

Science Advisors
Minnesota Public
Service Commission
1994-1998

Advisors

Staehle-- Chemical Engineer

Anderson- Biochemist

Dziuk--Veterinarian

Hird- Epidemiologist

Liboff-- Physicist

Polk--Electrochemistry

Richardson--Soil Scientist

Stetson-- Agricultural Engineer

*Furo--Electrical Engineer

Information Review

Peer-reviewed Literature

Oral and Written reports

Concerned Dairy Farmers

Electric Utility Representatives

Other Citizens or Scientists

MN, WI Government Staff

Farmers Union and Milk Producers Assoc.

TERF

Information Review (Cont..)

- Site Visits
- Surveys
 - Mail
 - Telephone follow-up
- Field Study

1996 Survey

- 11000 MN & 25000 WI Dairies
- 1250 Surveys in each State
- 752 responses (35%)

Dairymen's Herd Health & Production Concerns

- Poor heat estrus
- Poor conception rate
- Mastitis

Dairymen's Causes of Persistent Problems

- Forage quality
- Heat detection
- Fresh cow performance
- Housing
- Cow comfort
- Environment

Dairymen's Least Important Factors

- Soil type
- Quality of Expert's Recommendations
- Stray Voltage
- Other electrical phenomenon
- Chemical composition of feed & water

Survey: Dairymen's Electrical Concerns

- 30% had perceived electrical problems
- 60% of farms had been tested
- 8 of the 679 still had unresolved problems

Survey: Who Tested for Stray Voltage?

- 60% Utility
- 30 % electrical contractor
- 10-20% Dairy field reps or farmers

Advisors: Possible Mechanisms in 1996 Progress Report

- Low-level continuous ac voltage
- Transient voltage
- ac magnetic fields
- Interaction of ac & dc magnetic fields
- Pulsed electric fields

Field study

- Dairies with persistent problems
- Dairies with no perceived persistent problems
- Sampling technique very rigorous

Advisors: Electrical Field Test

Conclusions

- Low-level ac voltages not found to be a problem but research recommended
- Transients were small and from local sources
- ac magnetic fields too low for concern
- ac/dc fields too low for concern
- Pulsed fields were from trainers and could be controlled

Field Tests: Electrical Inspections

- Much wiring done by untrained persons
- Electrical contractor installations had many code violations
- Wiring in general was in poor condition

Field Tests: Veterinary Conclusions

- Major contributions to herd health and production problems were:
 - Nutrition
 - Cow comfort
 - Lack of vaccinations

Charles Polk's Paper

- Used summary data from Advisors final report
- Correlations were weak
- Misinterpreted stall mat data
- Conclusions not different from Science Advisors
- No known data to support possibility of effects of low-level ac voltages

Science Advisors Findings

1. We have not found credible scientific evidence to verify the specific claim that currents in the earth or associated electrical parameters such as voltages magnetic fields and electric fields, are causes of poor health and milk production in dairy herds.

Findings (cont.)

2. At the present time, there is no basis for altering the PUC-approved standards by which electrical utilities distribute power onto or in the vicinity of individual dairy farms

Findings (cont.)

3. There are many well-documented non-electrical factors that are known and accepted by the scientific community, and by most farmers as well, to cause dairy cow health and production problems. Among the most noteworthy stressors are poor nutrition, poor cow comfort and hygiene, and low or no use of vaccinations and related preventative dairy practices. Those who want to improve the performance of dairy herds should always address these factors.