



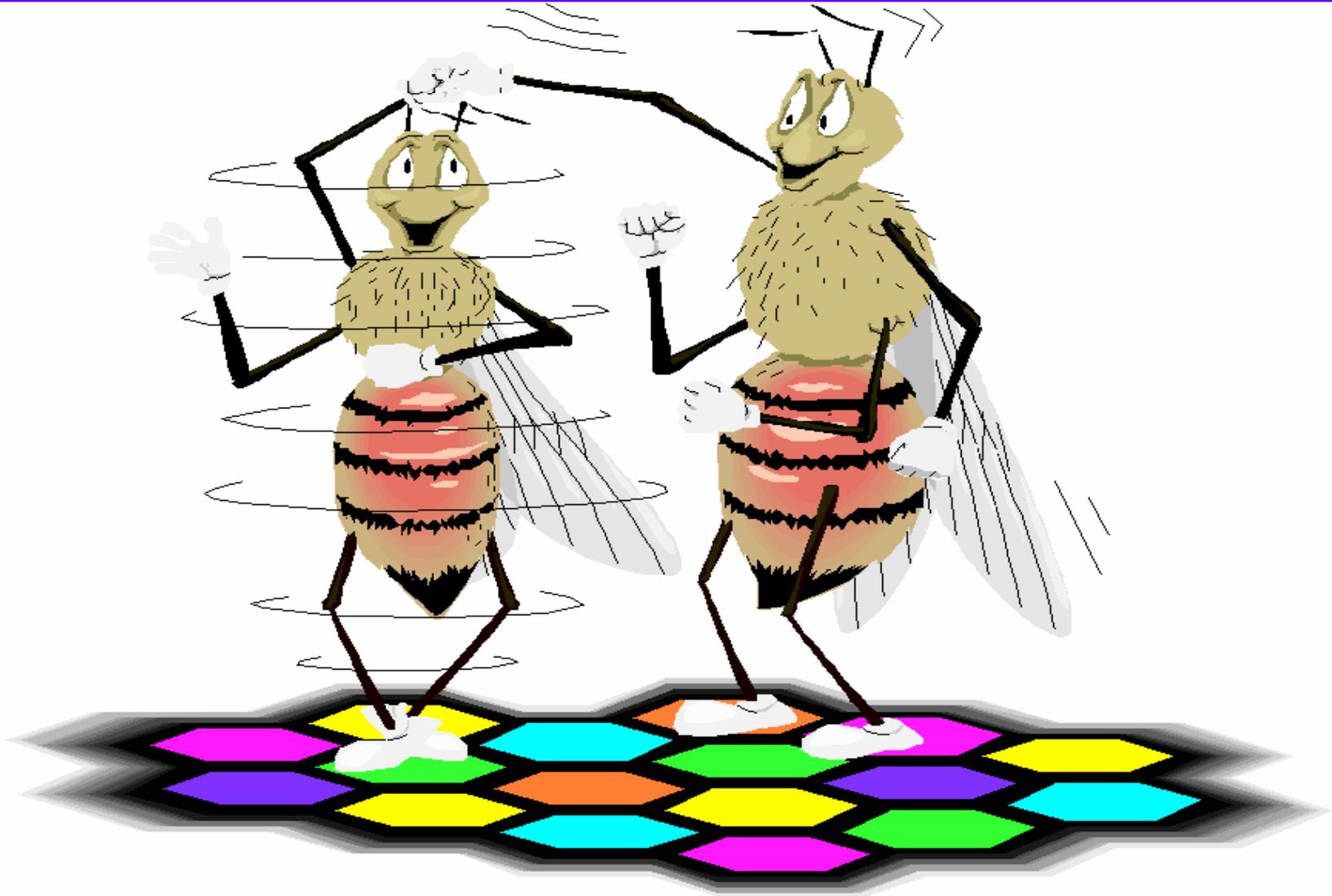
Williams – Non-Standard Gas Measurement

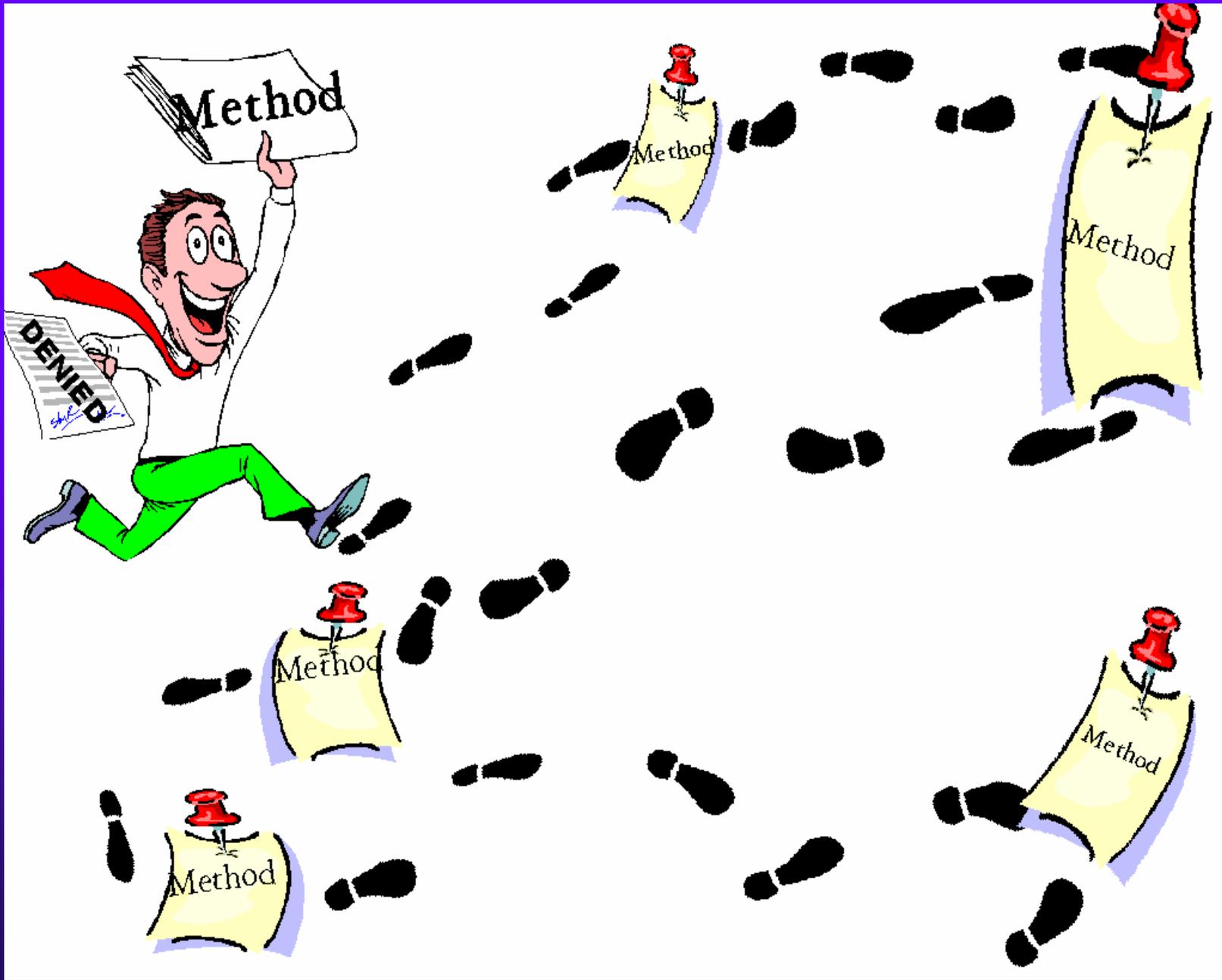
A Case Study

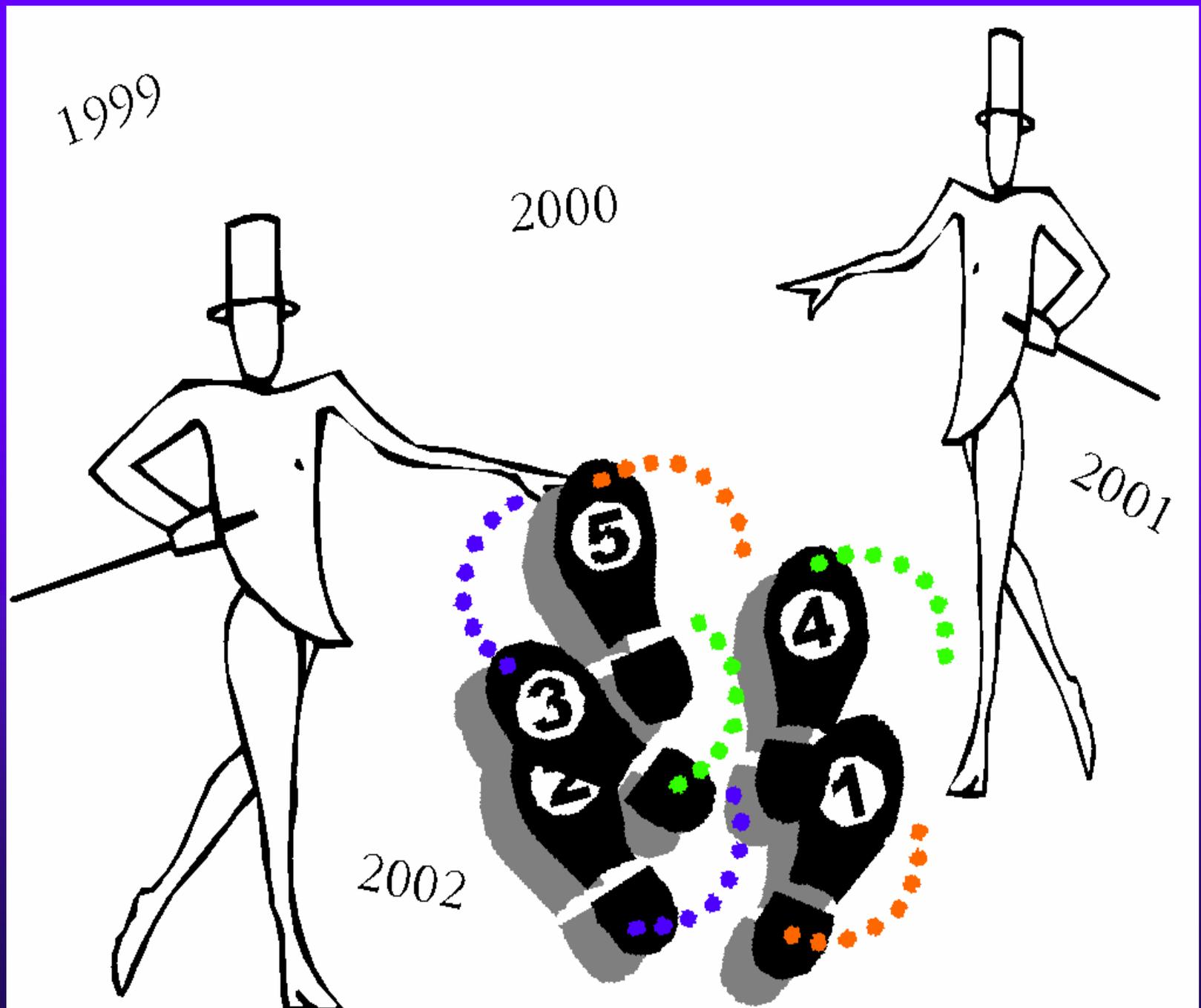
Multiple run common static and common temperature

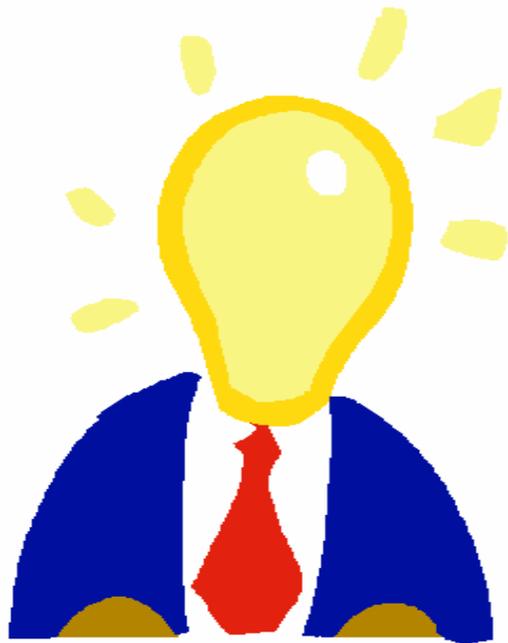


The Dance

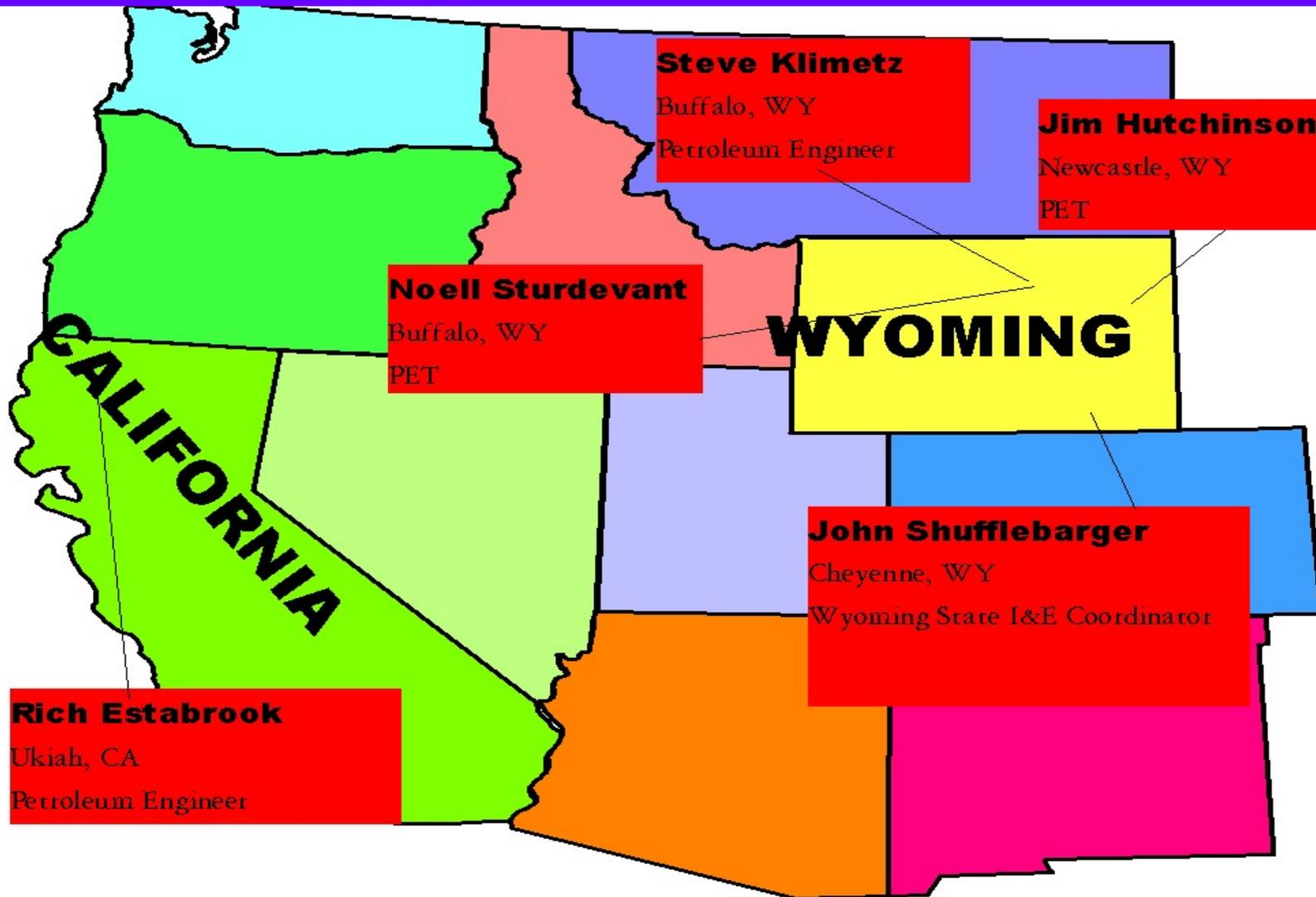








The Team







ONSHORE ORDER #5

Variance Request

FIELD
OFFICES



Pod Testing Program

CEESI

Colorado Engineering

Experiment Station, Inc.

On-Shore Order #5



All gas production shall be measured in accordance with an authorized method of measurement as set out in 43CFR3162.7-3.....may be by orifice meter or other methods acceptable to the authorized officer. The requirements and minimum standards for gas measurement are set out below.

The requirements of this order are based on the standards and specifications published by the American Gas Association (AGA), an officially designated ANSI/API2530 and AGA Committee Report No. 3, SE, 1985, hereafter referred to AGA Committee Report No. 3.....The requirements set minimum standards necessary to promote conservation of natural resources and to ensure proper measurement of gas production.....



Variance approval was limited to the specific set of conditions tested:

- Pod design per manufacturer's patented specs;
- Range of orifice plate sizes;
- Number of meter runs;
- dp/p ratio
- static pressure
- flowing temperature
- liquids
- Butterfly valves sealed open



Team Goals

- ◆ A need to develop a standardized testing procedure that could be used for other types of measuring methods/devices.
- ◆ Set testing procedure recognized as the standard to be used by all Field Offices.



Recommended Guidelines for Testing and Approval of Non-Standard Differential Pressure Meters

- ◆ Testing procedures submitted for review in advance of testing.
- ◆ Advance notice of testing dates and times.
- ◆ Only those conditions tested in lab allowed in field operations.
- ◆ Testing accepted only from independent laboratory.
- ◆ Field install must meet or exceed all laboratory conditions tested.
- ◆ Meter new condition unless wear tested.
- ◆ Testing to be done on production models.
- ◆ If meter is not individually tested, then random testing of meters in production line to be conducted.
- ◆ Applicant must provide an equation for discharge coefficient and gas expansion factor.
- ◆ Overall measurement uncertainty shall be +/- 3% or better of true flowrate.
- ◆ In some cases further tests may be necessary/required.