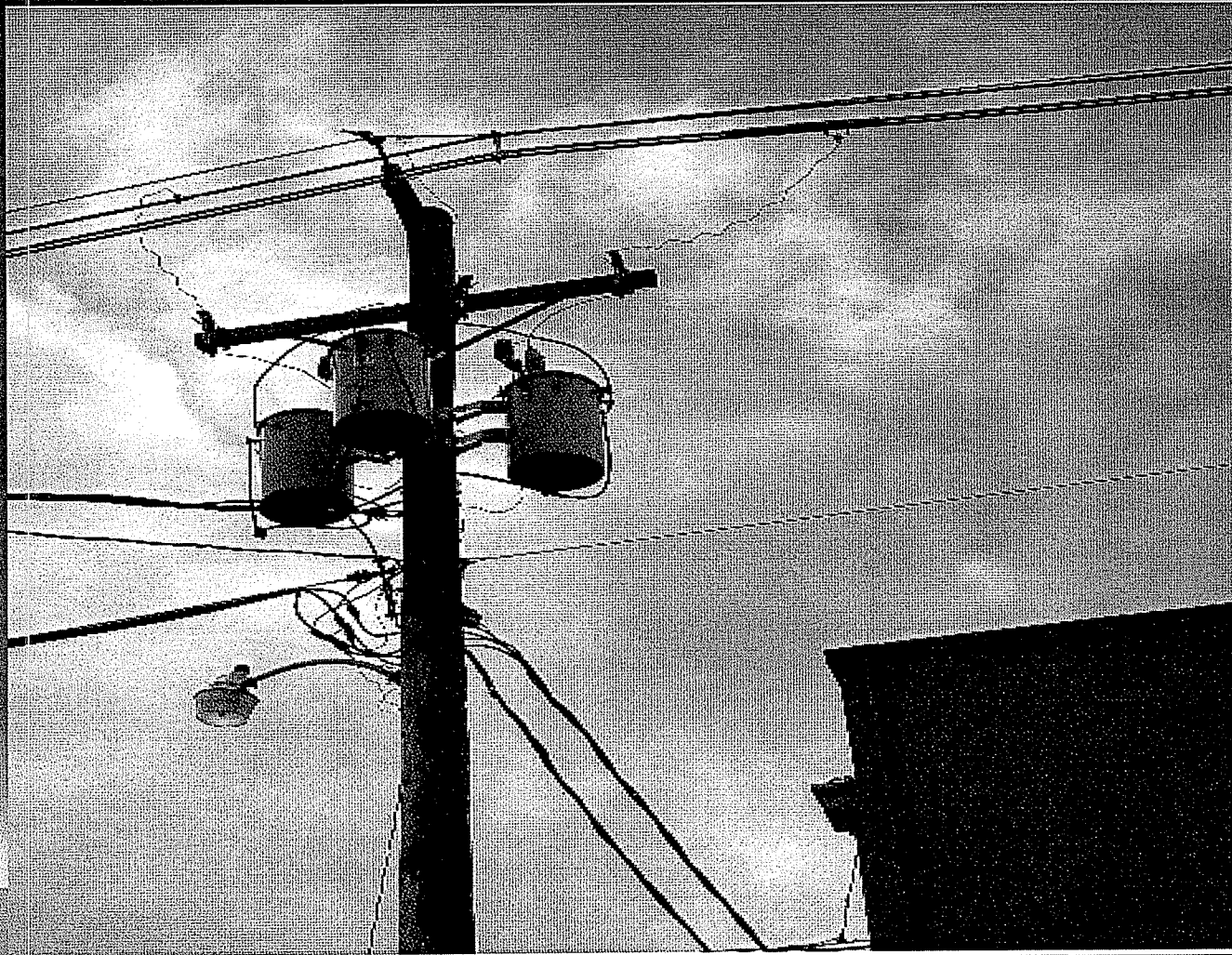
# Examples \ Un Guyed pole leaning



# Examples \ Pole Adjacent to Buildings



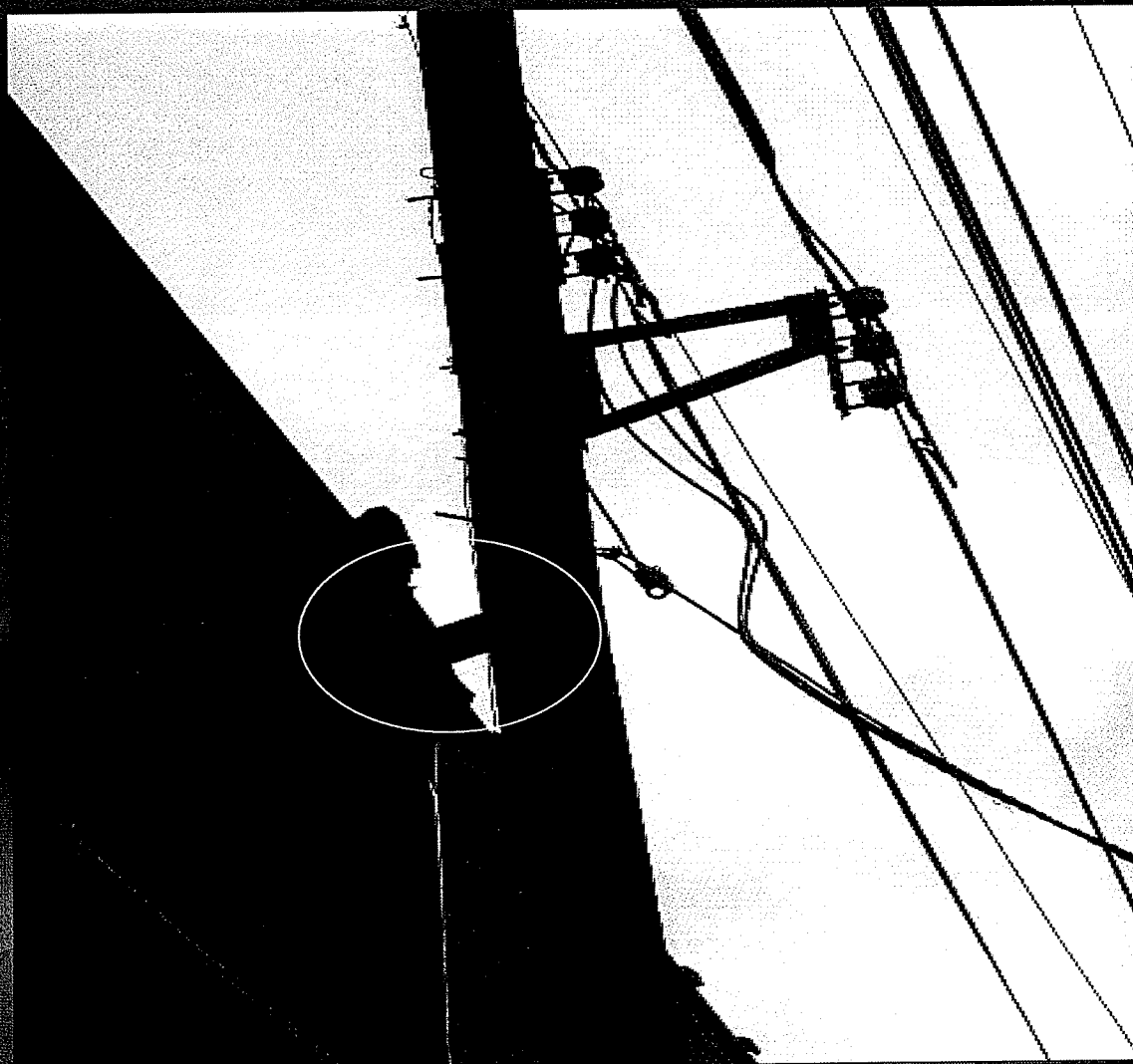
# Examples \ Pole Adjacent to Buildings



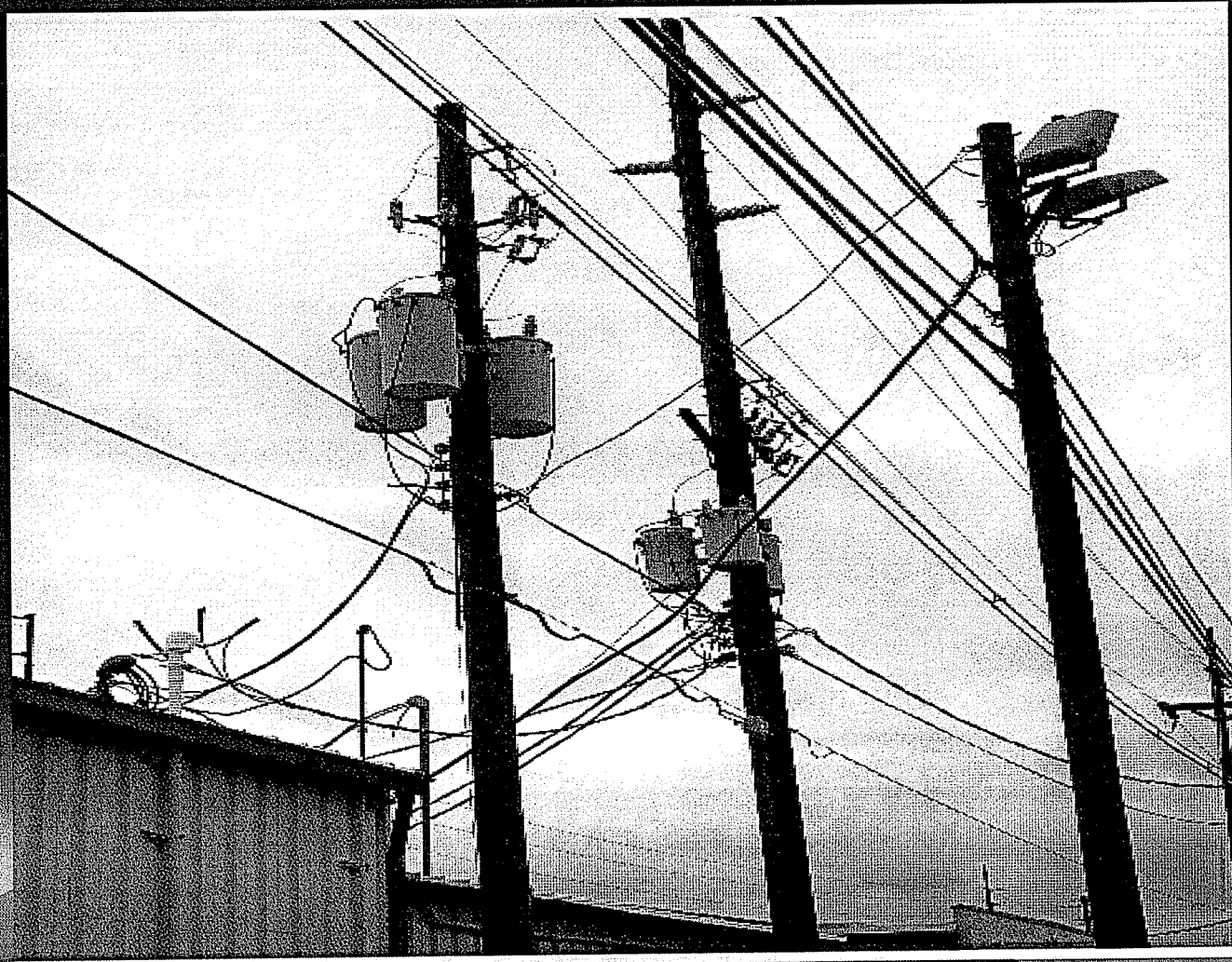
# Examples \ Pole Adjacent to Buildings



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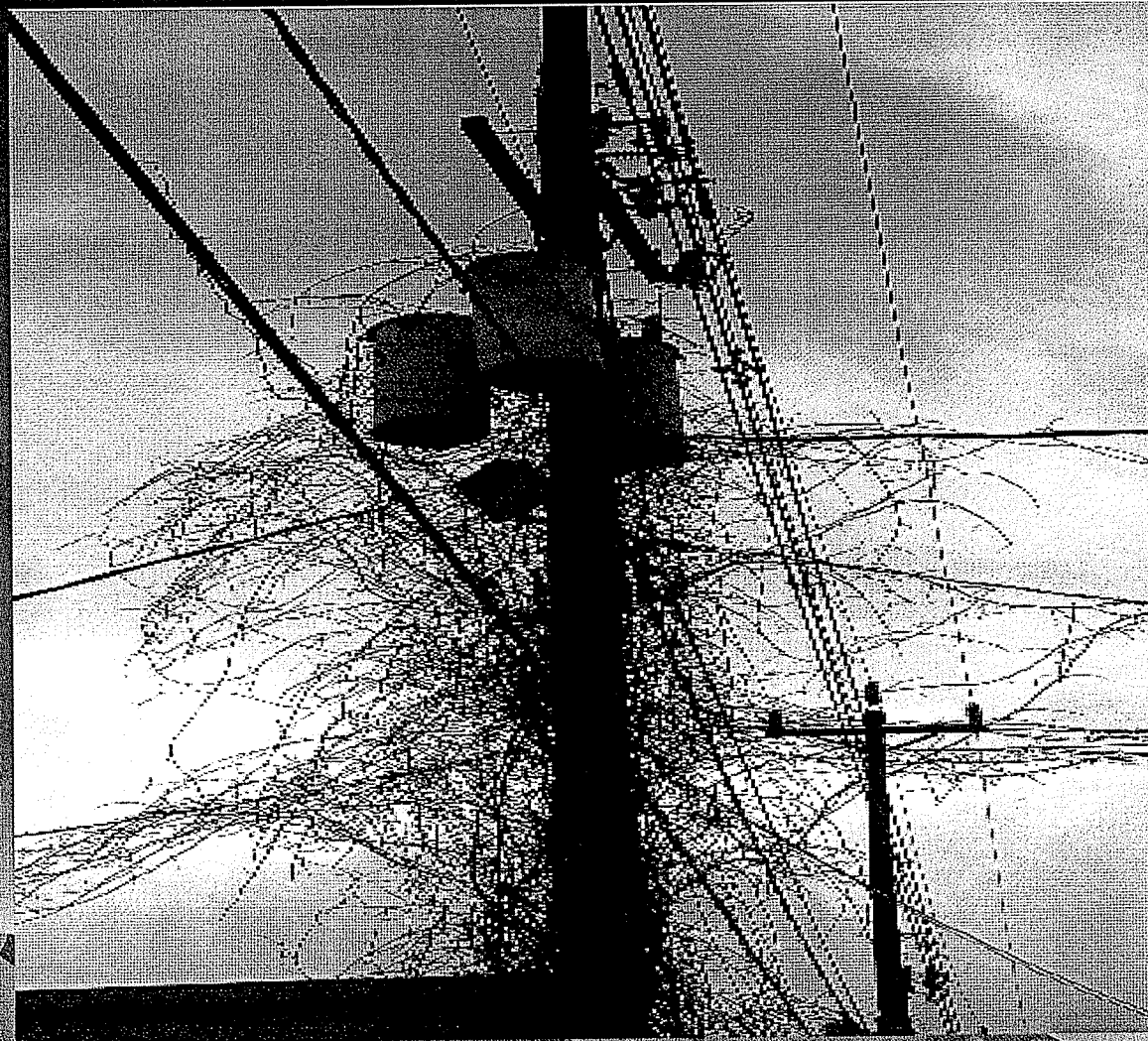


# Examples \ Slab





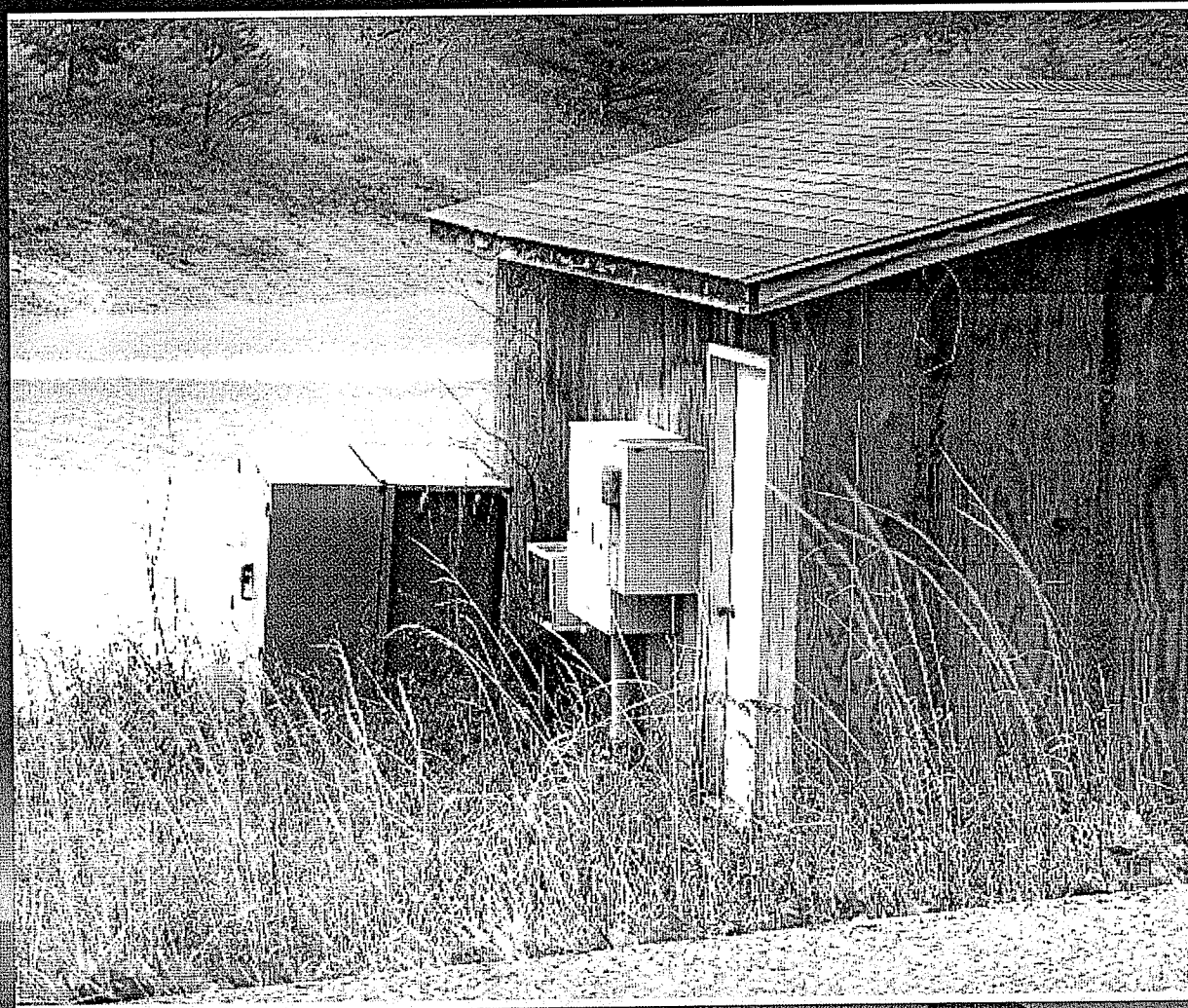
# Examples \ Vines



# Examples \ Pad Mount



# Examples \ Pad Mount



# Examples \ Pad Mount



# Examples \ UG

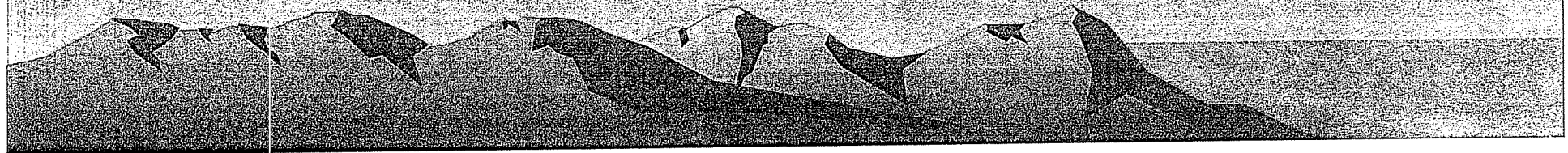


# Examples \ Meter Pedestals



# PSC Inspection Program

Guidelines for Circuit Inspection  
Service Premise Inspection



# Overall Program Objective

The objective of this program is to visually inspect all overhead and the external, above ground portions of underground facilities on a 2 year cycle to identify and correct deficiencies necessary for the safety of employees and the public under the conditions specified in the NESC and for system reliability.



# Circuit Criteria

A list of Circuits to be inspected are identified on a biannual basis. Circuits are identified based on the circuit miles. Keeping a balance of miles in each 2 yr cycle.

# What we are looking For

## Overhead :

Driving or foot patrol inspections are conducted as appropriate looking for obvious defects such as loose down guys, broken grounds, cracked insulators, lightning arresters with blown isolators, deteriorated crossarms having inadequate strength, low conductors, etc. Electrical and mechanical defects observed will be identified and the information will be collected so appropriate corrective action can be taken.

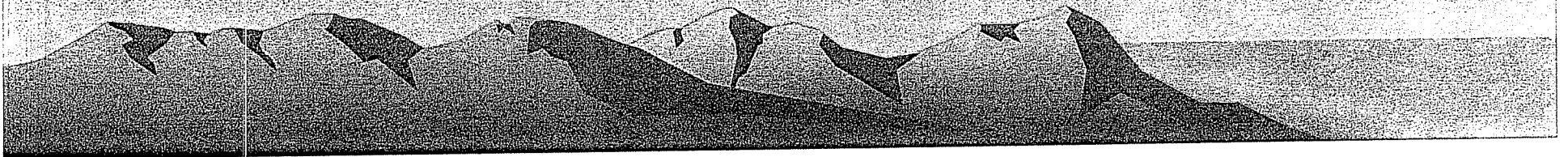
# What we are looking For

## Underground:

An external, visual inspection of the above ground portion of underground systems including pad-mounted equipment (transformers, switches, primary metering enclosures, junction cabinets, etc.), pedestals and the underground associated components of primary riser poles.

# What we are looking For

The external inspection will be conducted to determine that the equipment is locked and secure and that there are no openings that might allow access to the interior of the equipment via soil erosion, cabinet or conduit deterioration or by other means such as vandalism.



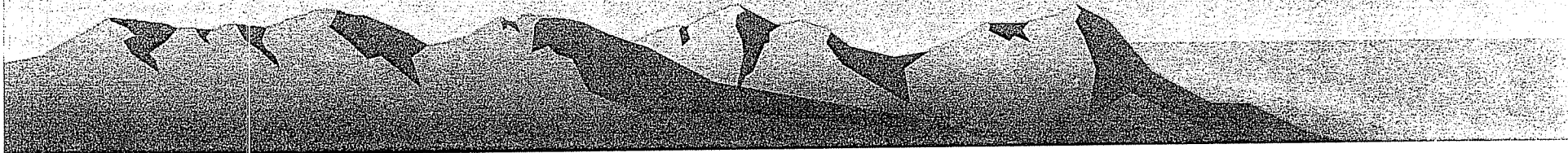
# Meter Inspection Criteria

Due to the conversion from mechanical meters to automated meters we are not visiting each premise as we did when reading mechanical meters. To meet the requirements of the PSC inspection we must make a visit to each of these automated meters every 2 years.

# Meter Inspection Criteria

To help meet these requirements the MRO group will perform a biannual inspection of the cycle routes which have automated metering devices.

Following is the process to be followed for the inspection.



# Meter Inspection Process Outline

The process for inspecting services metered by automated meters:

- The Route to be read is loaded in Meter readers Road Runner.
- A print out of the Cycle\Route containing automated meters is printed and assigned to a inspector. ( Copy will remain in the office until inspection is complete)
- The inspector reads the route and at each premise inspects the overhead or underground portions of the service from the service pole to the meter base.
- Deficiencies which are meter reading issues, broken seals, Cracked (not broken) meter covers, programming or communication issues are noted in the Road Runner as Investigation orders.

# Meter Inspection Process Outline

- Deficiencies found which are hazards to the public re: open hot meter base, hot conductor on ground, Shall be immediately called into Field Com. And an Investigation Order created (IO02)
- Deficiencies found which are not immediate Hazards but require investigation are low service drops (greater than 8ft), house knob pulled loose, meter base pulled loose, Damaged or leaning mast, damaged or leaning mast pipe. Shall be immediately called into Field Com. Appropriate Investigation Order created.
- Field com. reviews IO report for route and denotes inefficiencies found on paper copy of route report.



# Meter Inspection Process Outline

- The Supervisor reviews the report for deficiencies and has the meter reader review and sign off on the report.
- The route report with the recorded deficiencies which were not investigated by a first responder is forwarded to the lead techs in customer design for action.
- Customer design will create work request for any repairs needed and record work request numbers for the repairs on the report.
- The Lead Tech will return the report to the MRO supervisor to file.

# Meter Inspection Process Detail

Investigation Orders to be reported are as followed:

IO02 Unsafe Condition - Immediate attention required.

IO10 Equipment repair - To be issued for loose house knobs, meter base loose.

IO16 Damage Pole - Customer pole leaning or KYPCO pole leaning or damaged.

IO32 Service Relocate - Service Drop crossing over deck or swimming pool and is less than code clearance.

IO47 Re-sag Drop - Low Service less than 12'-0" that needs to be pulled up but is not a Hazard.

# Meter Inspection Process Detail

Deficiencies found which are hazards to the public re: open hot meter base, hot conductor on ground, Shall be immediately called into Field Com. (IO02 Unsafe Condition - Immediate attention required).

- Meter Reader will report to Field Com the condition found.
- If the condition is a Hazard to the public Meter Reader will barricade area if required and will remain at premise until released by a First Responder.
- Field Com will generate a trouble order for the premise. Routing order to the DDC.
- Field Com will generate a IO02 (Unsafe Condition) for the condition and route the order to the First Responder for completion along with the trouble order.

# Meter Inspection Process Detail

- DDC will route First responder to premise to investigate.

Upon arriving at site First responder will determine if Meter reader can be released or stand by until Hazard is cleared.

- First Responder will make repairs and complete trouble order and IOO2 Noting Corrections made.
- When repairs require additional crew to repair, First Responder will contact Duty Supervisor requesting crew assistance.
- If the servicer stays on site the repair order will remain with on the servicers spectrum. If he leaves the order should be transferred to the repair crew.

# Meter Inspection Process Detail

- Deficiencies found which are not immediate Hazards but require investigation are low service drops (greater than 8ft), house knob pulled loose, meter base pulled loose, Damaged or leaning mast, damaged or leaning mast pipe.
- Meter Reader calls Field Com to report condition found.
- Filed Com associate will create the appropriate Investigation order (IO) for the condition found. Noting the issue found.
- The IO is then routed to a First Responder to investigate.
- First Responder determines if repairs can be made at the time of the investigation. Repairs that can be made by the First Responder will be completed.  
The order will be completed noting the correction made.

# Meter Inspection Process Detail

- When First responder determines repairs will require a work order from Customer Design, the IO will be updated with comments of repairs needed by engineer, such as relocate drop, needs secondary, Needs Pole to relocate drop or Pole to raise drop.
- First Responder notes issue found in the IO. Then updates the order.
- First responder then transfers the IO order to the Lead Technicians spectrum ID for review.

# Meter Inspection Process Detail

- The Lead Technician reviews the Order in Spectrum. If required the order will be transferred to area technician to review for repairs needed.
- When a work orders is required, The work order will be created from the IO order

# What to Report?

## Conductors:

Proper Clearance - While performing inspections of existing facilities we need to take consideration of when the facilities were installed and if those facilities fall under a previous code. Generally the older codes require less clearance for services than previous code requirements. While performing inspections reference should be made to the following tables for Vertical/Horizontal Clearances of Neutrals, Secondary & Service conductors as defined the NESC code:



# What to Report?

Minimum vertical clearances of wires/conductors above ground, roadways and other surfaces				
Type of Surface ↓	Neutral Wire, Span Guys, Messenger Wire, Telecomm Cables	Duplex, Triplex, Quadruplex 0V to 750V L-G	Open Wire Secondary 0V to 750V L-G  See Note 2	Open Wire Primary 751V to 22kV L-G  See Note 2
Roads, Streets, Areas with Truck Traffic  See Note 1	15.5 Ft.	16 Ft.	16.5 Ft.	18.5 Ft.
Driveways, Parking Lots, Alleys	15.5 Ft.	16 Ft.	16.5 Ft.	18.5 Ft.
Cultivated Land, Orchards, Forests, Grazing Land	15.5 Ft.	16 Ft.	16.5 Ft.	18.5 Ft.

This document is not a design guide and is to be used as a field resource only. Refer to the 2007 NESC Book for additional information on the above chart, and for clearances over railroad tracks, water, buildings, swimming pools, etc.

- \* If measured clearance is less than the value in this table prompt corrective action is required. If a clear and immediate endangerment to human life is found to exist, immediate safe guarding action is necessary until corrective action can be taken.
- \* If measured clearance is at or within 1 foot higher than the value in this table, additional review is required.
- \* If broken or out of sag conductors are being replaced or repaired, a one foot buffer should be added to the clearance values in the tables to determine the required clearance.

Notes:  
 1. Interstate, limited access highways, and certain other roadways may require additional clearance.  
 2. If current carrying conductors are not loaded to their maximum capability additional clearance is required.

# What to Report?

## SERVICE DROP CABLE CLEARANCES

NATURE OF SURFACE UNDERNEATH SERVICE DROP CABLE	VERTICAL CLEARANCE ABOVE SURFACE FOR SERVICE DROP CABLE (FEET) NOTES 1 AND 2
TRACK RAILS OF RAILROADS	24.0
ROADS, STREETS, DRIVEWAYS, PARKING LOTS, ALLEYS AND OTHER AREAS SUBJECT TO TRUCK TRAFFIC NOTE 3	15.0
DRIVEWAYS, PARKING LOTS, AND ALLEYS	16.0 NOTE 4
SPACES AND WAYS SUBJECT TO PEDESTRIANS OR RESTRICTED TRAFFIC ONLY NOTE 5	12.0 NOTE 6
ROOFS OR BALCONIES	11.0 NOTE 7
SWIMMING POOLS	22.5 NOTE 8

# What to Report?

## NOTES:

1. ALL CLEARANCES LISTED ARE SPECIFIED BY THE NESC. THESE ARE MINIMUM CLEARANCES WHICH MUST BE MET FOR THE SAC CONDITION WHICH CAN OCCUR EITHER AT: MAXIMUM OPERATING CONDUCTOR TEMPERATURE OR, MAXIMUM LOADING AT 32° F, NESC ICE, FINAL SAG.

AN INCREASE IN DESIGN CLEARANCE AT TIME OF INSTALLATION IS RECOGNIZED AND ACCEPTABLE TO ACCOUNT FOR FUTURE RESURFACING OR GRADE CHANGES. A 12 INCH INCREASE IS TYPICAL IN LIEU OF ANY SPECIFIC INFORMATION. IT IS RECOMMENDED THAT THIS FACTOR SHOULD BE CONSIDERED AND, AS APPROPRIATE, INCLUDED WHEN PLANNING SERVICE INSTALLATIONS.

A POINT OF CLARIFICATION IS NECESSARY REGARDING WHAT CAN APPEAR TO BE A 2 FOOT INCONSISTENCY BETWEEN THE NESC AND THE NEC FOR CLEARANCES OVER "ROADS, STREETS, DRIVEWAYS, PARKING LOTS, ALLEYS AND OTHER AREAS SUBJECT TO TRUCK TRAFFIC" (NESC - 18 FEET VS. NEC - 16 FEET). NEC CLEARANCES ARE SPECIFIED (WITH LESS SAG) AT A CONDUCTOR TEMPERATURE OF 60° F., NO WIND, WITH FINAL UNLOADED SAG IN THE CONDUCTOR. THE 2 FOOT DIFFERENCE IS PARTIALLY ATTRIBUTED TO COMPARATIVELY LARGER SAG BY NESC SPECIFICATIONS. ADDITIONAL ALLOWANCES MADE FOR RESURFACING, ETC. IN APPLICATION OF THE NESC RULE WILL ACCOUNT FOR THE REST OF THE 2 FOOT DIFFERENCE. A SERVICE INSTALLED TO EITHER SPECIFICATION WOULD BE VERY SIMILAR WHEN ANALYZED BY THE OTHER. THEREFORE, THERE IS NO PRACTICAL INCONSISTENCY BETWEEN THE TWO CODES IN THIS SITUATION.

2. IN ADDITION TO PROPER DESIGN FOR GROUND/SURFACE CLEARANCES, BE CAREFUL TO PROVIDE CLEARANCES FROM BUILDING OPENINGS, WINDOWS, DOORS ETC. (TYPICALLY 3'-0"). PROVIDE A MINIMUM CLEARANCE OF 3 INCHES FROM DOWNSPOUTS AND EAVES FOR SERVICE CONDUCTORS 0 TO 750 VOLT. FOR CONDUCTORS MEETING NESC RULE 230C1, 230C2 OR 230C3 THIS CLEARANCE MAY BE REDUCED TO 1 INCH. ROUTE SERVICES SO THAT RAISED PATIO/DECK AREAS CAN BE AVOIDED IF POSSIBLE. AS AN ALTERNATIVE, CONSIDER PROVIDING ADDITIONAL CLEARANCE, WHEN FEASIBLE.
3. TRUCKS ARE DEFINED AS ANY VEHICLE EXCEEDING 8 FEET IN HEIGHT. AREAS NOT SUBJECT TO TRUCK TRAFFIC ARE AREAS WHERE TRUCK TRAFFIC IS NOT NORMALLY ENCOUNTERED NOR REASONABLY ANTICIPATED.

4. FOR RESIDENTIAL DRIVEWAYS ONLY, WHEN A BUILDING DOES NOT HAVE SUFFICIENT HEIGHT TO ALLOW A SERVICE ATTACHMENT LOCATION WHICH WILL PROVIDE 15 FEET OF CLEARANCE, THE CLEARANCES MAY BE REDUCED TO:

SERVICES 277 VLG:

IN-SPAN GROUND CLEARANCE - 12.5 FEET  
DRIP LOOP GROUND CLEARANCE - 10.5 FEET

SERVICES 120 VLG:

IN-SPAN GROUND CLEARANCE - 12.0 FEET  
DRIP LOOP GROUND CLEARANCE - 10.0 FEET

5. SPACES AND WAYS SUBJECT TO PEDESTRIAN OR RESTRICTED TRAFFIC ONLY ARE THOSE AREAS WHERE RIDERS ON HORSEBACK, VEHICLES OR OTHER MOBILE UNITS EXCEEDING 8 FEET IN HEIGHT, ARE PROHIBITED BY REGULATION OR PERMANENT TERRAIN CONFIGURATIONS OR ARE OTHERWISE NOT NORMALLY ENCOUNTERED NOR REASONABLY ANTICIPATED.
6. WHEN A BUILDING DOES NOT HAVE SUFFICIENT HEIGHT TO ALLOW A SERVICE ATTACHMENT LOCATION WHICH WILL PROVIDE 12 FEET OF CLEARANCE, THE CLEARANCE MAY BE REDUCED TO:  
SERVICES 277 VLG:  
IN-SPAN GROUND CLEARANCE - 10.5 FEET  
DRIP LOOP GROUND CLEARANCE - " "  
SERVICES 120 VLG:  
IN-SPAN GROUND CLEARANCE - 10.0 FEET  
DRIP LOOP GROUND CLEARANCE - " "
7. WHERE ROOFS OR BALCONIES ARE NOT READILY ACCESSIBLE AND WHERE VOLTAGE BETWEEN SERVICE CONDUCTORS DOES NOT EXCEED 300 VOLTS OR WHERE CABLES MEETING NESC RULE 230C2 OR 230C3 AND VOLTAGE DOES NOT EXCEED 750 VOLTS, CLEARANCE MAYBE REDUCED TO 3.0 FEET.
8. CLEARANCE IN ANY DIRECTION FROM THE POOL WATER LEVEL, EDGE OF POOL, BASE OF DIVING PLATFORM OR ANCHORED RAFT. CLEARANCE IN ANY DIRECTION TO A DIVING PLATFORM IS 14.5 FEET.

# What to Report?

## Conductors:

- Clearances for Primary and Secondary and service drop conductors above roofs, Decks and porches needs to be taken into consideration.
- In general where Primary crosses directly over a Roof of a Residence or Mobile Home and the neutral is less than 3'-0" or the Primary conductor is less than 12'-6" feet above the structure, report of the issue shall be made. If the conductor is rubbing against the roof immediate action shall be taken to correct the condition.

# What to Report?

## Services:

- Where service drop crosses over a Roadway and is less than 16ft.
- Where a Service crosses over a driveway and is less than 12ft.
- Where a service crosses over a yard and is less than 10ft.
- Where a service crosses over land that can be transverse by a vehicle or farm equipment 16ft.

# What to Report?

## Services:

- Where secondary or a service drop crosses directly over a Roof of a Residence or Mobile Home and is less than 3'-0", report of the issue should be made. If the drop is rubbing against the roof immediate action shall be taken to correct the condition.
- Where a service crosses a deck or porch and is less than 11'-0", report of the issue shall be made. If the conductor is rubbing against the deck, handrail or any portion of immediate action shall be taken to correct the condition.

# What to Report?

## Services:

- Services found rolled up on poles.
- Loose meter bases.
- Deteriorated meter bases
- Broken Glass\Plastic on meter
- Loose mast pipes
- Deteriorated entrance cables where the insulation is flaking off the conductors
- Any bare exposed conductors
- Connection that appear to be overheated
- Customer tampering.

# Priority for Repairs

- Immediately repair those facilities which presently are a risk to safety of the public & our employees. Repair any item that could cause an outage if not immediately attended to.

RE: A rotten pole which is badly leaning if would fall could cause an outage or is hazard to the public or may cause damage to public property.



# Priority for Repairs

- A unattached guy wire which could come in contact with energized conductors or equipment.
- Services rolled up and attached to the pole.
- NESC clearance violations where low hanging energized conductors could come in contact with vehicle or pedestrian traffic. (this could be moved to a #2 priority if deemed nonurgent).

# Priority for Repairs

- Repair those items which could become a safety or outage risk within a reasonable amount of time (3 to 6 months).

RE: A deteriorated pole which is stabilized by wires and guys and could be expected to remain in service for some time.

- Repair items which would not cause a safety or reliability concern within the next year. RE: Failed arresters, rotten crossarms.

# Priority for Repairs

- NESC clearance violations which are not a Hazard to our employees, the public or other joint users of our facilities.
- "If defects should be discovered that pose a safety risk, then timely corrective action by qualified personnel is required."

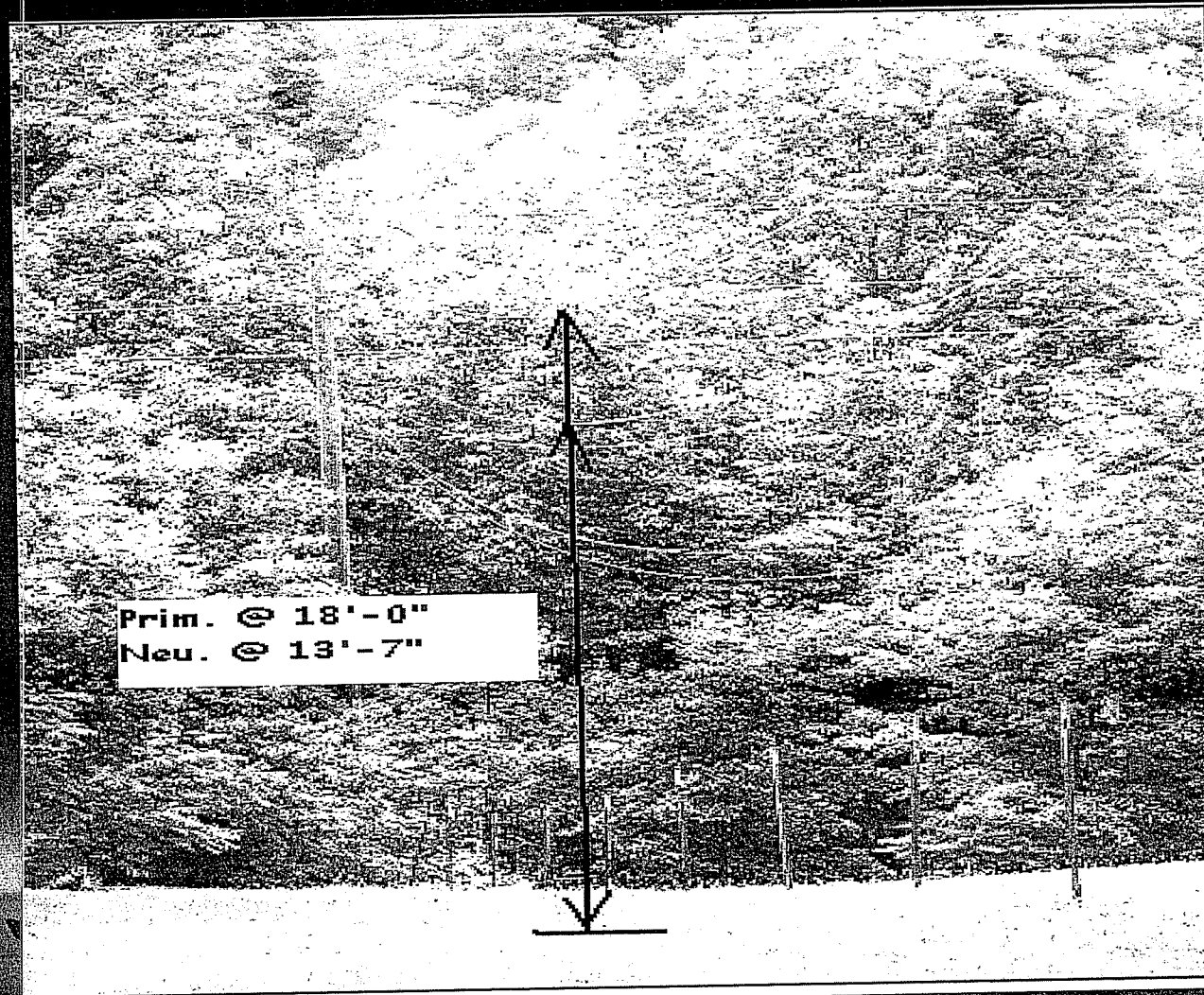
# Examples \ Pole in Slip



# Examples \ Broken Leaning



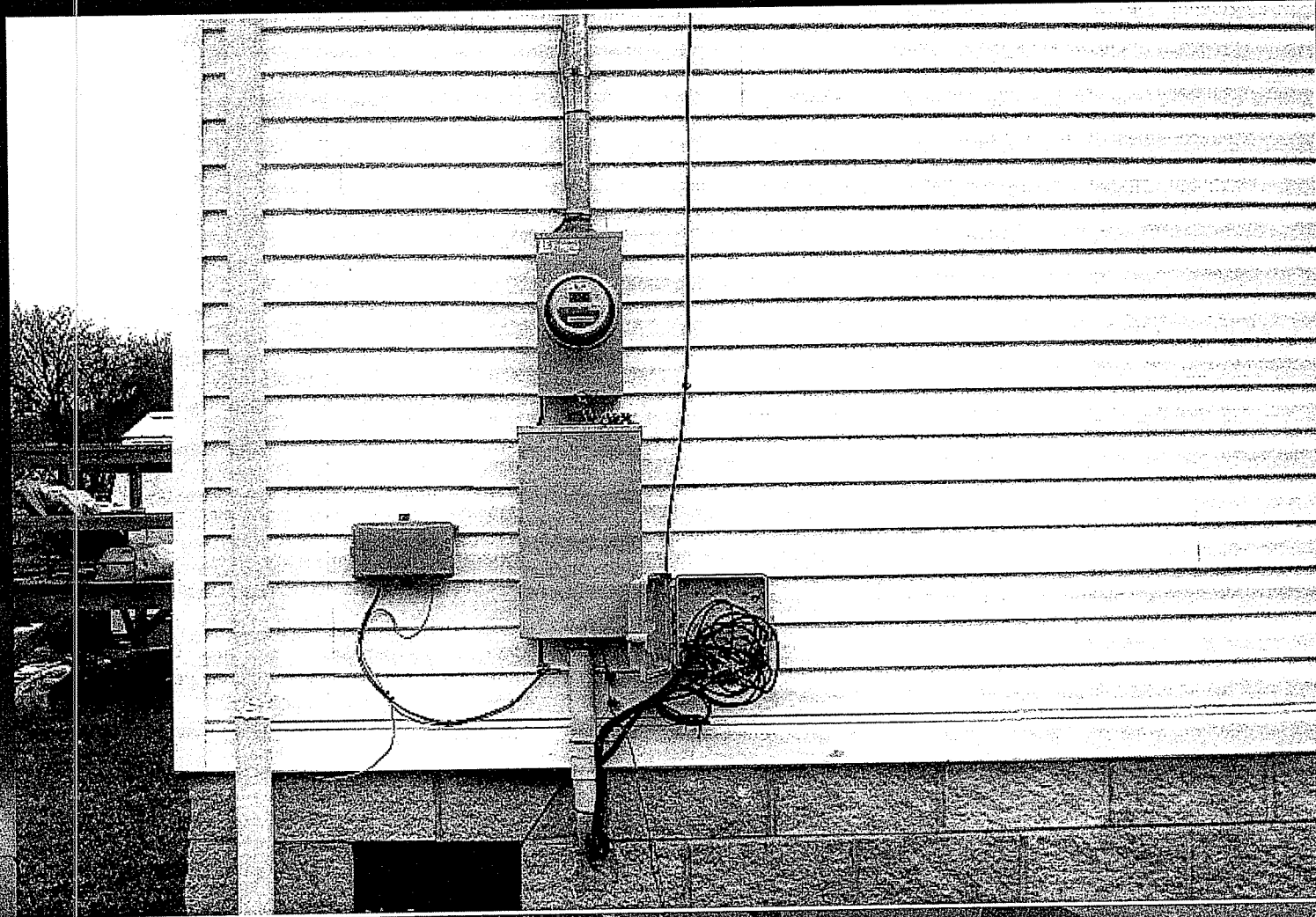
# Examples \ Low Clearance



# Examples \ Drop Over Deck

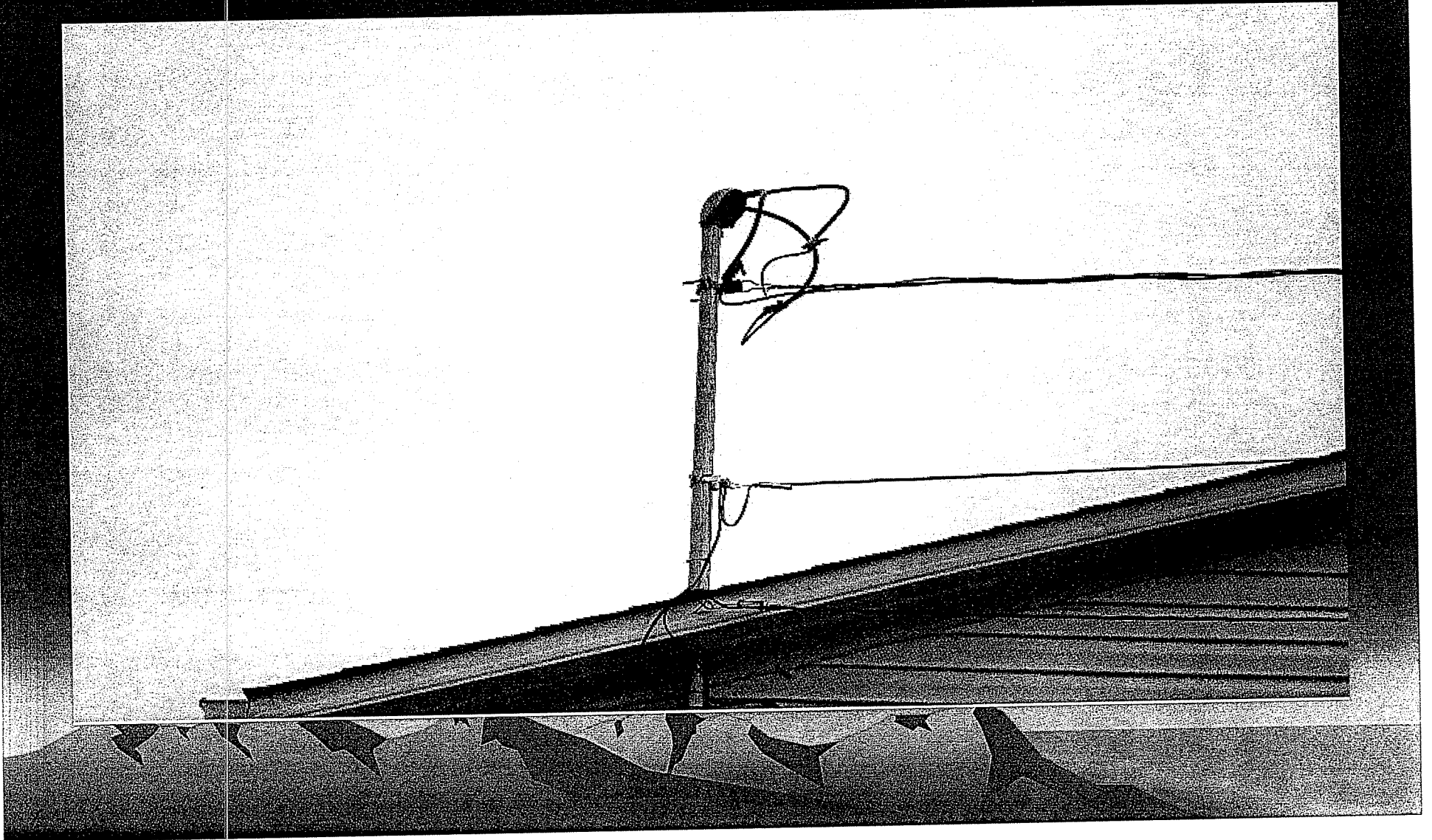


# Examples \ Metering



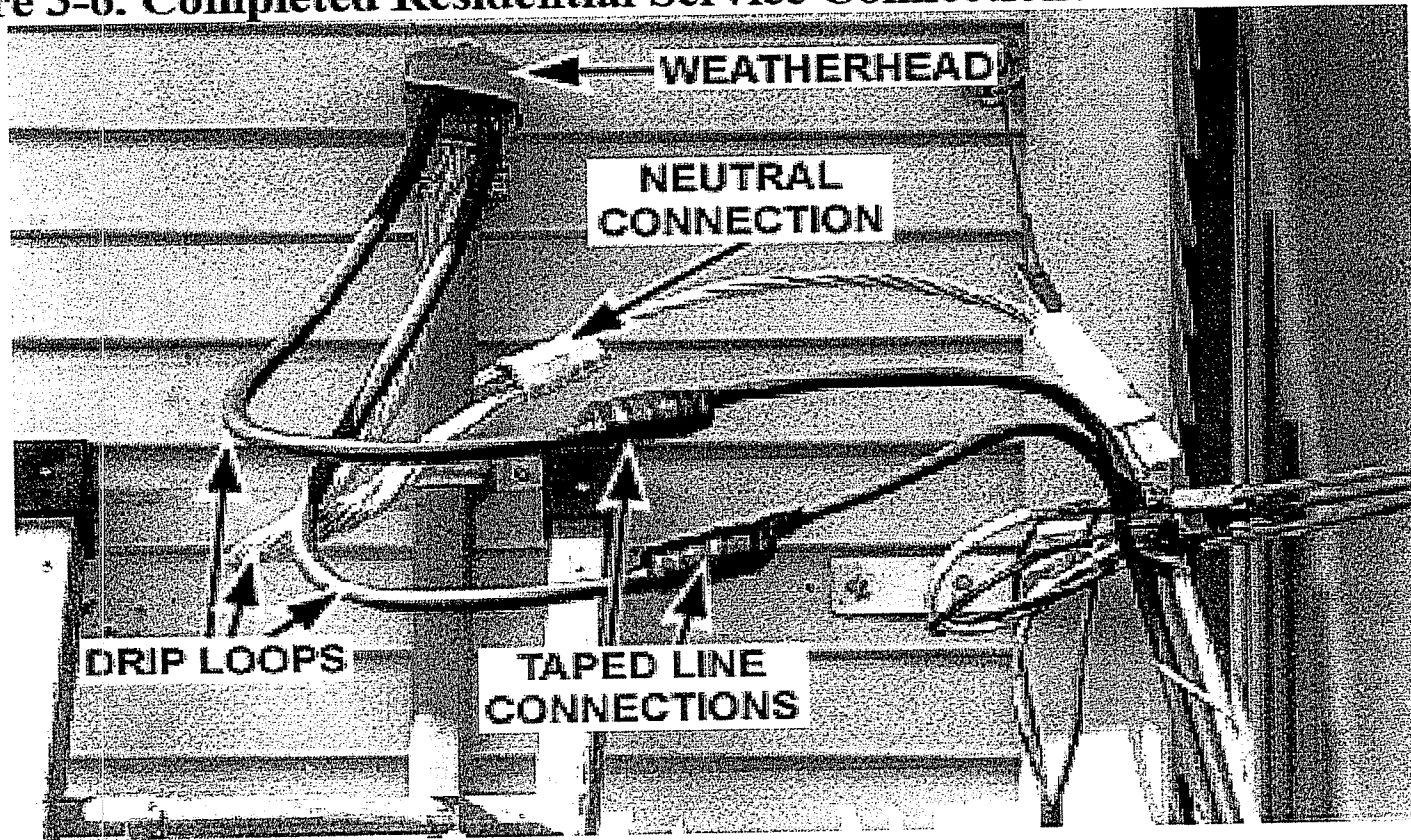


# Examples \ Metering



# Examples \ Weather head and Connections

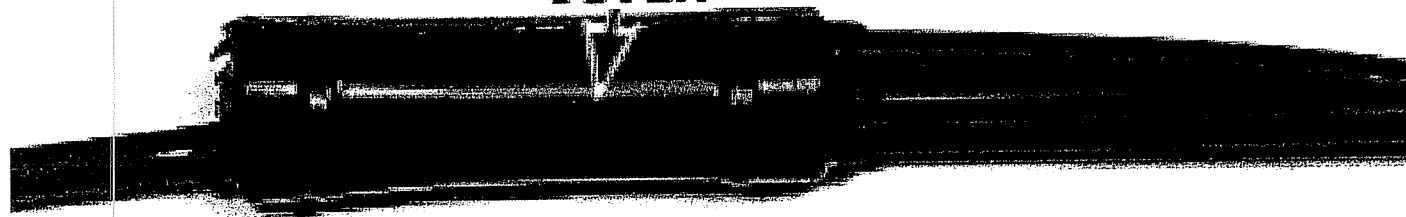
**Figure 3-6. Completed Residential Service Connections at the Weatherhead**



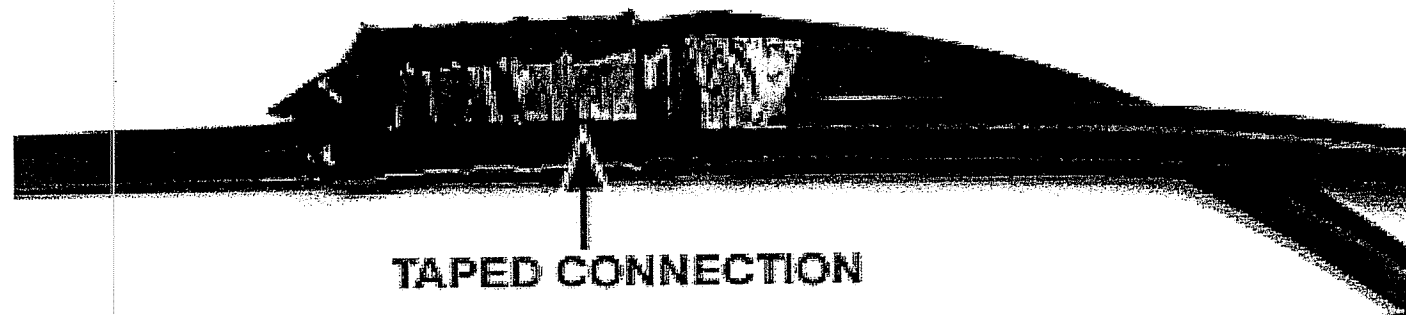
# Examples \ Connection Types

**Figure 2-14. Connection Covered with a Plastic, Snap-On Cover and  
Connection Covered with Tape**

**PLASTIC, SNAP-ON  
COVER**

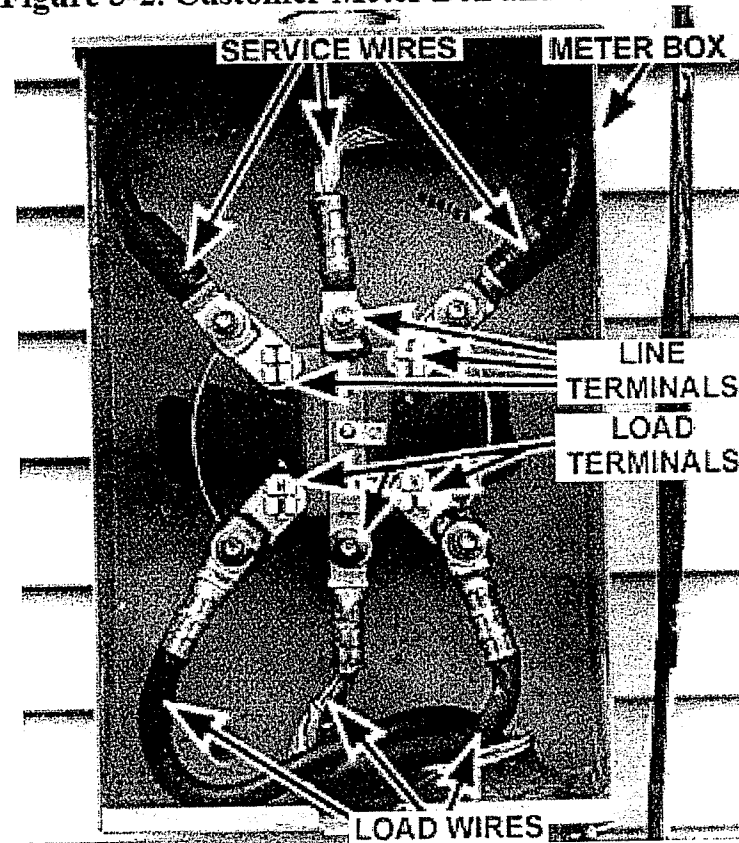


**TAPED CONNECTION**

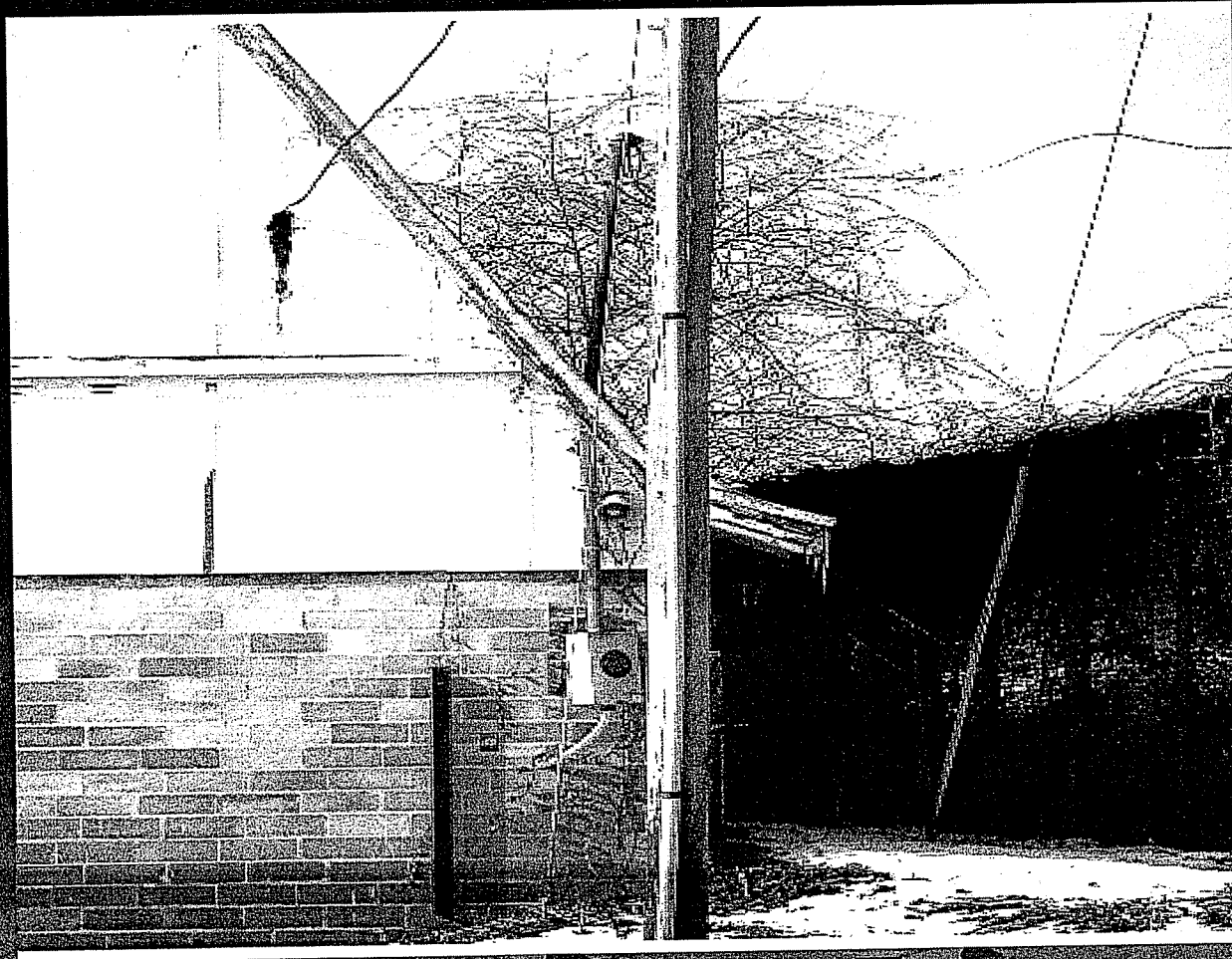


# Examples \ Load and Service Connections

Figure 3-2. Customer Meter Box and Connections



# Examples \ Loose Meter Base



# Examples \ Service in Tree



# Examples \ SD Across Deck

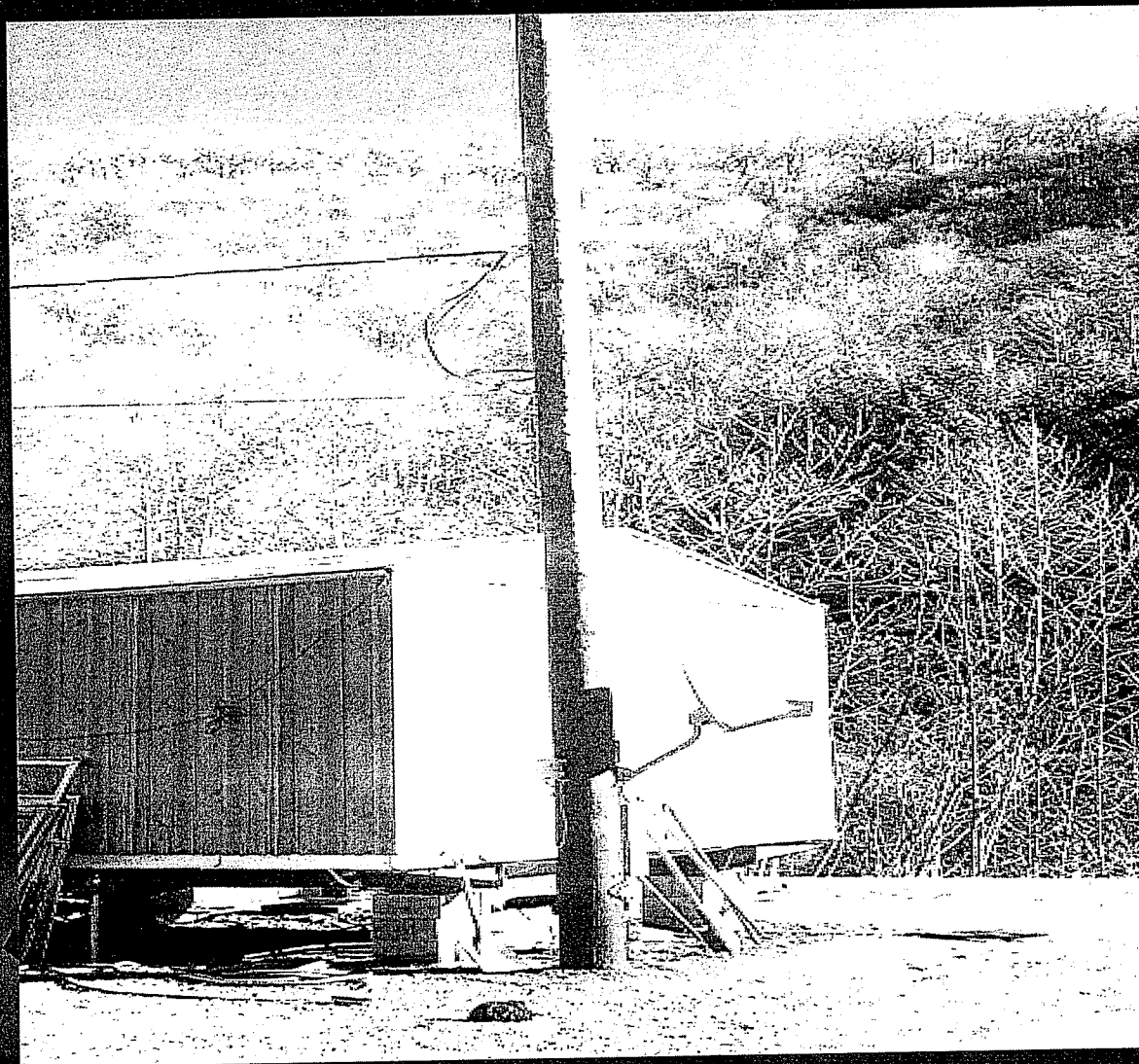


# Examples\ Tree Stand





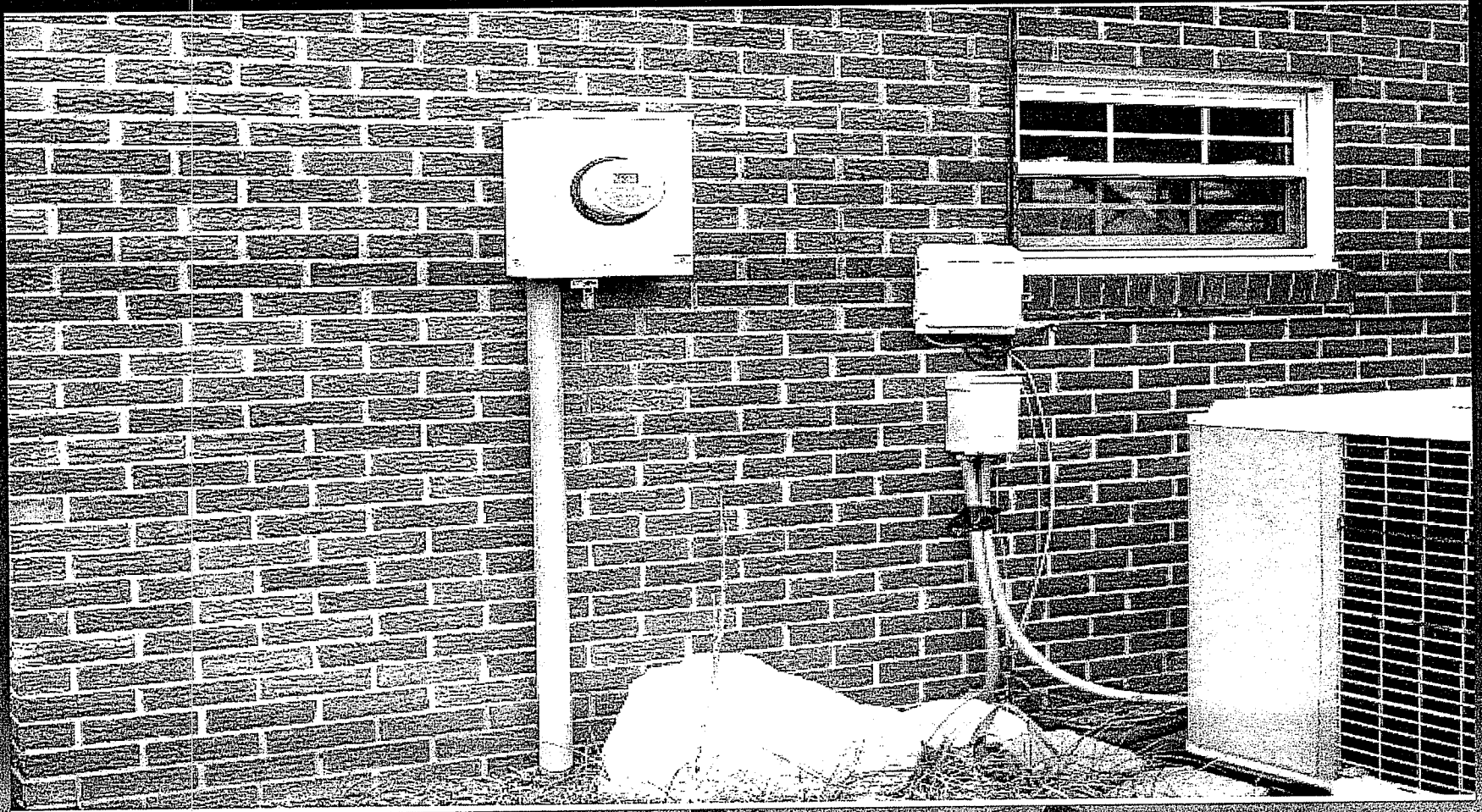
# Example \ Sat. Dish



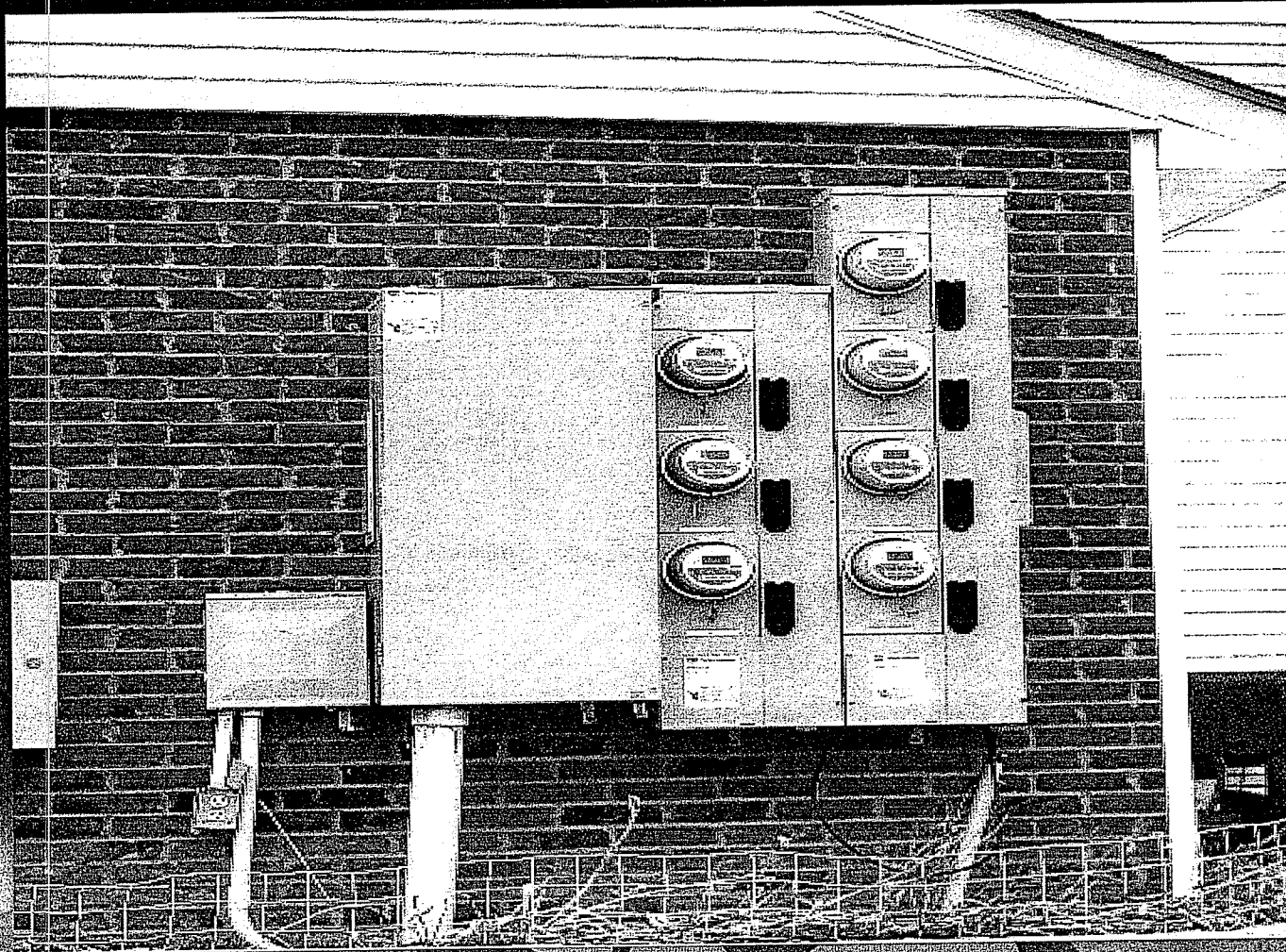
# Example\ Sat. Dish



# Examples \ Metering UG



# Examples \ Loose Ground



# Examples \ Meter Pedestals

