

## Current Situation of the Cornell Patent in Canada

Brian Van Doormaal



## Cornell Patent in Canada

### History:

- Filed in United States on February 25, 1993
- Filed in Canada on February 15, 1994
- Patent was granted on July 14, 1998
- CDN filed a request for re-examination of the patent validity in March 2001
- On January 31, 2003, the Canadian Intellectual Property Office (CIPO) announced its decision in favour of Cornell
  - Excluded a key reference (Cornell Research Report)
  - Argued that patent claims are different than prior art

## Cornell Patent in Canada

### History (cont'd):

- CDN representatives traveled to Cornell in July 2003 to present CDN's current patent interpretation
- Second meeting with Cornell in October 2003 ... Cornell presented their arguments that CDN is infringing on all patent claims
- Cornell provided a licensing agreement proposal in November 2003
- CDN Board meets on March 11<sup>th</sup> and a response to Cornell is due by March 31<sup>st</sup>

## Canadian Interpretation

### Initially:

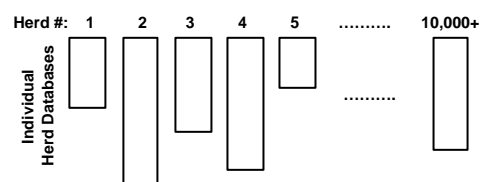
- Interpreted that Cornell was trying to "patent" any use of Test Day records
- Explains why reaction was so negative since much prior art exists and therefore the patent "can't be valid"
- Explains the similar reaction in the U.S. and other countries
- Explains CDN's request for re-examination

## Canadian Interpretation

### Now:

- Reviewed several documents produced by Cornell Research Foundation and/or Dr. Everett
  - Documentation provided to CIPO as part of the patent re-examination process
  - Nov. 2002 affidavit provided to CIPO by Dr. Everett
  - Dr. Everett's homepage as a Cornell University faculty member
  - The A.I. Bull Census description on the Internet
  - Dr. Everett's Internet articles "Evaluating Genetics and Management Using Your DHI Records" and "Dairy Genetics in 1994 and Beyond"

### Cornell Patent Interpretation



- ≠ Individual herd databases are established with their size depending on the herd size and length of time test day records are available
- ≠ Within each herd database the adjustments are calculated for each factor being considered (i.e.: age of cow, month of calving, days in milk, days pregnant, test day)
- ≠ Each test day record in the herd database is corrected using the adjustments specific to that herd to yield a "residual", which is referred to as the "Actual Productivity" in the Cornell patent

### Cornell Patent Interpretation (Cont'd)

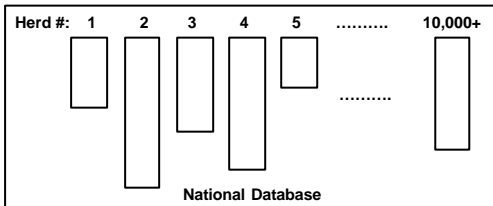
Example: 40 kg Milk – Herd Specific Adjustments = “Actual Productivity”

- ≪ An “Actual Productivity” is calculated for each TD record in each herd
- ≪ The same TD yield in another herd would have a different “Actual Productivity” due to varying adjustment values for the various factors
- ≪ TD “Actual Productivity” values are accumulated within each lactation to produce a “Lactation Actual Productivity” for “n” days in milk
- ≪ High “Actual Productivity” values indicate superior performance in the herd and vice versa, which allows the herd owner to make management decisions
- ≪ As a separate step, the “Actual Productivity” values from each herd database, either on a test day or lactation basis, are pooled across many herds and used as input into a genetic evaluation system that also includes known pedigree information
- ≪ The Cornell patent is broad enough to include additional factors (i.e.: fixed effects) in the model as long as the adjustments are calculated using only each herd’s database rather than using global values

### Current Interpretation

- ❑ What is the “true spirit and scope” of patent?
  - Calculation of “Actual Productivity” values using specific adjustment factors determined from each herd database of Test Day records
  - “Actual Productivity” values provide herd owner with management information and can be used as input data into a genetic evaluation system
- ❑ Based on this interpretation:
  - Apparently, little prior art exists with herd-specific adjustments for various fixed effects
  - Method therefore could be “novel” although a detailed research review has not been done by CDN

### Canadian Test Day Model



- ≪ A national database of over 35 million “raw” test day records from all available herds, is established with weekly additions
- ≪ A one-step approach is used to calculate genetic evaluations and no herd management information is produced for herd owners
- ≪ The national database is used to estimate and apply adjustments, based on a multitude of herds, for each factor being considered (i.e.: region, age at calving within parity group, season of calving)

### Summary Comparison

#### Cornell Patent:

Step 1: Yield = Management / Environmental Factors + Residual

Actual Productivity

Step 2: Residual = Non-Genetic Effects + Genetic Effects + Random Error

- ≪ Adjustments for the Management / Environmental factors are estimated using the test day records from that herd only
- ≪ Residuals are provided to herd owners as a management tool

#### Canadian Test Day Model:

Yield = Non-Genetic Effects + Genetic Effects + Random Error

- ≪ Adjustments for the Non-Genetic effects are estimated using data from a multitude of herds as global factors
- ≪ Only genetic information is provided to herd owners

### Cornell Patent

- Uses Test Day data that is accumulated over time in separate herd databases
- Uses a model that includes various fixed effects
- Adjusts data with herd-specific factors to get “Actual Productivity”
- Values for “Actual Productivity” are used for herd management and input into genetic evaluations
- “Actual Productivity” values and genetic evaluations are provided to herd owners

### Canadian TD Model

- Uses Test Day data that is accumulated over time in a single national database
- Uses a model that includes various fixed effects
- Adjusts data with global factors determined across many herds
- Simultaneously adjusts the raw Test Day data when estimating genetic evaluations for all bulls and cows
- Herd owners receive only genetic evaluations, not management information