

How to Do Absolutely Everything Wrong...

And Then How To Fix It

Late 80's and Early 90's: Not Kind

- 1992 Performance Audit showed significant problems across the Exploration spectrum
 - Strategic, Organizational, Technical Process and D&RA
- Exploration not delivering predicted oil/gas volumes that we promised to the Corporation
 - Finding only 60% of the predicted technical volume
 - Economic, eventually produced, even less
- Organizational rewards led to over-marketing of predicted oil/gas volumes
 - Technologists behavioral biases
 - Over-optimism – “most-likely” too high
 - Over-confidence – range too narrow
 - Middle management reinforced the problem

1992: How to Do DA Wrong

- No Management Support or Buy-In for D&RA
 - No belief in economic decision-making
 - No “cookbooks”
 - No external quality control
- Little Communication to Exploration Community
- No D&RA Training or Education
- No Formal Process, Guidelines or Standards
 - Broad “hand-waving” recommendations to improve volume estimation
 - In-house Monte Carlo tool would not build lognormal distributions
- No Formal Performance Analysis

1994: Steps Taken to Improve D&RA

- Improvement of Risk & Volume Uncertainty Estimation for individual prospects initiated
 - Formal guidelines/standards for risk & volume estimation, including reality checks, issued and mandated to be used for all prospects (1994-95)
 - Broad Decision & Risk Assessment education program for management & technologists (1994-1997)
 - Delivery of new Unix-based Monte Carlo tool including lognormal distributions (1995)
 - Risk/Volumes Network to address real-world implementation and application issues (1996)
 - Formal statistical performance audits of predicted vs. actual results (1995-99)
 - Lotus Notes-based Knowledge Management tool to facilitate global learning and sharing (1998)

1999: Results

- Performance audits of 60 technical discoveries from 1995-1999 showed
 - when guidelines not followed:
 - Discovered about 50% of Predicted Expected Value
 - Predicted P99 Probability of Exceeding
 - when guidelines were followed explicitly:
 - we discovered the predicted EV (about P35) of both technical and economic oil/gas volumes
- Improved credibility that Exploration could deliver predicted economic volumes