

## APPENDIX A

### Technical Merit

#### a. Qualifications of the project team

##### **Dr. Berry Lott, Extension Professor, Poultry Science Dept., Mississippi State University:**

Dr. Lott's major role as a member of the project team was to conduct an energy assessment of each proposed improvement or group of associated improvements, determining their impact on both energy usage and poultry production. He also provides, on a continuing basis in his role with MSU Extension Service, recommendations on project design, equipment installation and facility operations and maintenance. He, along with the certifying engineer, qualifies as Energy Auditor.

He is the recipient of B.S., M.S., and PhD. degrees in Poultry Science from Mississippi State University. He worked for over 30 years with the USDA Agricultural Research Service as a Research Animal Scientist (until August 2001). He currently works with Mississippi State University Poultry Science Department as an extension professor.

Dr. Lott's research has been primarily in the area of poultry production and management. He has collaborated with engineers, physiologists, and veterinarians in various research areas. His major work involved in establishing the effects of air velocity on effective air temperature. Dr. Lott has authored or coauthored over 200 scientific publications during his 35-year career. He is a member of Poultry Science Association and Southern Poultry Science Association. Dr. Lott's knowledge of basic environmental engineering and computer programming has enabled the development of controls for commercial poultry houses that are regulated by moisture control. Dr. Lott designed two wind tunnels in an environmentally controlled poultry house to generate production data. This data collected from the wind tunnels will answer the question of "wind chill" effect on broilers at various wind speeds and temperatures.

Years ago Dr. Lott recognized the need to investigate the effects of air velocity on broiler performance. His research has caused the industry to change to tunnel ventilation more rapidly. In addition to be the author of over 200 technical papers, he is the author of the chapter on Poultry Production Systems involving the effect of temperature and humidity on broiler performance in the "Poultry Housing and Equipment Handbook" published by Northeast Regional Agricultural Engineering Service of the Cooperative Extension Service of Cornell University, August 1995. He has made numerous presentations on the "Effect of Air Velocity on Broiler Performance". He is a member of the following professional societies:

Poultry Science Association, Southern Poultry Science Association, Mississippi Feed and Grain Association and Mississippi Poultry Association.

**Dr. Ken Hood, Economist, Food and Fiber Center, Mississippi State University:**

Dr. Hood's major role as a member of the project team was to provide current and projected future financial data to help determine the financial feasibility of the proposed improvements. This included preparation of the required 3-year pro forma statements from information provided by the applicant.

Dr. Hood holds a B.S. Degree in Marketing and M.S. and Ph.D. Degrees in Agricultural Economics from Mississippi State University. He has been an Economist on the staff of the Food and Fiber Center of the Mississippi State University Extension Service for the past 16 years. He is a member of a number of professional organizations, including the Southern Agricultural Economics Association and has served as past President of the Mississippi Agricultural Economics Association. He has authored dozens of professional and media publications, including a 1994 report on "Integrated Poultry Operations, Opportunities in the Greater Golden Triangle Area of Mississippi" and a 1995 study on "Poultry House Design and Construction Using Modern Alternative Structural Systems".

**Bennie Hutchins, RC&D Project Coord., USDA-NRCS, Brookhaven MS:**

Mr. Hutchins' role on the team was to coordinate the collection of information and the use of that information by the other team members, including making arrangements for all of the technical assistance provided by the other team members. He will continue to be involved in working with the applicant up to and following project completion to assure that adequate information is collected and analyzed to allow proper evaluation of project performance. He was also responsible for assessing the requirements detailed in the Federal Register notice and assuring that all the required information was entered in the grant application.

He is a 30-year career employee of the USDA-Natural Resources Conservation Service, serving the past 19 years as program coordinator for the Southwest Mississippi Resource Conservation and Development Area. His work with units or government, community organizations and individual businessmen and agricultural producers consists primarily of project planning and coordination and grant-writing and administration. Recent projects include a statewide study of alternative uses for poultry litter in Mississippi. In 2003 he assisted five poultry broiler producers in successful applications for \$231,000 in Energy Efficiency Improvements grants from USAD-Rural Development. In 1990 he planned and coordinated a state conference on "Economic Development Using Wood

Energy”. Hutchins holds a B.S. degree in Forestry from Mississippi State University.

**Donald E. Thompson, P.E., C.E.M., C. D. S. M., Staff Engineer - Energy Division, Mississippi Development Authority, Jackson, Mississippi:**

Donald Thompson has more than eighteen years of experience in HVAC design and energy conservation analysis and design. He also has considerable experience in many phases of the construction industry, including project management and installation. His primary function on the project team, in addition to being the certifying Professional Engineer (PE), was to review data and calculations used in the energy audit process, especially information in TABLE 1 – ENERGY AUDIT, Appendix A – Energy Audit Calculations Table and Appendix B – Energy Audit Calculations Worksheet.

Mr. Thompson received his Bachelor of Science degree in Construction from Northeast Louisiana University in 1979 and his Bachelor of Science degree in Mechanical Engineering from Louisiana State University in 1984. He is a registered Professional Engineer in Mississippi, a Certified Energy Manager and a Certified Demand Side Manager. He is a member of ASHRAE and other professional organizations.

**b. Agreements and Permits**

i. Local Codes: Applicant’s farming operation is located outside of an incorporated area; there are no county building codes that will apply to any of the proposed energy efficiency improvements. Applicant’s poultry production facility received a construction and operating permit from the MS Dept. of Environmental Quality before starting and currently is in compliance with that permit. Applicant currently operates under an approved Animal Waste and Nutrient Management Plan prepared by the USDA-Natural Resources Conservation Service and approved by the Mississippi Department of Environmental Quality. Construction of new production facilities, if applicable under this project, will comply with permit requirements of the Mississippi Department of Environmental Quality with guidance received through the local Soil and Water Conservation District Office and technical assistance from the USDA Natural Resources Conservation Service.

ii. Component Warranties: Warranties are provided on all components of the proposed retrofits by the vendor identified in the itemized bid (Appendix N) and are backed by the manufacturers of the individual pieces of equipment and materials. Also see Section d. 10. vi. Operations and Maintenance.

iii. Potential Environmental Impacts: All proposed activities and retrofits involve internal improvements to existing poultry production houses or will

be attached to the immediate exterior or such buildings. There will be no anticipated environmental impact on nearby or adjacent land or other natural resources, including atmospheric impact above and beyond that of the existing permitted operations. New facility construction, if applicable under this project, will comply with National Environmental Policy Act (NEPA) requirements as identified by the State Rural Energy Coordinator immediately after grant approval.

**c. Energy or Resource Assessment**

A. Baseline Energy Usage: The most recent 12-month operating period was selected as the baseline period for all energy use and energy conservation calculations in this proposal. This information is recorded in **Appendix \_ – Energy Audit Calculations Table, Column 3**, indicating value of electricity and gas consumed as applicable. Additionally, see **Appendix \_** for records of electricity and gas consumption, including units and cost per unit, for the recent evaluated period.

B. Energy Audit: The required and separate Energy Audit Report is contained in the following

1. Situation Report: See ENERGY AUDIT – TABLE 1 below for information on description of current facilities, energy systems and providers, baseline usage and cost per unit of energy. The current description provides details on type of construction and basic details on equipment, materials and construction techniques used to regulate temperature, humidity and air velocity within the poultry production facilities being proposed for retrofitting. Corresponding solutions to problems identified in the current situation report are provided in the right-hand column and correlate with the itemized listing in the prospective contractor’s bid (Appendix N).

2. Planned Improvements: See **ENERGY AUDIT – TABLE 1** below for details on proposed improvements. Also see **Energy Audit Calculations Table - Appendix\_** for proposed Energy Efficiency Improvements listed as line items in Column 1.

i. Impact - For project impact on both energy consumption and system production, see: **Appendix \_** - Column \_ “Projected Energy Reduction - %” and Column 8 “Projected Production Increase - %”.

ii. Cost - See **Appendix A** - Column 6 “Cost of Improvements” for line itemized costs.

3. Technical Analysis (see **Energy Audit Calculations Table – Appendix A**)

i. Estimated Annual Energy Cost Savings Expected From Each Improvement – These values are listed in Column 2 as a percent and in Column 4 as a dollar value, both by line item, and for both gas (top part of table) and electricity (bottom part of table), as applicable.

ii. Direct and Indirect Cost of Each Energy Efficiency Improvement – All listed costs of improvements are direct costs.

iii. Rank by Cost Effectiveness – Proposed improvements are listed in order of impact, with a “Cost Efficiency Index” indicated in Column 7 as determined by the cost of improvements required to achieve \$1 in energy savings, and calculated by dividing the cost of each line item improvement or associated groups of improvements by the resulting value of energy saved by that improvement.

#### 4. Description of Improvements

i. Critical Component Specifications:

See Contractor’s Bid in **Appendix \_\_** below (immediately following Engineer’s Certification - Appendix \_\_ in this Technical Requirements Report and Energy Audit) for details and specifications on each line item. Also see **ENERGY AUDIT - TABLE 1** below for additional details on the current situation and critical components of proposed improvements to address current conditions.

ii. Project Layout Drawings (Not Applicable)

iii. Documentation of Baseline Data:

See Column 3 of **Appendix \_\_ – Energy Audit Calculations Table** for the value of gas (top) and electricity (bottom) consumed over the recent 12-month period prior to grant application. Energy use records and documentation for the same period are contained in **Appendix \_\_**, which is not a part of this Technical Requirements Report nor the Energy Audit, but is part of the grant application. Monthly bills are on file with the applicant and can be produced upon request.

iv. Changes in Future Operations and Maintenance Costs:

There will be no significant change in the future operations of the applicant’s poultry production facility nor in future maintenance costs associated with the proposed equipment and improvements.

v. Measurement of Outcomes:

Outcomes will be measured by monitoring energy usage and production increases for at least two 12-month periods following completion of the proposed energy efficiency improvements. System performance will be evaluated by the impact on energy efficiency, i.e. the cost of energy

required to produce one unit or one dollar value of commodity before the improvements as compared to the same parameter after installation of proposed improvements.

**d. Design and Engineering**

Donald Thompson has more than eighteen years of experience in HVAC design and energy conservation analysis and design. He also has considerable experience in many phases of the construction industry, including project management and installation. He currently serves as Staff Engineer – Energy Division, Mississippi Development Authority, Jackson MS

Mr. Thompson received his Bachelor of Science degree in Construction from Northeast Louisiana University in 1979 and his Bachelor of Science degree in Mechanical Engineering from Louisiana State University in 1984. He is a registered Professional Engineer in Mississippi, a Certified Energy Manager and a Certified Demand Side Manager. He is a member of ASHRAE and other professional organizations.

**e. Project Development Schedule**

i. Energy Audit: The energy audit was conducted by the project team during the month of **February 2006** with the results included as part of this application.

ii. System and Site Design: The system and site design were done by the contractor/vendor identified in **Appendix \_\_ – Contractor Bid and Certification** prior to the submission of the Bid to the applicant.

iii. Permits and Agreements: As identified in section # above, there are no permits required for the proposed improvements, with the exception of construction of new poultry production houses to replace old ones, where applicable as identified in the list of improvements. In the latter case, these permits will be pursued through the proper channels by the applicant immediately following notification of grant approval.

iv. Equipment Procurement: In no case will equipment be procured prior to **date**, 2006. However, equipment procurement may be initiated beginning on **date**, 2006. Applicant will proceed with procurement as soon after grant approval as personal and production circumstances will allow so that project will be completed by **date**, 2006.

v. System Installation: The same criteria and timeline will apply to system installation and other construction as applies to Equipment Procurement above.

**f. Project Economic Assessment**

The best measure of project financial feasibility is cost effectiveness, as measured by the “reduced amount of energy required per unit of production”, as allowed in Section ##, page ## of the original NOFA (Federal Register, Vol. ##, No. ##, date, 2006). Accordingly, we compared the value of energy consumed to produce one unit of commodity (one pound of live chicken, one dozen eggs, one pullet or rooster) prior to the proposed improvements with the value of energy consumed to produce that same unit of commodity after project completion. In some cases, as with breeder, pullet, and egg producers, this comparison is best demonstrated by value of energy per value of commodity rather than unit of commodity. Using [these](#) criteria, the increase in energy efficiency resulting from the project will be **46.7** percent (see **Energy Audit Calculations Worksheet – Appendix \_**).

An additional measure of financial feasibility is the number of years required to pay back the cost of the energy efficiency improvements, as calculated by total project cost divided by the combined projected annual energy savings and increase in production efficiency (projected increase in total production combined with increase in value per unit received by producer, when applicable). Using these criteria, the proposed improvements will return the cost of investment in **4.5** years (see **Energy Audit Calculations Worksheet – Appendix B\_**).

**g. Equipment Procurement**

Applicant will comply with the applicable requirements of 7CFR part 3015 regarding standards of conduct, open and free competition, access to contractor records and equal employment requirements.

The contractor providing the itemized bid (Appendix \_\_) is only one of several poultry equipment and supplies contractors in the immediate area to the applicant’s operation. The enclosed bid used as a basis for this application was obtained from the identified contractor based on the applicant’s experience in working with this contractor over the recent past. Applicant will solicit bids from additional contractors following grant approval.

**h. Equipment Installation**

The poultry production facility will be shut down for the period required to install the proposed improvements, estimated to be approximately 6 weeks. Upon installation of the equipment and completion of the proposed modifications, all equipment and systems will be checked for proper performance by the installing contractor during a “shakedown” procedure. Also, a field representative from the Poultry Company will check all work for compliance with the Company’s specifications.

**i. Operations and Maintenance**

The applicant/operator already possesses the knowledge, skills and abilities required to operate the system with the proposed improvements from his years of experience working with similar, however less efficient, poultry production facilities and systems. System and equipment installers will update the operator on capabilities and unique characteristics of the new retrofits.

Operations will begin as soon as all equipment and proposed retrofits are installed and the “shake-down” trial is completed and determined successful. Monitoring for evaluation of project success will begin when the first poultry flock is stocked following project completion. Maintenance checks of all equipment and systems will be a daily responsibility of the applicant/facility operator, with more detailed maintenance checks and needed servicing conducted between flocks or “batches” of poultry.

**j. Dismantling and Disposal of Project Components**

In the unlikely event that the participating poultry production facility and its associated energy efficiency improvements are abandoned for an extended period of time without being utilized or maintained, there are no identified hazards that will be associated with its abandonment or removal.