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# Meter Testing and AMI Deployment – Before, During and After

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*8:30 AM*



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# Certification, First Article and Pilot Testing

We will discuss;

- testing protocols
- pitfalls

and other solutions developed by various utilities who have gone through these various stages

We will also talk about the equipment and systems used to handle these types of testing.





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# Why Develop Protocols?

The first Question is really

**Why do we Test?**

Because things fail.

Why do we develop protocols?

So we can capture all of the ways that meters have failed in the past and make sure we are rigorously checking them going forward.





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# Before – Preparing for AMI

**Certification Testing** – This is not the most detailed testing we will perform on a meter. The goal of this testing is to determine that the meter has the features that the utility is looking for, that the manufacturer says the meter has and that the communication system is working as advertised.

**Note:** *And what are the back up plans? How well does the meter under consideration handle other communication protocols should the primary protocol fail? Can an antennae be added? Cellular solution added? PLC potential?*

**First Article Testing** – This is the most detailed testing that the utility will perform on the meter. What most people do not realize is that the meter manufacturers will be delivering them a series of “First Articles” as the production meter being delivered will change over the course of the AMI deployment.

**Pilot Test** – This will allow the utility to test the entire system and begin to identify and fill some of the process holes identified.

Do your internal systems need to be upgraded or augmented to allow the system the ability to handle the stress of an AMI deployment?

**Acceptance testing** – this will be a part of the pilot test

- Accuracy testing – the shorter part of the acceptance test
- Functional testing – the longer part of the acceptance test

Equipment Used in this phase – Functional Test boards (Meter Qualification Boards), Accuracy Test Boards, Meter Engineering/Demand Boards, Meter Farms, Meter Asset Management and Meter Record System upgrades/replacement





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# Data to Keep

So what type of data will we be interested in for these various types of tests?

Guidelines: Record everything and make everything as automated as possible. Add to your protocol every time you encounter an issue.







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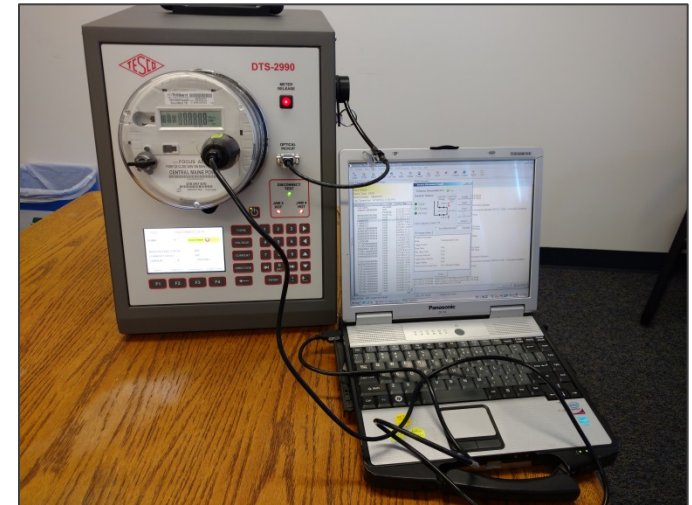
# First Article Testing

Here we are looking at everything.

Start with the ANSI tests and even the ANSI folder from the Manufacturer.

Take nothing for granted from accuracy at Test Amps to accuracy at light loads and rated loads. Check for performance with sags and swells, disconnect under load and reconnect, ability to detect and not reconnect with back feed, introduce the new ANSI waveforms and monitor performance. Check everything.

Similar tests can and should be developed for the collectors and every other device used to get information from the meter to the head end.





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# Pilot and Acceptance Testing Protocols

## Examples of things to check (i.e. have gone wrong)

**The Meter Box label:** Company header, meter attributes listed, part # listed, meter model listed

**The PO:** Line items and descriptions and ID's all matching between the Manufacturer's system and the utilities system. Barcodes include, start and stop on a pallet correct, all bar codes scannable, # of meters on a pallet

**Meter Nameplate:** Correct format for SN, bar code, part number

**Meter File:** PO match between manufacturer and utility (down to and including individual line numbers), text file format correct, file format processes in Utility CIS and meter record systems, file can flow to inventory and be released for work management system

**Physical Inspection:** Pot clips, cover, T seal, hardware version – part number

**Power up inspection:** Meter connects to network, display works, correct firmware on meter and on communications module; correct settings in meter; energy accumulation working; reverse power working; correct date and time displayed; correct company name displayed; all screens displayed as specified; Validate interval data; DST time change; Simulate time adjustment; validate interval data against meter register; clear billing, interval and event data

## Accuracy Test

## Voltage Profile

**Service Switch:** Disconnect with load, reconnect with load; attempt reconnect with back feed; switch status displayed on meter





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# Pitfalls and Protocols

Discussion of problems encountered.

- Not all features advertised were present
- Data issues and reporting issues
- Problems identified in internal systems to receive and deploy meters. This is potentially the most serious, the most time consuming and the most costly to address
- Do we have the personnel and the training capabilities needed before deployment begins? Will we need more of both after deployment ends?







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# Things Often Forgotten About

- Consumables
- Socket Repairs
- Training Facilities
- KYZ cables and testing
- Useful tools and protocols not envisioned or necessary prior to AMI deployments (e.g. Safety disconnect to repair kits to meter farms)





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# During AMI Deployment

- **Acceptance Testing:** Who is doing this, the utility or the third party deployment vendor? How will test results be transferred if the latter.
  - **Functional Testing**
  - **Accuracy testing**
- **Field Audits:** Are they needed? Who is responsible?
- **Continued Certification/First Article Testing:** Does this ever end?
- **System Testing:** Does this ever end?
- **What are we looking for/hoping for: Nothing**
- **Equipment Used in this phase:** Functional Test boards (Meter Qualification Boards), Accuracy Test Boards, Meter Engineering/Demand Boards, Meter Farms





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# After AMI Deployment

- **Acceptance Testing:** This is now the Utility's responsibility regardless of who performed this function during deployment
  - **Functional Testing**
  - **Accuracy testing**
- **System monitoring and population management:** This become essential and hopefully, very low key. But always in the background
- **What are we looking for/hoping for:**  
**Nothing again**
- **Equipment Used in this phase:** Functional Test boards (Meter Qualification Boards), Accuracy Test Boards, Meter Engineering/Demand Boards, Meter Farms







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# TESCO's Users Group

**June 9-12, 2019**

*Philadelphia, PA*

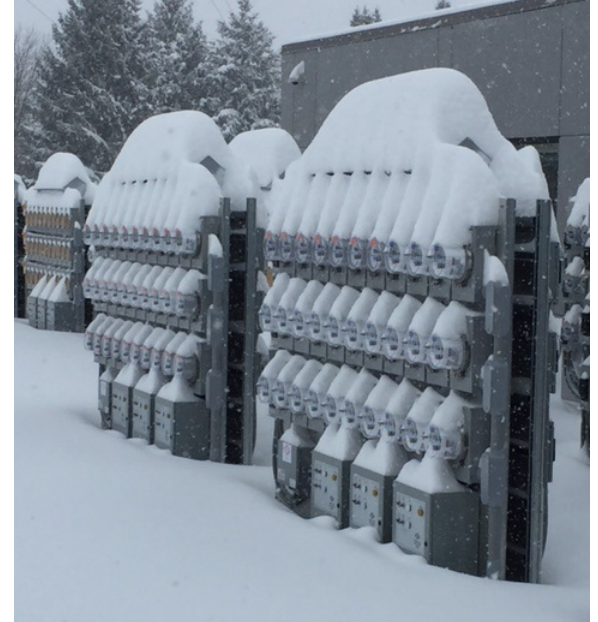
- Learn and discuss new TESCO technology and products through interactive sessions and hands-on training with TESCO engineers.
- NEW training sessions for the new Meter Shop and Lab Equipment
- Current AMI Topics and Practices for First Deployments
- Meter Manager Software sessions including asset management tracking, in-service testing, and kiosks.
- Tour of TESCO's facility or historic Philadelphia
- Dinner events at Phillies game and National Constitution Center





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# Questions and Comments



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