# CPGA LOCATOR TRAINING CLASS OUTLINE

I. **How EM Locators work**
   A. Energizing a conductor
      1. Conduction (Metal to metal)
      2. Induction (Nonmetal to metal)
   B. Receiving the transmitters energy
      1. Peak
      2. Null
   C. Energy wants to leave the conductor equally in all directions
   D. Energy will always follow the path of least resistance
   E. Different frequencies can & will do different things
   F. Locate results cannot be changed with the receiver

II. **How To Use An EM Locator: Energy (Current/Signal)**
   A. Energy leaving the transmitter must return to the transmitter
   B. Assessing the energy level (current/signal)
      1. Strong (Good)
      2. OK
      3. Weak (Bad)
   C. 4 factors influencing energy (current/signal)
      1. Far end grounds
      2. Insulation
      3. Earth
      4. Frequency

III. **How To Use An EM Locator: Receiver & Transmitter**
   A. Receiver - 5 ways to determine the shape of the electromagnetic field produced by the energy leaving the conductor
      1. Peak vs Null
      2. Digital depth validation
      3. Peak method
      4. Null method
      5. Triangulation
   B. Transmitter – 4 ways to change locate results

1. Change grounding system
2. Change frequency
3. Move transmitter
4. Conductive vs Inductive

IV. **Current     Shape     Endpoint**
   A. Transmitter converts DC into AC
   B. Frequency determines how many times the energy (current/signal) alternates per second
   C. AC produces an electromagnetic field
   D. Receiving antennas detect the electromagnetic field
   E. Peak & Null are determined by the position of an antenna
   F. 2 Stacked antennas determine digital depth
   G. Type of utility being located can only be verified by following the field to a logical termination point