Paradigm

Houston – September 2010

Introduction to Natural Gas Trading & Hedging

September 20-21

Beyond Essentials: Optionality in Energy

September 22-23

Register On-line

Renaissance Houston Hotel Greenway Plaza

Houston, TX

Program 1 Topics Include:

Successful natural gas portfolio management requires the ability to recognize and manage risk as well as the knowledge and skills to exploit opportunities to enhance portfolio value. Natural gas enjoys a robust, thriving, and largely transparent market offering a wide array of financial products to manage natural gas associated risks and extract incremental value. In this seminar, we will isolate the portfolio components of fixed price, basis, transportation and storage.

Participants will actively engage in a realistic trading simulation in competition with other class participants.

(Participants will need access to a laptop computer running Microsoft Excel)

Program 2 Topics Include:

- *Synthetic puts and calls*
- *Volatility term structure & volatility skews*
- *Limitations of closed form pricing for energy*
- *Monte Carlo option pricing*
- *Delta and the dynamic option hedge process*
- *Trading gamma and theta*
- *Issues in aggregating option risks in energy*
- *Complex optionality common in energy*
- *Role of correlation in multi-fuel pricing*
- *Valuing "real" options in generation*

Detailed Seminar Outlines Below

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Course Introduction to Natural Gas Trading & Hedging

Day 1

Natural Gas Risk and Forward Prices

Enterprise Risk

- The concept of risk
- Categories of risk faced by energy companies
- Interdependence of risk in the energy enterprise
- Identifying price risks

The Dealing Process

- Bid-offer spreads
- Role of brokers, dealers and market makers

Forward Pricing Concepts

- Arbitrage discipline in forward pricing of commodities
- Understanding why natural gas prices deviate from theory
- Limitations to the ability to arbitrage
- The 'Fear Factor': physical (delivery) risk

The Forward Price Curve for Natural Gas

- Seasonality
- Synthetic forwards
- Long-term backwardated and contango natural gas curves
- Valuing and marking to market risk position using the forward curve
- Using the forward price curve to develop hedge tactics
- The role of forward prices in capital budgeting

Swap Structures in Natural Gas

The Financially Settled Contract

- The swap structure
- Indifference between Index cash flow and physical natural gas
- Advantages of the swap hedge versus fixed-price physical
- Understanding box & arrow swap hedge diagrams
- Unbundling and separating physical risk from financial risk
- The swap as the collapse of two physical trades
- Calculating the all-in pricing with a swap
- How swaps are quoted

Pricing a Swap

- Creating a fair value exchange
- The role of the forward price curve
- The index price reference

Swing Swaps

- Intra-month swaps referencing Gas Daily prices
- Calculating a Gas Daily Average
- Balance of Month (BOM) swaps

Group Review

Register for COURSE 1

Register for COURSE 2

Course Introduction to Natural Gas Trading & Hedging

Day 1

Location Basis and Basis Trading Structures

Understanding Location Basis

- Defining location basis
- Basis as synthetic transportation cost
- Basis risk

Basis Trading Structures

- The basis swap in natural gas
- Pricing basis trades from price curves
- Quoting convention for basis swaps in natural gas
- Basis spreads in natural gas vs. basis swaps
- Quoting basis spreads
- How a basis swap and a basis spread lock in transport cost

Using Basis Swaps to Price Natural Gas

- The basis risk of hedging at the Henry hub
- Using the basis swap to secure a fixed-price for gas
- Benchmark pricing for natural gas
- Adjusting gas prices for non-benchmark gas sales

Using Basis Swaps to Optimize Risk Taking

- Synthetically relocating risk exposures
- Selling Rocky Mountain gas indexed to Appalachian prices
- Multiple fuel basis-like swap structures
- Selling Rocky Mountain gas indexed to MISO power prices

Group Review

Course Introduction to Natural Gas Trading & Hedging

Day 2

Hedging Risk with Natural Gas Futures

The Henry Hub Natural Gas Futures Contract

- Origins of futures exchanges
- The natural gas contract
- Contract specifications

Margining and Credit Risk

- Default risk mitigation
- Original margin
- Maintenance/variation margin
- Exchanging credit risk for cash liquidity risk
- Implications of margins on cost

Using Futures to Hedge

- NYMEX Standard Delivery
- Delivery procedure
- Alternate delivery procedure
- Futures as a 'paper' hedge
- Managing cash-futures basis
- NYMEX "Look-Alike" swaps
- Comparing futures against swap hedges

EFP's and EFS's

- Exchange of Futures for Physical (EFP)
- Execution risk with futures when dealing away from the Henry Hub
- Pricing and executing an EFP
- Exchange of Futures for Swaps (EFS)

Other Floor Traded Natural Gas Products

- Options
- Strips

Natural Gas On-Line Trading

- Henry Hub swap futures (outrights)
- Henry Hub Penultimate swap futures (outrights)
- Index swap futures
- Basis swap futures
- Swing swap futures

Clearing OTC Transactions

- Managing Over the Counter Credit Risk

Group Review

Trading Simulation

Understanding Trading Concepts

- The dealing process
- Understanding and working under VaR trading limits
- Factors affecting natural gas prices
- Storage levels
- Weather
- Reading and understanding historic price charts
- Developing trading strategies
- Performance metrics

Trading Game Session

Register for COURSE 1

Register for COURSE 2

Course Introduction to Natural Gas Trading & Hedging

Day 2

Basis Trading & Natural Gas Pipeline Transport

Basis Spreads and Pipeline Transportation

- Cost of moving gas financially
- Understanding pipeline tariffs
- Calculating fuel charges and capacity gross ups
- Total cost of moving gas using the pipeline
- Pipeline capacity as a long basis position
- Pipeline capacity as a long option position

Review of Option Basics

- Option as payout asymmetries
- Structure and payouts of calls and puts
- Hedging natural gas risk positions with options
- Cost/revenue profiles of risk positions hedged with calls or puts

Options on Basis

- Calls and puts on basis spreads
- Identifying embedded options
- Basis options embedded in supply contracts
- Real options

Pipeline Capacity as Option on Basis

- Pipeline capacity owners have a long call on basis
- Pipeline as a 'chooser' option

Swing Swaps and Swing Swap Options on Basis

- Gas Daily swaps
- Gas Daily basis swaps
- Options on Gas Daily basis spreads

Pipeline Segmentation

- Implied transport cost embedded in a price of delivered gas
- Cost minimization using basis swaps
- Choosing between pipeline and basis transport for pipeline segments
- Backhauling as transport arbitrage to reduce transport cost

Group Review

Time Spread Trading & Storage

Time/Calendar Spreads

- Time spread and seasonal spreads
- Buying and selling a time spread

Storage and Time Spreads

- Storage as a long time spread position
- Time spread as a cost of synthetic storage
- Adjusting for time value of money
- Comparing the cost of storage vs. using time spreads
- Storage as an option on time spreads

Storage Arbitrage

- Arbitrage opportunity because forward gas price is not arbitrage-free
- The cost of storing synthetically
- Packaging synthetic storage
- Synthetic storage as lending

Managing Storage Using Time Spreads

- Using storage to fix a time spread
- Increasing storage margins using time spreads
- Swing swap options as alternative to storage

Short Term Storage Strategies

- "Park-and-Loan" programs
- Trading for value using "Park-and-Loan" programs
- Intentional imbalance to extract value

Group Review

Course 2 Beyond Essentials — Option Applications in Energy

Day 1

Review of Option Concepts

- Basic put/call structures and payouts
- Intrinsic and time (extrinsic) value
- Storage as an embedded component of an American Option
- Options embedded in energy assets
- Option vs. fixed-price hedging strategies
- Identifying options embedded in transactions of physical
- Physical vs. financial settlement

Option Packages

- Caps, Floors & Collars
- Advanced Collar structures
- Inter-seasonal option structures

Arbitrage Discipline in Option Pricing

- Option premium arbitrage
- Put call parity
- Creating synthetic puts and calls
- Structure of time value
- Volatility smiles and skews in energy options
- Structuring implications of skews

Group Review

Option Pricing Models in Energy

- What option models do and don't do
- How pricing energy options differs from pricing stock options
- Assumptions underlying models
- Limitations and implications
- Understanding option pricing parameters
- The option premium: forecast of hedging costs vs. expected payout

Understanding Volatility

- Types of volatility
- Measuring volatility
- Interpreting volatility
- Role of holding period in volatility measure
- Term structure of volatility
- How volatility structures in energy differ from financial markets
- Interpretation of volatility by option models

Group Review

Delta Hedging

- Creating neutrality to directional price moves
- Isolating volatility risk from directional price risk
- Calculating the delta value
- Delta as a hedge ratio
- Delta as a statistical measure of the likelihood of option exercise
- How option values change as the price of the underlying changes
- Positive vs. negative delta values
- Implications of delta to the option trader
- Implications of delta to a non-trader

Cost of Adjusting Delta

- Dynamic hedging
- Need to adjust the hedge
- Cost of each hedge adjustment
- Variability of hedge adjustment costs
- Constraints on delta hedging in the energy markets

Group Review

Course 2 Beyond Essentials — Option Applications in Energy

Day 2

Gamma

- Measuring the cost of delta hedge adjustments
- Calculating gamma
- Importance to the option trader
- Interpreting gamma
- Positive vs. negative gamma
- The profile of gamma and relationship to time value
- Implications of gamma to volatility smiles and skews

Portfolio Aggregation Option Risk

- Portfolio aggregation of Delta
- Need to segregate position into "time buckets"
- Interpreting portfolio delta
- Managing aggregated portfolio gamma positions
- Need for stress testing

Theta, Vega & Rho

- Theta as the offset to gamma
- The decay of time value
- Differentiating exposure to implied vs. actual price volatility (vega vs. gamma)
- How rho differs in energy options compared to financial (non-energy) options
- Differentiate time value of money vs. time value of options

Group Review

Complex Optionality Common in Energy

"Exotic" Optionality

- Defining an "exotic" option
- Non-standard ("exotic") optionality embedded in energy contracts
- Non-standard optionality embedded in energy assets
- Advantages of exotic options as a risk management tool
- Minimizing hedge costs by avoiding "overhedging"

Path-Dependent Options

- Asian options
- Barrier options
- Lookback/Ladder options
- Advantages of path-dependent options
- Path-dependent options common in the energy business

Digital Options

- Binary structures
- Valuing a digital option
- Structuring using digitals
- Digital options embedded in energy operations
- *Force majeure* as a digital risk

Multiple-Fuel Options

- The role of correlation in valuing multi-fuel options
- Basket options
- Spread options: options on basis, calendar, & spark spreads
- Rainbow options
- Dispatch options
- Multi-fuel options contained in common energy contracts

Optionality Embedded in Energy Assets and Operations

- Pipeline Optionality
- Storage Optionality
- Extrinsic Value in Generation
- Option-Based Asset Valuation vs. Conventional DCF Approach

Group Review

About Paradigm and Our Instructors

Paradigm provides practical non-theoretical training in energy derivatives, and their related risk management technologies. Programs are structured to the specific needs of today's dynamic energy industry and are designed to excite participants by knocking down the myths and mystiques built around derivative products. Paradigm's instructors offer participants a clear understanding of the business potential arising from combining physical energy and financial products.

The following programs are basic level (group-live offering) courses with no prerequisites or advanced preparation required. *Course 1 CPE Credits: Marketing 2, Management Advisory Services 1, Economics 1, Production 5, Specialized Knowledge & Applications 5. Total =14. Course 2 CPE Credits: Accounting & Auditing 1; Consulting Services 0; Management 1; Specialized Knowledge & Applications 12: Total = 14.*

September 20-21, 2010 Course 1 — Introduction to Natural Gas Trading & Hedging — $1,595 USD REGISTER HERE

This program provides participants with a comprehensive understanding of the structures that underlie Natural Gas trading. The program begins by examining the dealing process; forward pricing in natural gas markets; and the strategic use of the forward price curve. The role of Swaps and swaps structures commonly used in today's trading is explored before a detailed overview of Location and Basis swap trading structures is reached. The second day considers basis trading and the underlying optionality in pipelines, as well as swing swaps and swing swap options on basis. The focus then shifts to consider time spread storage and trading mechanisms. The instruction ends with a session on hedging risk with Natural Gas Futures. The program concludes with a trading simulation that brings all previously discussed trading concepts together in a realistic trading "game."

September 22-23, 2010 Course 2 — Beyond Essentials: Option Applications in Energy — $1,595 USD REGISTER HERE

This course is appropriate for professionals wishing to obtain a solid practical and conceptual (non-quantitative) understanding of more sophisticated option concepts as they apply specifically to the energy business. Optionality as seen in the energy business is different in many aspects from options on stocks and bonds. Emphasis is placed on the unique dimensions of the energy business and how they influence option valuations and hedge implementation. The program includes a wide array of option structures. These are important for the energy professional, not just because they can represent efficient tools to hedge existing risks. However, more significantly, almost all of these forms of optionality can be found embedded either in energy assets or supply contracts. Awareness of the nature of the risks inherent in these embedded positions and the values associated with them, is critical to efficient management throughout the energy sector.

Program Instructors

Paradigm's instructors bring to the classroom the hands-on experience of working in related business areas. Combining this extensive knowledge with their experience in conducting dedicated training for thousands of executives insures that our seminars feature lively interaction between participants and the instructor.

Venitta M. Ferguson

Prior to joining Paradigm in 1999, Venitta spent her entire career in the natural gas industry. Recognition of her work lead to Venitta's appointment as a member of the Natural Gas Advisory Committee to the New York Mercantile Exchange, where she was instrumental in fostering the acceptance of Exchange instruments within the natural gas industry. Venitta has practical experience in trading the physical energy markets and working with derivative products to control risk.

John A. Doble

John's career spans the spectrum from trading and developing special applications for derivative products, through to actual corporate treasury responsibilities where managing risk positions and working with Value at Risk are a priority. John has considerable experience in the field of training and he has developed and delivered seminars on derivative products and the mechanics and uses of Value at Risk concepts. John has also managed the aspects of designing and implementing risk management systems for trading rooms.

Special Promotions

- Team Discount — Your organization may send one participant FREE with every 3 Paradigm registered participant.
- Early Bird Discount — Register now through September 19th and receive $100 off of your registration fees.
- Multi-Course Discount — Each registrant will receive a $300 discount by signing up for both courses.

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