Farm Energy Audit Workshop
Dairy:  Phase I – day 1 (8 hrs)

I. Overview of Dairy Farm Operations and Energy Use

A. Background on Farm Energy Use

B. Farm Operations

- **Milking**
  - Stanchion Milking (Stall, Tie-stall)
  - Milking Parlor
- **Housing**
  - Stanchion Barn, Free Stall Barn
  - Free Stall Bedding
  - Dry Cow
  - Maternity
  - Natural, Curtain & Forced Ventilation
- **Feeding**
  - Milking Area
  - Free Stall Barn
  - Fence Line
  - Mechanical
  - Tractor Delivery
- **Feed Storage**
  - Bunker
  - Tower/Bunker Silo
  - Round/Small Bales
  - Bags
  - Haylage
- **Calf Housing**
  - Individual Hutches
  - Super Hutches
  - Controlled Environment
- **Shop**
- **Manure Handling and Storage**
  - Solid Handling
  - Pit Storage
  - Slurry Storage
  - Application

II. Farm Energy Assessment and Options

- **Vacuum and Milk Pump**
  - 3-Phase Motor
  - Variable Speed Drive (VSD) on vacuum and milk pumps
on your milking equipment
  - High Efficiency Pumps

- Milk Cooling
  - Plate Cooler - pre-cooler system to cool the milk before it enters the bulk milk tank
  - Heat Exchanger for Heating Water
  - Milk Cooler/Motor Heat Used for Heating
  - Water recycling equipment

- Water Heating and Water Consumption
  - Separate Unit for Milking Use
  - Separate Unit for Equipment Washing
  - Insulated Hot Water Lines
  - Milk Cooler Heat Reclaimer Used for Water Heating
  - Fuel: Electric, Natural Gas, Propane. Fuel Oil
  - Demand Water Heaters
  - Solar Assist for Water Heating

Farm Energy Audit Workshop
  Dairy: Phase I – day 2 (8 hrs)

II. Farm Energy Assessment and Options (- Continued - )
- Lighting
- Ventilation
- Space Heating and Building Design
- Manure Handling and Treatment
- Electric Rates From Energy Supplier

III. Potential Alternative Energy Sources
- Wind
- Anaerobic Digesters
- Solar
- Geothermal

IV. Single Phase and Three Phase Electrical Service Issues
V. Long-Day Lighting

VI. Calculation Sessions
- Vacuum Pump and VSD
- Milk Cooling
- Water Heating and Heat Recovery
- Lighting
- Air Circulation & Ventilation
- Efficient Motor
- Tractor Heater
- Hot Water Pipe Insulation

VII. Fuel Cost Comparison and Conversion

VIII. Conducting A Farm Energy Audit
- Audit Philosophy and ANSI Tier II standards
- Analysis of utility bill and energy use records for previous 12 months
- Forms and gathering information
- What data is supplied by the farmer
- How to conduct an audit
- Review a sample Dairy Farm Energy Audit Report
- Sanitation: boots, brush, solution
- Do’s and don’ts while on the farm

IX. Energy Efficiency Funding Opportunities
- USDA – REAP
- USDA – NRCS (Energy Efficiency and EQIP plate water reuse)
- Utility Companies
- Michigan Agencies

X. Grant Writing Issues and Opportunities For Auditors
Farm Energy Audit Workshop
Dairy: Phase II – 1 day (6 hrs)

I. On-Farm Energy Audit Assessment and Data Gathering

• A project staff is assigned to be a team leader (2-3 groups depending on nos.)
• In groups of 4 or 6 auditor trainees, conduct an actual farm energy assessment with the guidance of a team leader.
• Group gathers information, documents, operational process information and takes measurements. May need to return to site or contact operator for additional information at a later date.

II. Data Analysis and Report Preparation

• Group discussion regarding energy or operational issues that impact energy use observed in the on-farm assessment.
• Group develops Farm Energy Audit Report strategy, areas of emphasis, and assignments. Additional group meetings prior to finalizing the report and presentation for the next training session is anticipated.
• Calculations of project costs and energy savings using tools and software adopted by the project and comparative analysis of various recommendations.
• How to make sound energy savings decisions
• What should be in the report for the farmers and requirements for funding?
• Review of case study scenarios and presentation of sample reports.

Farm Energy Audit Workshop
Dairy: Phase III – 1 day (8 hrs)

I. Report Presentation, Defense and Evaluation

• Presentations of Farm Audit Report with group discussions.
• Detailed review of calculations, assumptions and solutions identified in each group presentation.
• Assistance and available resources.

II. Post Report Issues

• Review of problems encountered in the assessment and report phase.
• Recommendations of review team (composed of funding agencies).
• Appeal process and procedures for unaccepted proposals by funding agencies.
• Set date for final submission of reports incorporating recommendations made.

- Conduct Independent Farm Energy Audit
- Participating dairy farms will be assigned among the trainees. Trainees may opt to select their own dairy farms to be audited. Project staff will not participate like they did in the first audit, but will only act as consultants and not lead the audit.

- An individual or two person audit team will analyze and crunch the numbers and prepare a complete Farm Energy Audit report. This includes analysis, recommendations, cost savings and pay back estimates.
- Farm Energy Audit Reports will be submitted by January 31, 2012 in electronic form (via email or CD) to:

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