Part A - Scope

Article 547, Agricultural Buildings, was first published in the 1978 National Electrical Code; it was received with mixed reviews. The original 1978 scope statement was:

547-1. Scope. The provisions of this article shall apply to the following agricultural buildings or that part of a building as specified in (a) or (b) below.

(a) Agricultural buildings where excessive dust and dust with water may accumulate. Such buildings include all areas of totally enclosed and environmentally controlled poultry and livestock confinement systems, where litter dust, feed dust, including mineral feed particles, may accumulate and enclosed areas of similar or like nature.

(b) Agricultural building where a corrosive atmosphere exists. Such buildings include totally enclosed and environmentally controlled areas where (1) poultry and animal excrement may cause corrosive vapors in the confinement area; (2) corrosive particles may combine with water; (3) the area is damp and wet by reason of periodic washing for cleaning and sanitizing with water and cleansing agents; (4) similar conditions exist.

One of the greatest misunderstandings was that Article 547 applied to all agricultural buildings; there was even a contention that NEMA 4X junction boxes were required in machine sheds.

The 1981 National Electrical Code tried to clear the air by adding a new paragraph (c).

547-1 (c) Other Articles. For agricultural buildings not having conditions as specified in (a) or (b), the electrical installations shall be made in accordance with the applicable articles of this Code.

There were several proposals to the 1984 National Electrical Code aimed at clarifying the scope of Article 547, but in the end all were rejected.

Eventually 547-1(c) became a separate section; in the 2008 National Electrical Code it is 547.3:

547.3 Other Articles. For buildings and structures not having conditions as specified in 547.1, the electrical installation shall be made in accordance with the applicable articles of this Code.

The 1993 National Electrical Code expanded the scope of Article 547 with the following change:

547.1(a) Agricultural buildings where excessive dust and dust with water may accumulate, including all such buildings include all areas of totally enclosed and environmentally controlled poultry and livestock and fish confinement systems, where litter dust, feed dust, including mineral feed particles, may accumulate and adjacent and enclosed areas of similar or like nature.

547.2(b) Agricultural building where a corrosive atmosphere exists. Such buildings include totally enclosed and environmentally controlled areas where (1) poultry and animal excrement may cause corrosive vapors in the confinement area; (2) corrosive particles may combine with water; (3) the area is damp and wet by reason of periodic washing for cleaning and sanitizing with water and cleansing agents; (4) similar conditions exist.
The intent was to expand the scope of Article 547 to include adjacent support buildings, structures, and confinement areas; free-standing feed and other livestock structures were integrated into Article 547.

It's clear that there can be other buildings on a farm or ranch that are not covered by Article 547, but what are they?

**Non-Type 547 Buildings.** What are some non-Type 547 buildings or structures that might be on a farm or ranch? Dwellings. Stand-alone grain bins. Grain silos. Equipment storage buildings. Tool sheds. Corn cribs.

**Type 547 Buildings.** Any livestock confinement building, livestock confinement area, feed building, or building or structure directly associated with the support and care of livestock is considered a Type 547 building.

### Part B - Equipment Grounding Conductors and Agricultural Buildings

Agricultural buildings and outdoor livestock confinement areas typically include wet conditions with corrosive agents which attack ferrous (containing iron) and nonferrous (typically aluminum) metals in a short period of time - as little as a few months.

Underground aluminum conductors corrode in half when there is even a tiny nick in the conductor insulation. If a supply (energized or hot) conductor corrodes in half, will you know it? Of course. Equipment will malfunction. If a grounded (neutral) conductor corrodes in half, will you know it? Sure. Again, equipment will malfunction. If an equipment grounding conductor corrodes in half, will you know it? Never.

**Equipment Grounding Conductors in Agricultural Buildings.** Recognizing the potential danger of open equipment grounding conductors, Code Making Panel 19 accepted the following proposal for the 1987 National Electrical Code:

**547-8(c). Separate Equipment Grounding Conductor.** In agricultural buildings as described in Sections 547-1(a) and (b), noncurrent-carrying metal parts of equipment, raceways, and other enclosures where required to be grounded, shall be grounded by a copper equipment grounding conductor installed between the equipment and the building disconnecting means. If installed underground, the equipment grounding conductor shall be insulated or covered.

**Equipment Grounding Conductors Run Underground to Agricultural Buildings.** The 2002 National Electrical Code added the following:

**547.9(C) Underground Equipment Grounding Conductors.** Where livestock is housed, any portion of the equipment grounding conductor run underground to the building or structure shall be insulated or covered copper.

In the 2008 National Electrical Code these two requirements are in:

**547.5(F) Separate Equipment Grounding Conductor.** Where an equipment grounding conductor is installed within a location falling under the scope of Article 547, it shall be a copper conductor. Where an equipment grounding conductor is installed underground, it shall be insulated or covered copper.

**547.9(D) Direct-Buried Equipment Grounding Conductors.** Where livestock is housed, any portion of a direct-buried equipment grounding conductor run to the building or structure shall be insulated or covered copper.
Agricultural Buildings

The 2008 National Electrical Code also modified Section 547.5(F) to permit the use of aluminum messenger supported cable located outside the 547 area to be run overhead from the building disconnecting means to other areas (such as a silo). The revision was intended to allow above-grade equipment grounding conductors installed outside the 547 building to be aluminum.

Part C - Distribution Point.

Although the term distribution point had been used in previous National Electrical Codes, it wasn’t until the 1999 Edition that we were provided with an official definition, which was later modified in 2002. The 2008 National Electrical Code defines a distribution point as:

547.2 Distribution Point. An electrical supply point from which service drops, service conductors, feeders, or branch circuits to buildings or structures utilized under single management are supplied.

FPN No. 1: Distribution points are also known as the center yard pole, meterpole, or the common distribution point.

Figure 12-13 is representative of a typical distribution point.
The 1999 National Electrical Code consolidated several disconnecting and grounding rules into Section 547-8. Over the years this section has been revised several times. In the 2008 National Electrical Code it begins:

547.9 Electrical Supply to Building(s) or Structure(s) from a Distribution Point.

A distribution point shall be permitted to supply any building or structure located on the same premises. The overhead electrical supply shall comply with 547.9(A) and (B), or with 547.9(C). The underground electrical supply shall comply with 547.9(C) and (D).

Overhead supplies must comply with 547.9(A) and (B) - Figure 12-14 or Figure 12-15.
Agricultural Buildings

The pole-top site-isolating device depicted in Figure 12-14 is usually not a service disconnecting means; it is generally a non-fused switch supplied by some electric utilities. The 2008 Code® now requires the circuit from the site-isolating device to include an equipment grounding conductor.

The new rule requires
(a) the equipment grounding conductor to be bonded to the system grounded (neutral) conductor at the site-isolating device,
(b) the equipment grounding conductor to be the same size as the line or phase conductors or adjusted if of different materials, and
(c) the grounded (neutral) conductor in the building or structure service disconnecting means must remain insulated from contact with the service disconnecting means enclosure.

**Overhead Supply with Service Disconnecting Means Located at the Distribution Point**

*Fig.12-15 Overhead Supply with Service Disconnecting Means Located at the Distribution Point*
The basic rule in Section 547.9 is that overhead electrical supplies must comply with 547.9(A) and (B) which is illustrated in Figure 12-14, or with 547.9(C) which is illustrated in Figure 12-15.

Underground electrical supplies must comply with 547.9(C) and (D) as illustrated in Figure 12-16.

What is not recognized is the installation depicted in Figure 12-17 where a utility supplied site-isolating device is installed at grade level without a service disconnecting means.
The installation depicted in Figure 12-17 is common in rural areas throughout the country, but the rules of Article 547 do not permit it.

547.9(2) Location. The site-isolating device shall be pole-mounted and shall meet the clearance requirements of 230.24.- meaning it can’t be installed lower than 10 feet.

Code Making Panel 20 rejected two proposals for the 2008 Code® that would have permitted the site-isolating device to be installed at grade level as depicted in Figure 12-17. If installed at grade level, the installation must include service disconnecting means and overcurrent protection as illustrated in Figure 12-15.