

G+ Gas Day Setup

Presented by

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A Subsidiary of MDU Resources Group, Inc.*



Williston Basin Interstate Pipeline Company

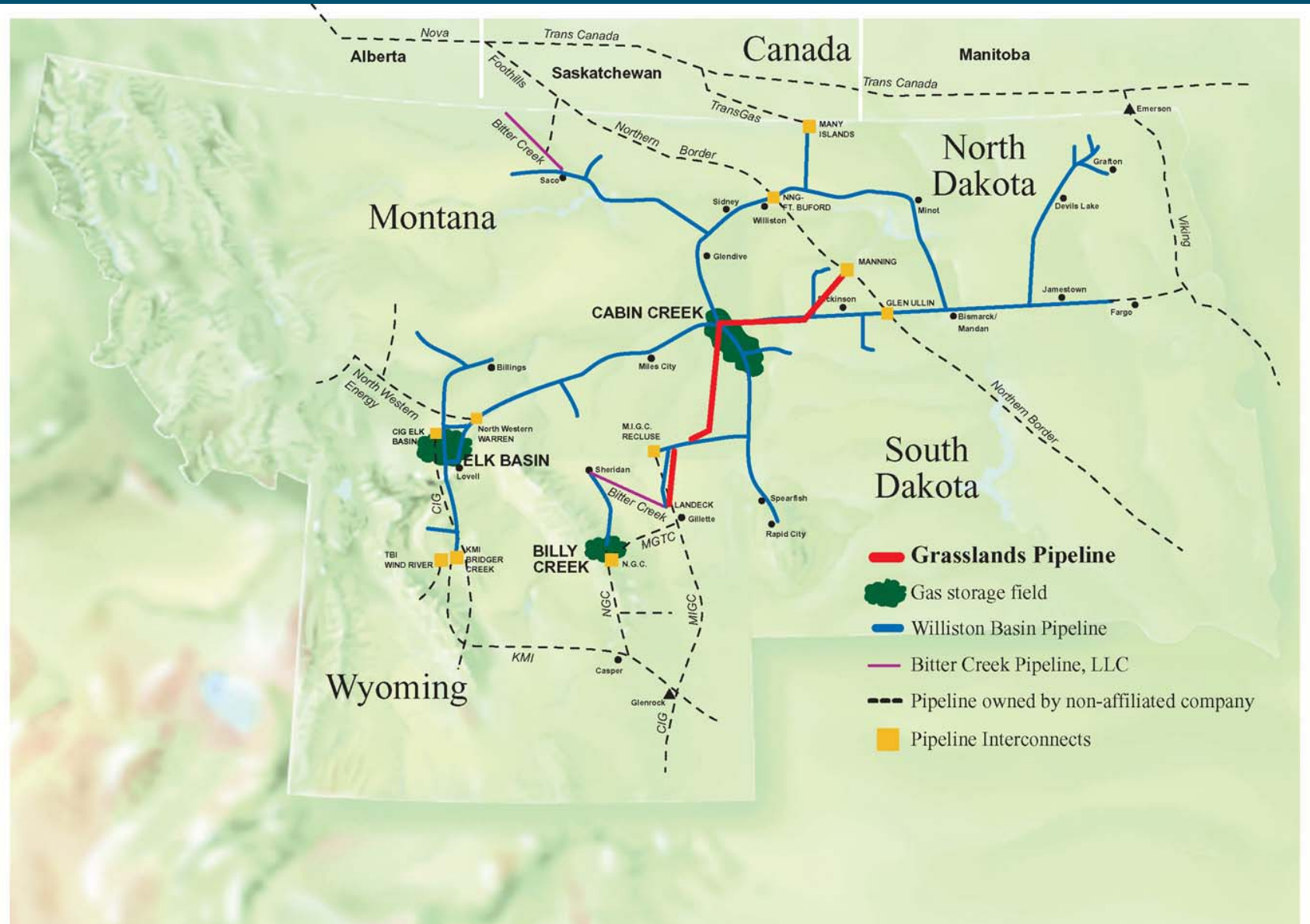
A Brief Introduction



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The Regulation Conundrum

- FERC regulation and NAESB standards make the process of scheduling ever more difficult.
- Traditional methods for scheduling nominations are becoming increasingly inadequate.
- A much tighter and more efficient relationship between Gas Control, Scheduling, Marketing and Operations was necessary.



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What Do We Do About It?

- Williston Basin realized a need to combine pipeline simulation with nomination and scheduling procedures.
- It is no longer sufficient to just use pipeline simulation technology to solve hydraulic problems.



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G+

*Gas Day Setup
is the tool Williston Basin
will use to address these
issues.*



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Project Objectives

- Maximize scheduled volumes cycle to cycle.
- Insure consistent allocation of capacity cycle to cycle, day to day and season to season.
- Minimize the affect day to day pipeline upsets have on Williston Basin customers.



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How?

1. By combining steady state simulation.....
with
2. Williston Basin business analysis tools.....
and
3. An array of scheduling, contract, maintenance,
weather and operational data.....
to
4. Address complex Williston Basin scheduling
issues



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G+ Gas Day Setup General Functionality

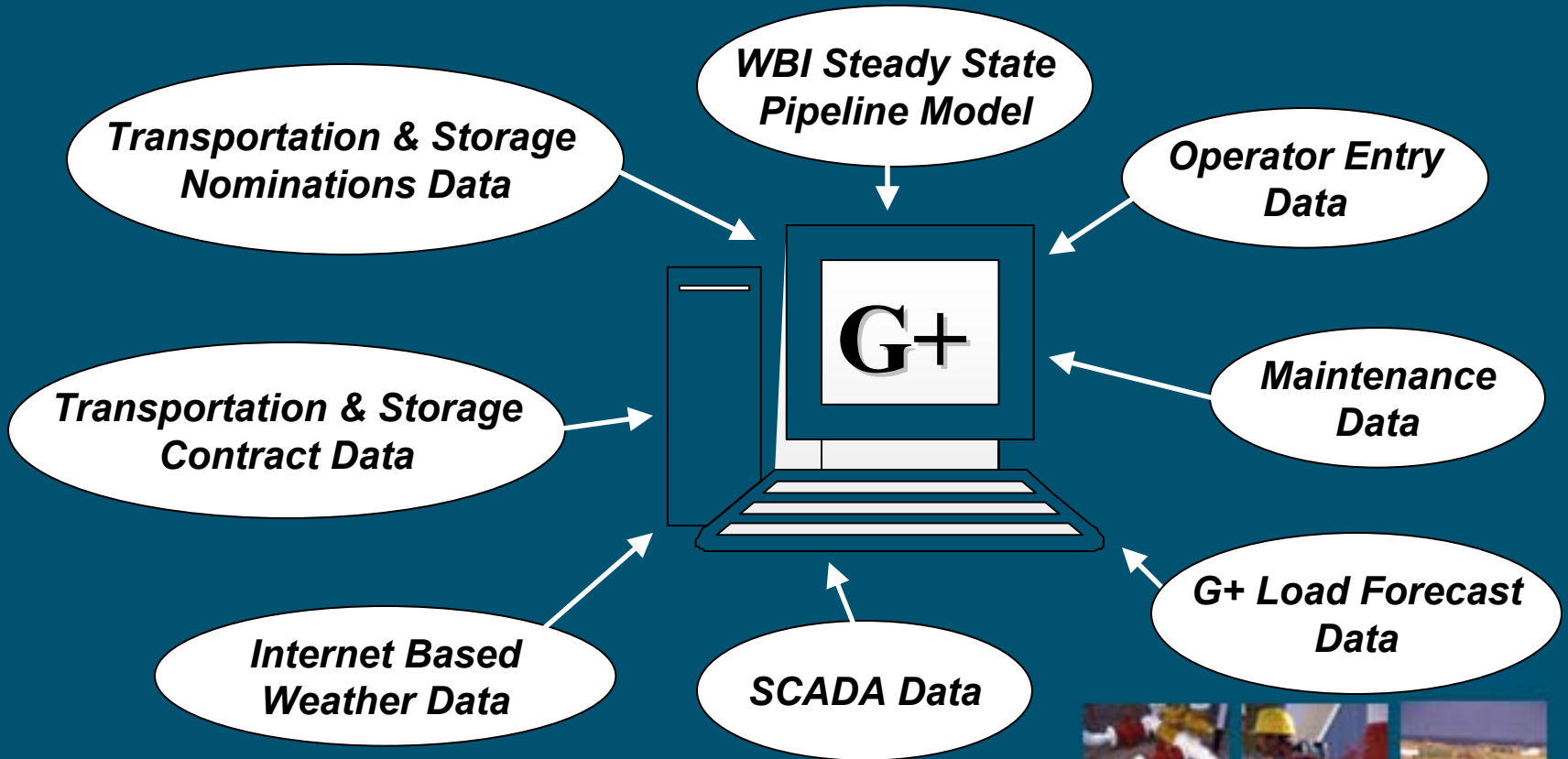


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G+ Gas Day Setup Data Sources



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Nominations and Contract Data

- Customer nominations and contract information is passed to G+ from the company's Gas Management System.
- This data includes nomination volumes, associated receipt and delivery points, contract information, and rate information.



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SCADA and Weather Data

- Key volumetric and gas quality data is passed from the Williston Basin SCADA system.
- Contractor Internet based weather data is accessed by SCADA and passed to G+.



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G+ Load Forecaster

- Approximately 25% of Williston Basin's peak day load requirements are NO-NOTICE service!
- These volumes must be estimated and scheduled from Firm Storage by Williston Basin without the benefit of nominations.
- With temperatures capable of -50F this places a huge importance on accurate load forecasting.



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Maintenance Data Base

- Williston Basin maintenance items are capable of being tracked in G+ by date and time.
- Maintenance items are entered in the model as “leg” items.
- Capacity constraints created by maintenance items are considered by G+ Gas Day Setup during runtime and volumes scheduled accordingly.



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Operator Dialog

- The G+ Gas Day Setup operator has the capability of entering:
 - OBA volumes
 - ROBA volumes
 - Specific pressure set point parameters
 - And storage target volumes



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WBI Steady State Model

- A multitude of steady state models are built to cover all possible operating scenarios.
- The models are stored in a G+ Multi-Scenario Library and new or modified models can be added at any time.
- G+ selects the appropriate model from its Multi-Scenario Library to meet loading requirements.



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Run G+ Gas Day Setup

G+ Gas Day Setup takes into consideration the parameters described above and determines if adequate capacity exists to meet the customer's requests.



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Adequate Capacity

- G+ marks the nominations for scheduling and returns them to the Gas Management System for final scheduling.
- An excess capacity report is generated and sent to gas control and scheduling personnel:
 - Allowing short term excess capacity to be marketed
 - Allowing unscheduled maintenance to be performed without affecting customer's requirements



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Inadequate Capacity

- Allocation of capacity must be considered.
- The operator is presented the opportunity to change OBA, ROBA, and storage and pressure set points.
- The operator may re-schedule maintenance projects.
- **Re-run G+ Gas Day Setup**



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Still Inadequate Capacity

- Nominations are cut based on the contract and rate information passed from the Gas Management System.
- If the system is delivery constrained, then cuts are also made to the corresponding receipt points.
- If the system is receipt constrained, then cuts are also made to the corresponding delivery points.
- Continue looping until all constraints are satisfied.



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Capacity Allocation Procedures

- The allocation of capacity takes into consideration the following transactions:
 - Discounted rate transportation or storage transactions
 - Firm, Alternate Firm and Interruptible transportation
 - Firm and Interruptible storage
 - Imbalance management
 - Meter bouncing
 - Park and Loan
 - Pooling



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Capacity Allocation Procedures cont'd

- Capacity allocation is performed utilizing scripts written specifically for Williston Basin business procedures and Tariff rules.
- These scripts are supplied to Williston Basin to allow Williston Basin personnel to keep them current within the ever changing scheduling environment



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Project Status

- G+ is being implemented in conjunction with a complete SCADA and RTU replacement project.
- The SCADA project is mid-way through the Factory Acceptance Testing phase.
- The G+ project is entering the Factory Acceptance Testing phase of the project.
- The overall project is scheduled to be completed and operational by year end.



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THANK YOU



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