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**Capacity Reservation Factors**

October 22, 2008

# Defining Our Purpose

El Paso Corporation provides natural gas and related energy products in a safe, dependable, and efficient manner

# Capacity Reservation Factors: Presentation Overview

↗ Introduction

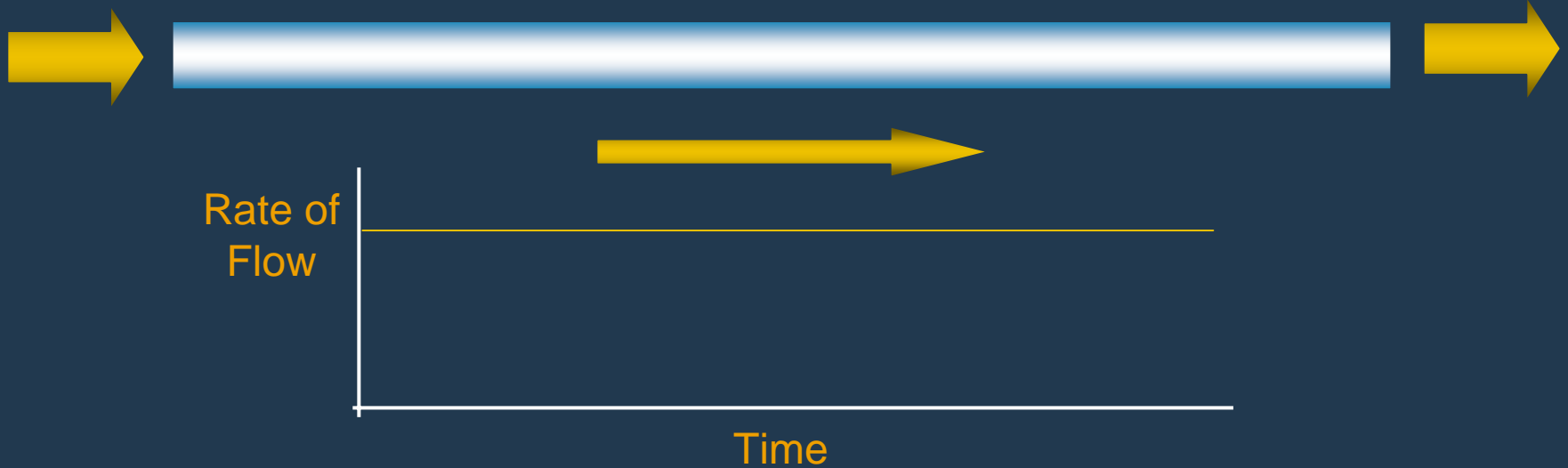
↗ Description of Analysis

↗ Results

↗ Q&A

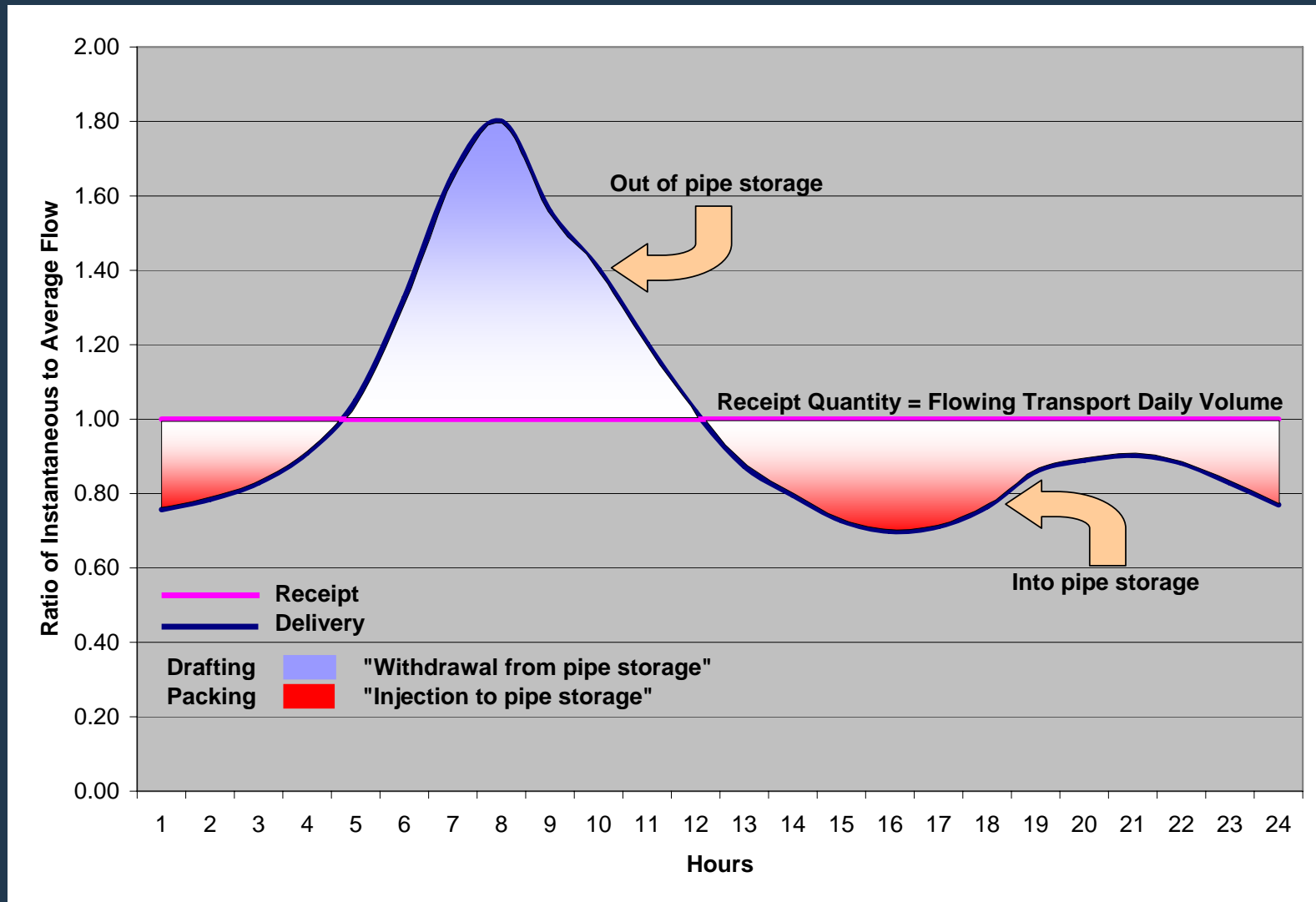
# Introduction

# Scheduling at Constant Rates



- ⤴ Flow constant
- ⤴ Receipt equals delivery
- ⤴ Capacity utilization = transport quantity

# Managing Flow Variations



# Total Pipeline Capacity

- ⤴ Total Pipeline Capacity = Transport +  
Pipe Storage
  - Transport – capacity in the traditional sense
  - Pipe Storage – capacity to manage differences between receipt and delivery quantities
- ⤴ Operations at full transport capacity
  - No “room” for pipe storage
  - Must have constant rates of flow

# Scheduling “Pipe Storage” Space: HEEN

## *Hourly Entitlement Enhancement Nomination*

- ⤴ Available for FT, FTH, NNTD and NNTH services
- ⤴ Nominated by shipper
  - HEEN allows shippers to manage their capacity
  - Alternative: reserve hourly requirement 24/7
- ⤴ For FT-1 transactions
  - Scheduled quantity =  
Flowing quantity (transport) + HEEN (pipe storage)



# Scheduling “Pipe Storage” Space: CRN

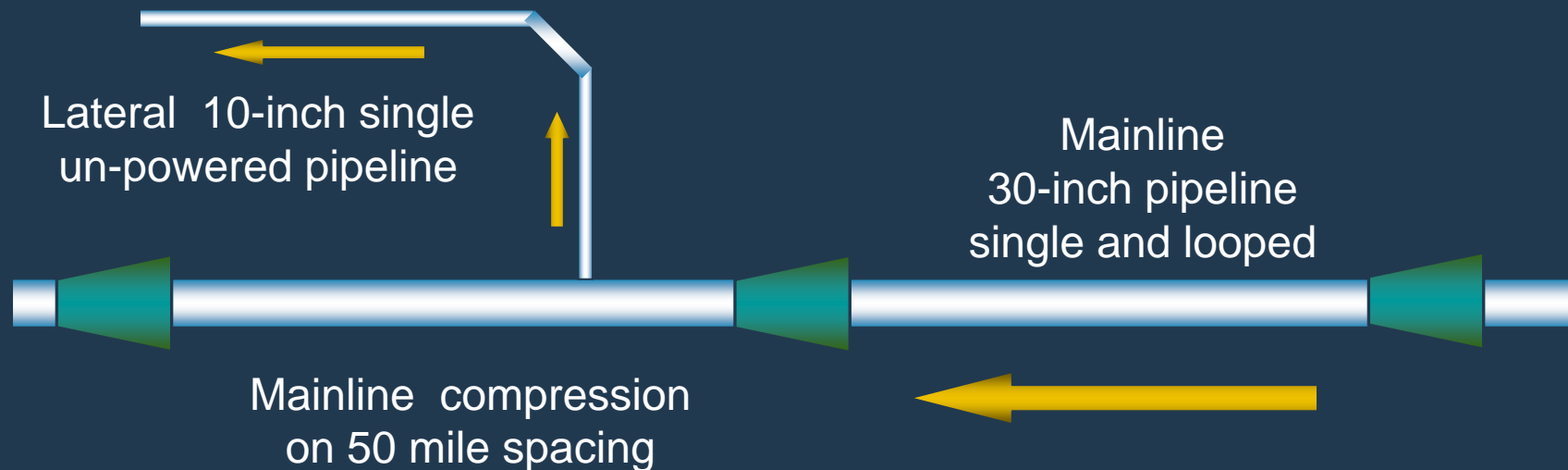
## *Capacity Reservation Nomination*

- ⤴ Component of FTH, NNTH services
- ⤴ Automatically calculated
- ⤴ Based on flowing nomination and service
- ⤴  $CRN = \text{Capacity Reservation Factor multiplied by Transport Nomination}$
- ⤴ Scheduled quantity =
  - Flowing quantity (transport) + CRN (pipe storage)
- ⤴ Duration at peak specified as part of service

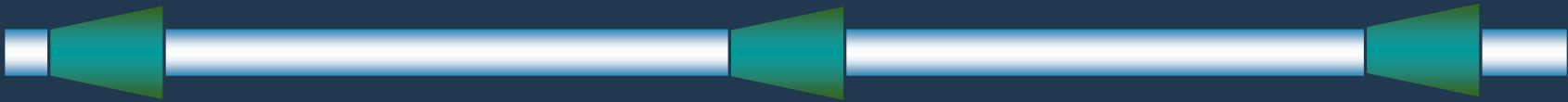
# Description of Analysis

# Computer Models

- ^ Advantica/Stoner transient simulations
- ^ Facility configurations
  - Mainlines and laterals
  - With and without compression



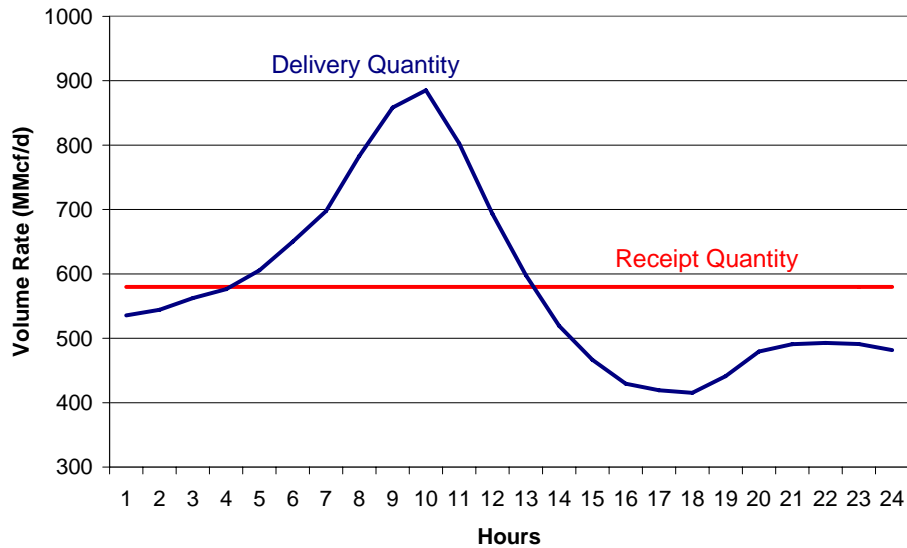
# Baseline



- ^ Simple pipeline
- ^ Constant rates of flow
- ^ Receipts at one end; deliveries at other end
- ^ Quantify full capacity

# Study Assumptions

Simulations: Example Volume Sets



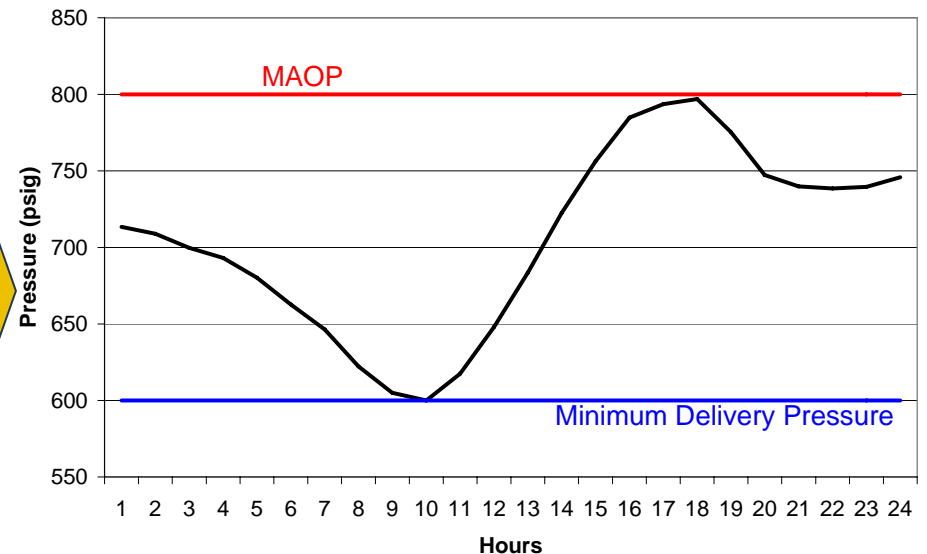
## Simulation Assumptions

- Receipts
  - constant volume rate
  - constant pressure
- Delivery (load) duration curves
  - Varied hourly over day
  - Balanced with receipts daily

Reduced capacity until...

- Receipt/delivery balanced
- Calculated Pressures
  - Below MAOP
  - Above delivery pressure

Simulations: Example Pressures



# Sensitivities

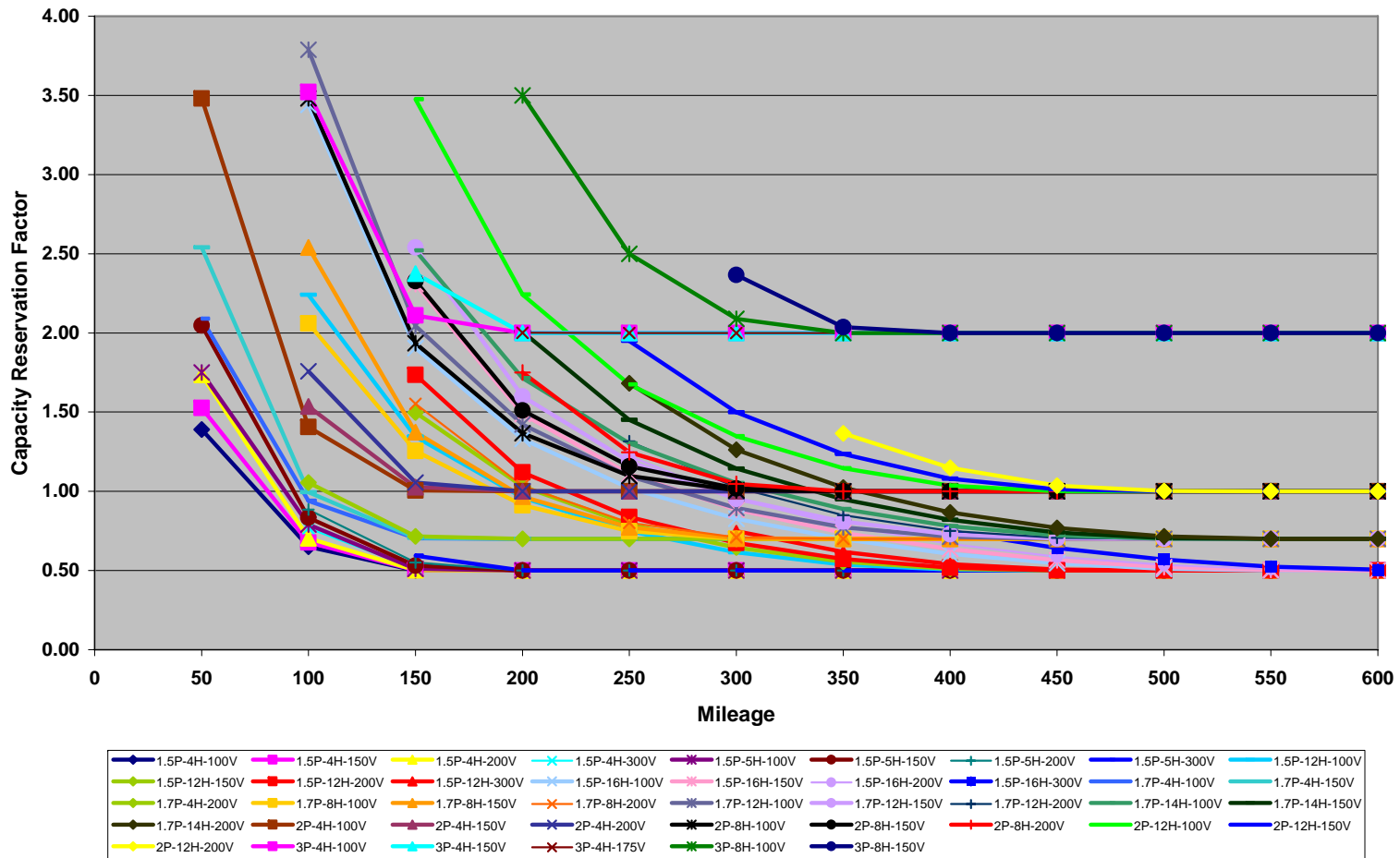
- ^ Peak Hour and Duration
- ^ Facilities
  - Single line
  - Looped lines
  - Lateral line
  - Mainline and lateral
- ^ Service mix: Non-uniform rates vs. uniform rates
- ^ Pressure ranges

# Presentation of Results

- Capacity Reservation Nomination (CRN) equals Capacity Reservation Factor (CRF) multiplied by Transport Nomination
- Total nominated quantity equals  $(1 + \text{CRF}) * \text{Transport Nomination}$

# Making sense of all the data

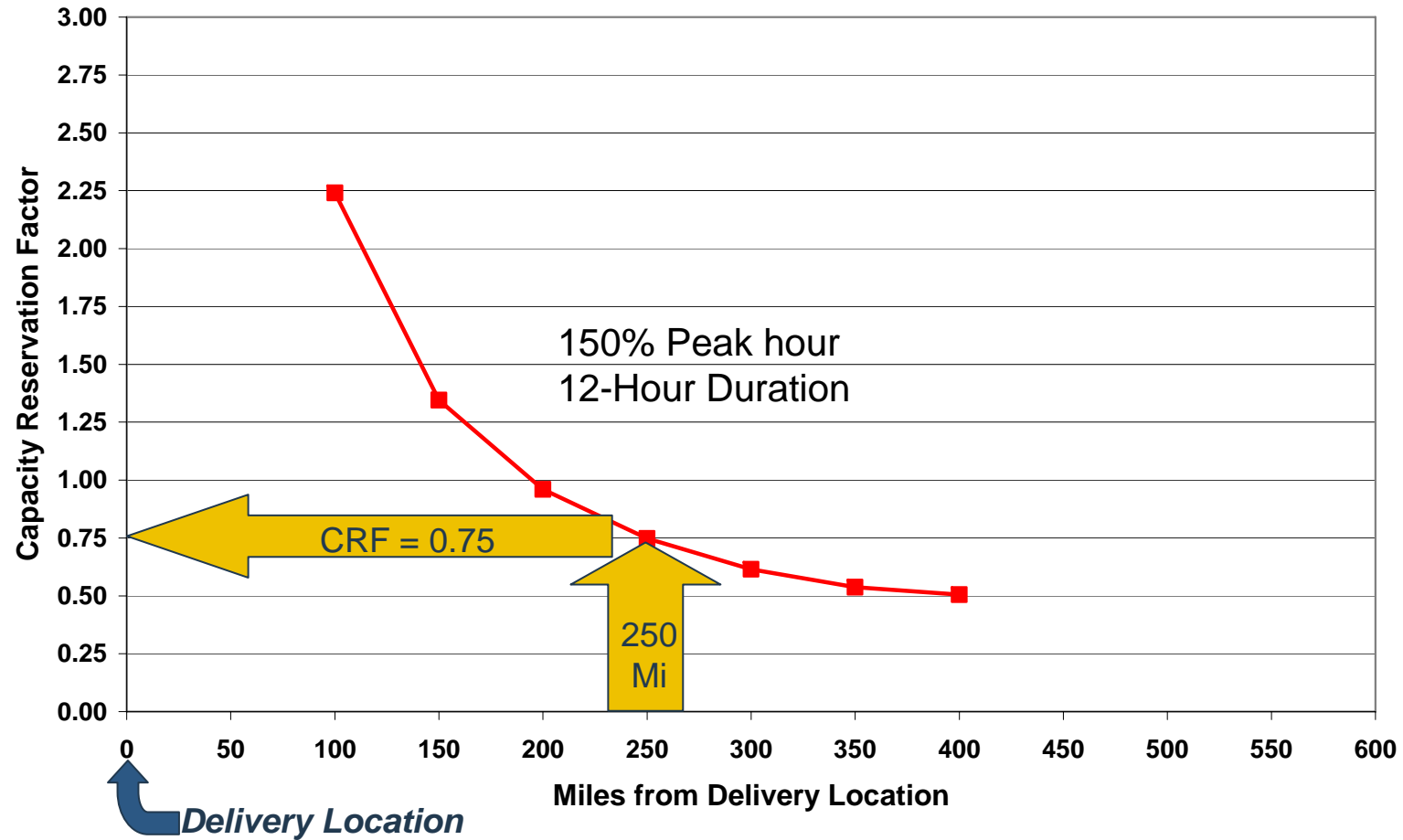
## Capacity Reservation Factor vs Mileage (All Data Points)

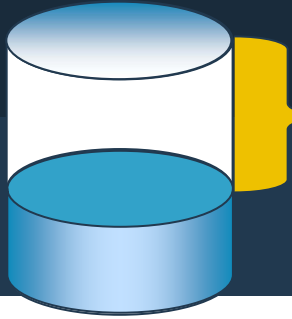




# Presentation Format

## Example





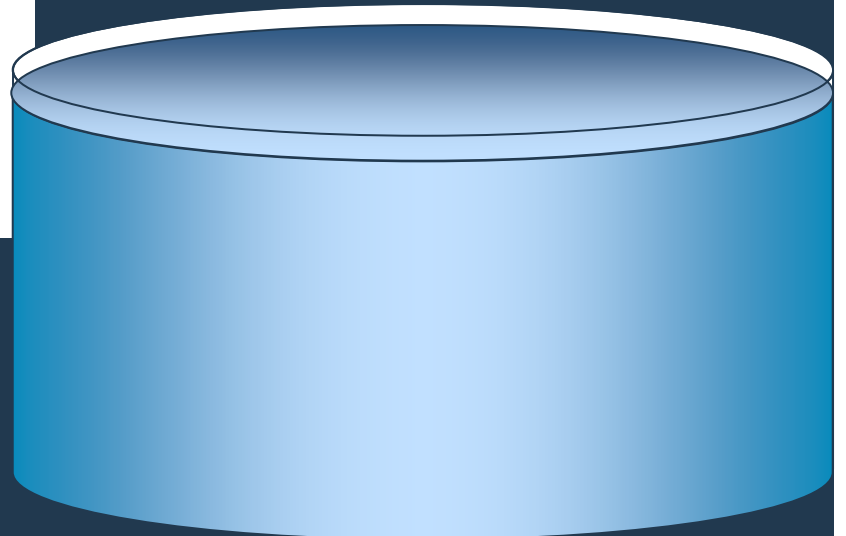
Large percentage of small asset

# Storage Space

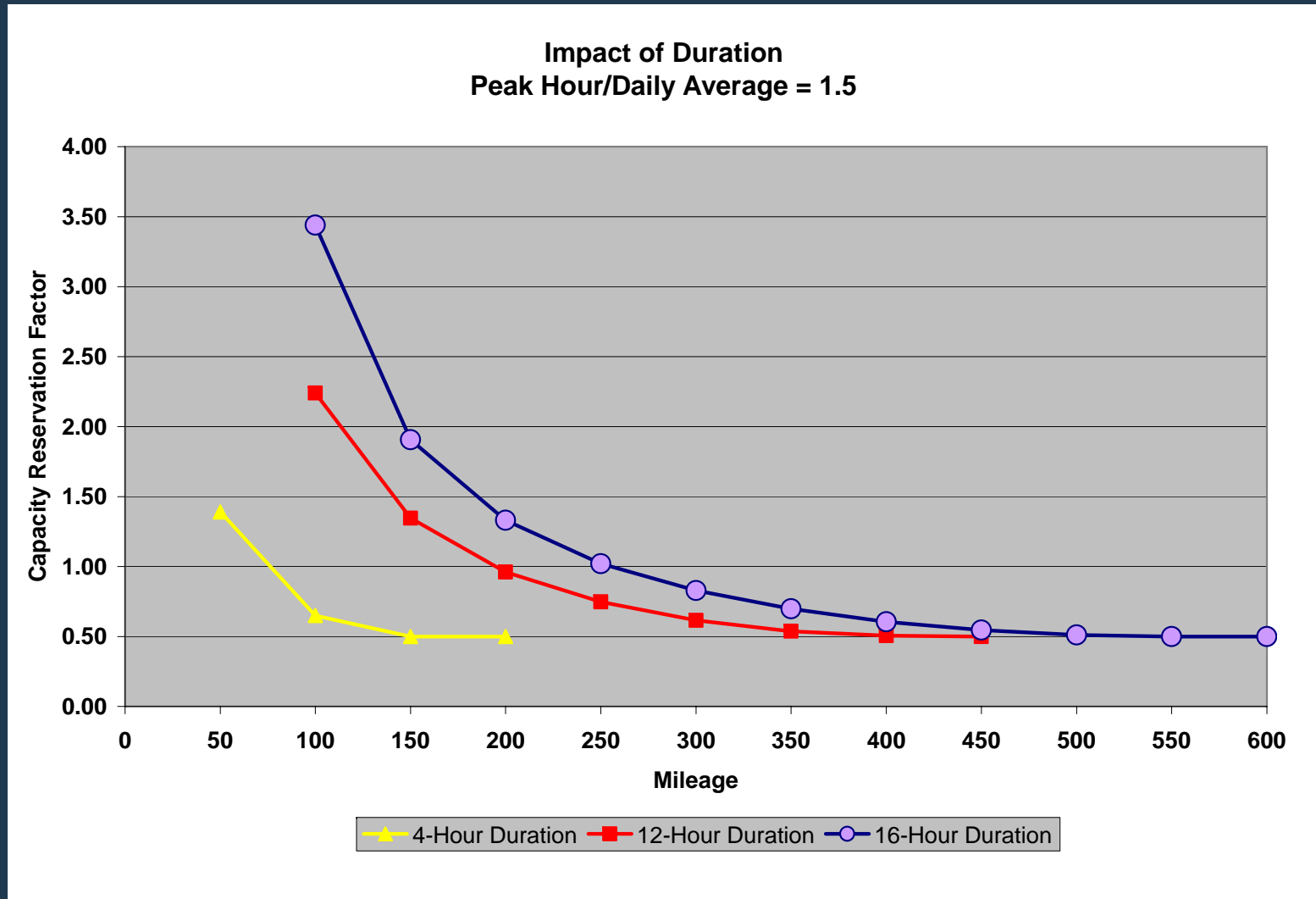
Example



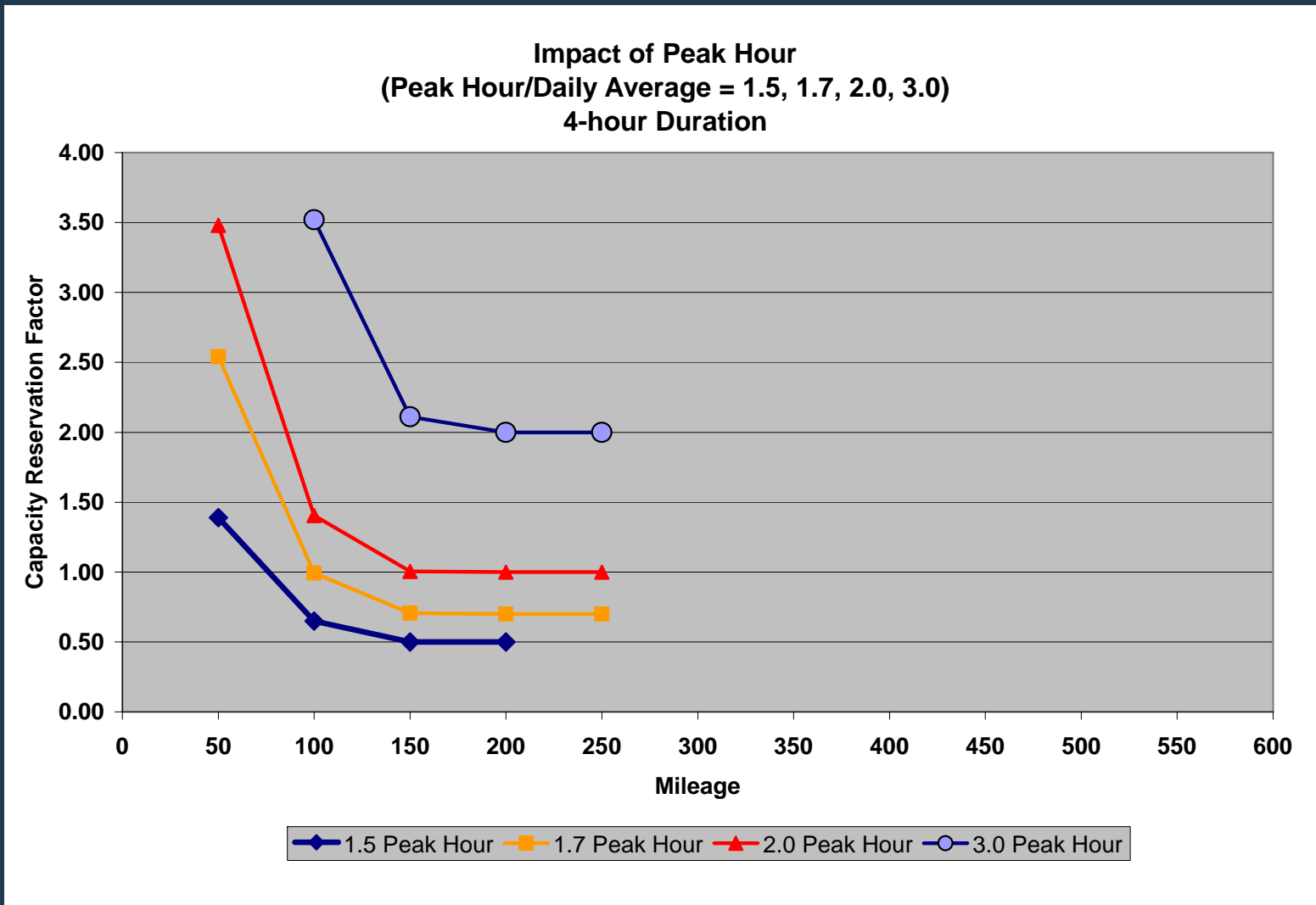
Small percentage of large asset



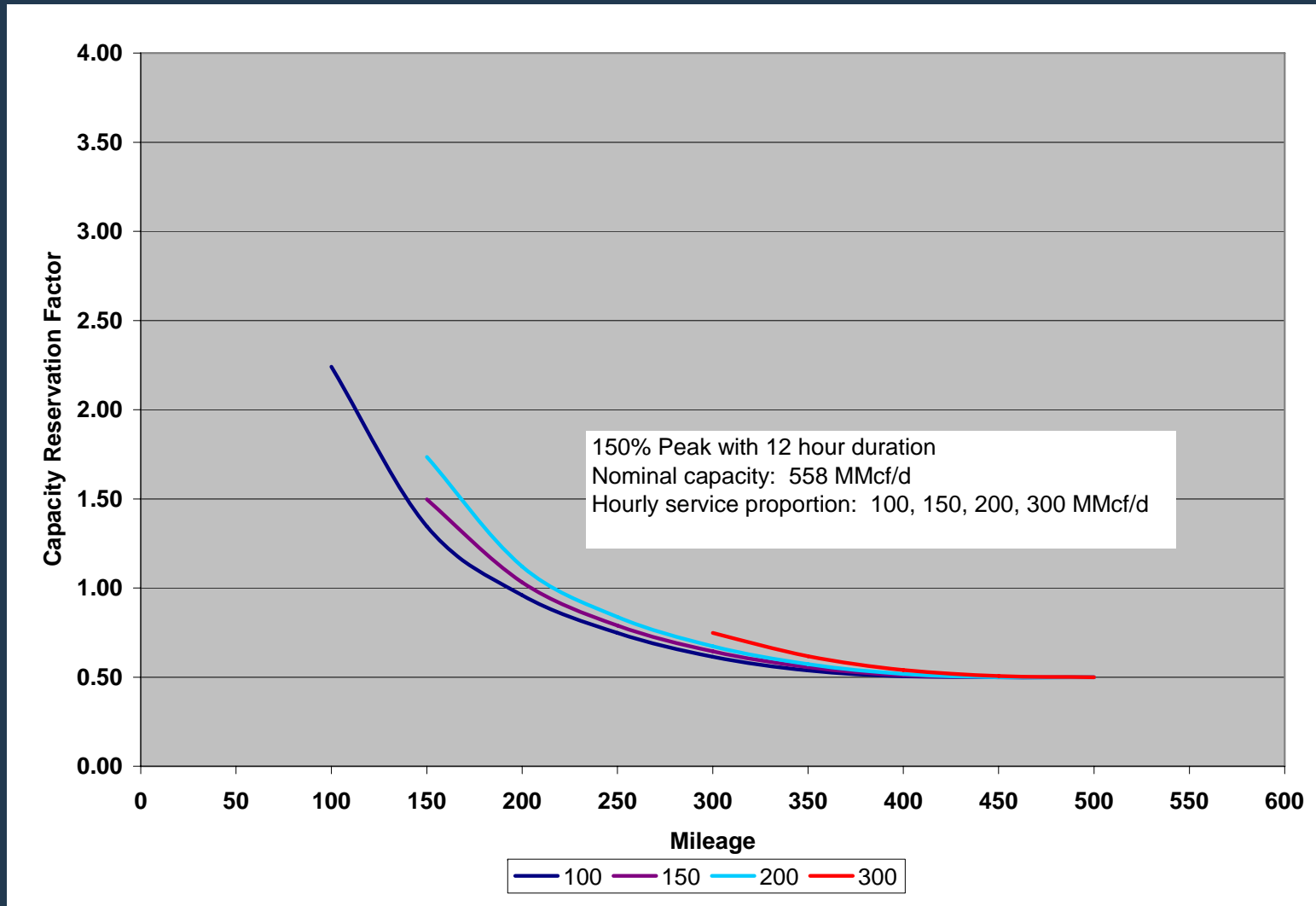
# Sensitivity: Duration of Peak Flow



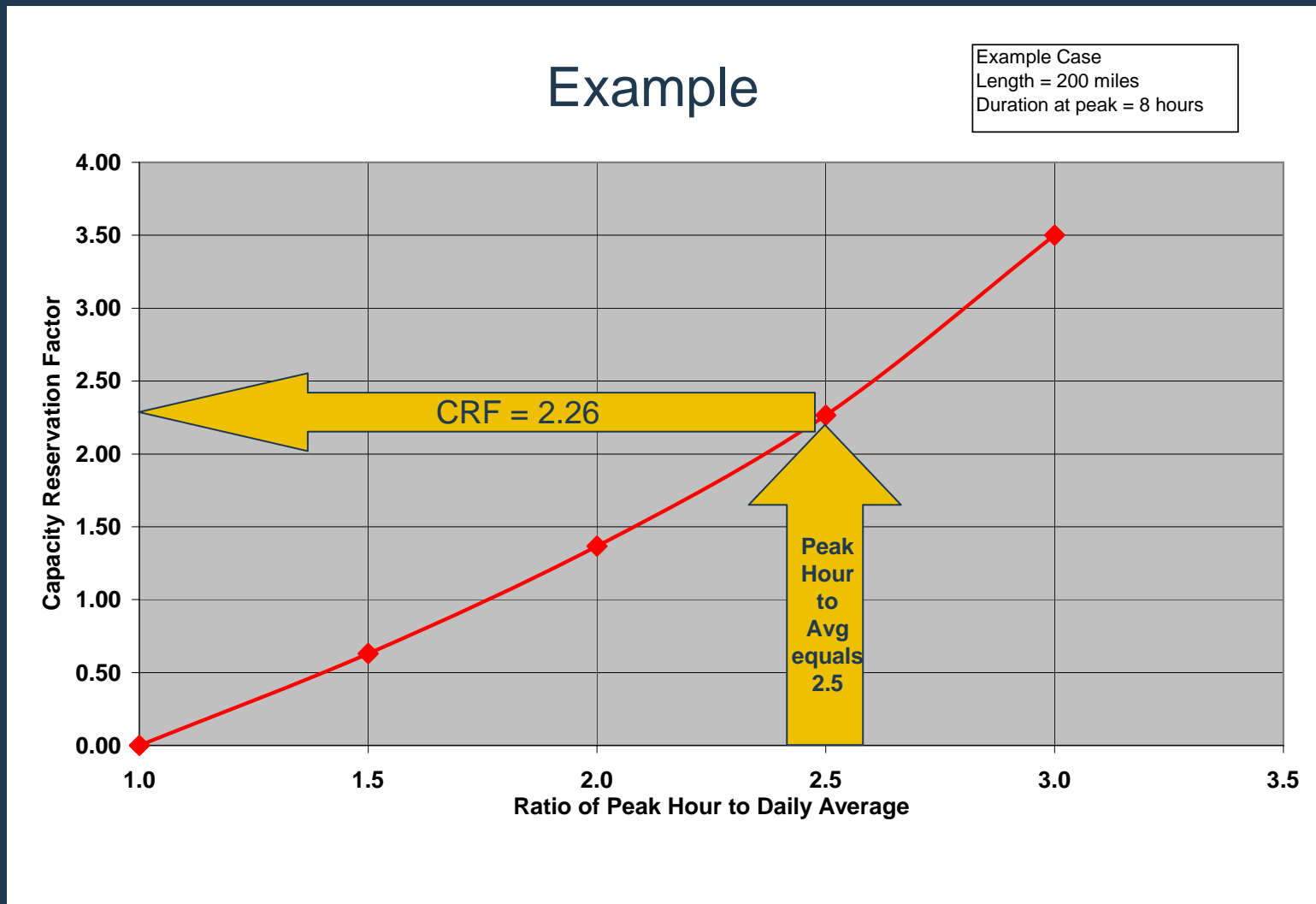
# Sensitivity: Peak Hour



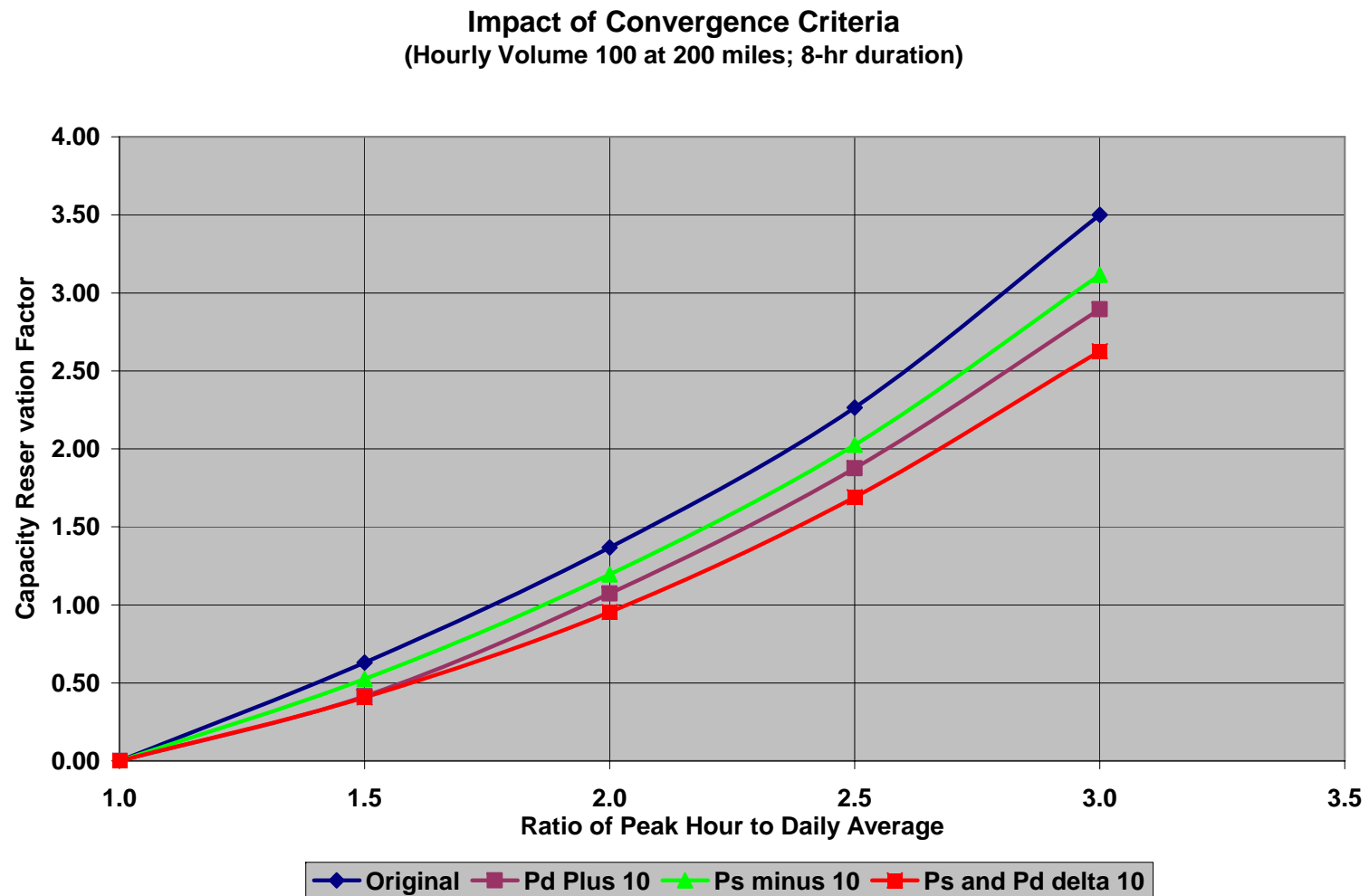
# Sensitivity: Service Proportions, Looped Lines



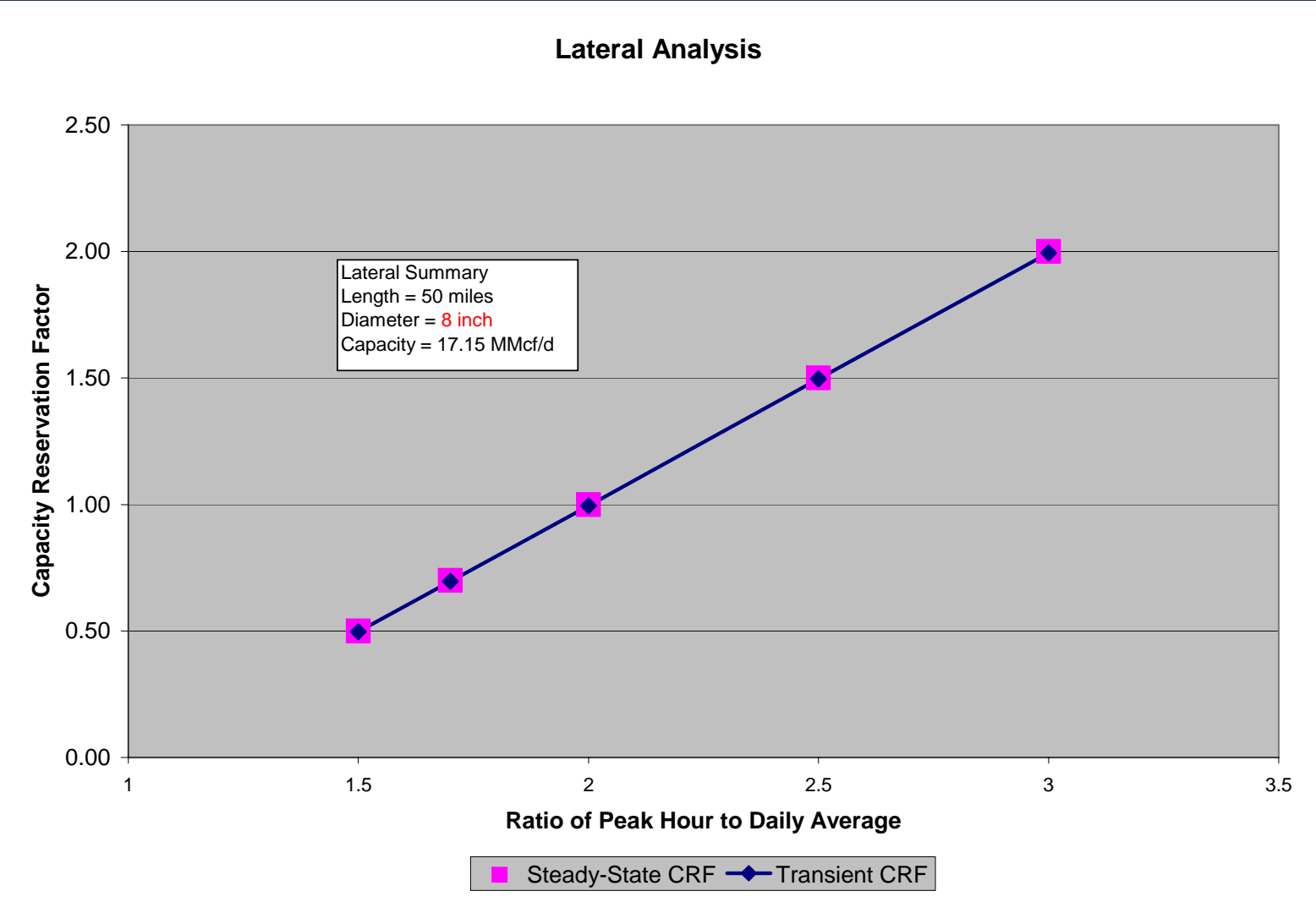
# A Different Presentation Format



# Sensitivity: “Convergence” Criteria

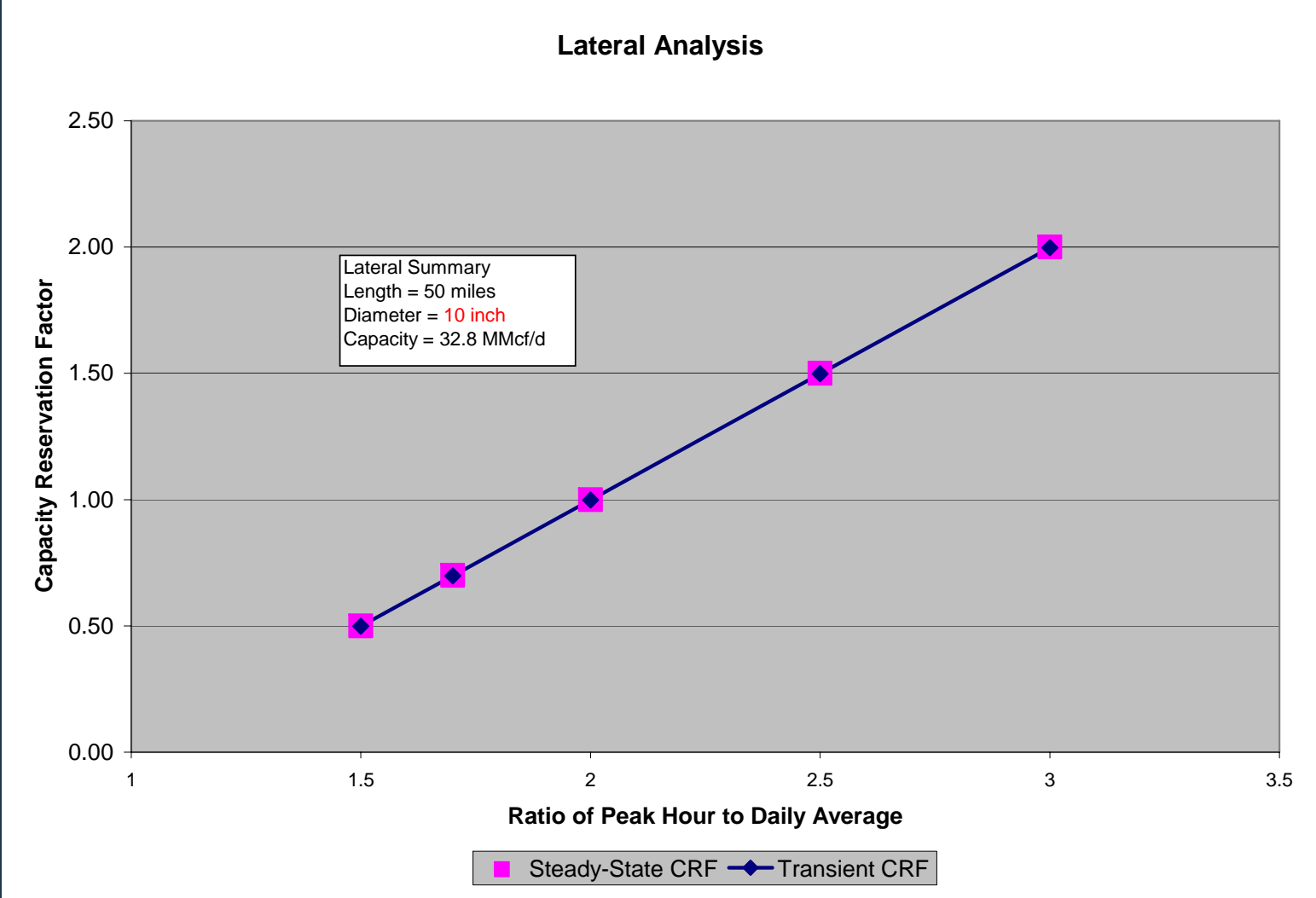


# Capacity Reservation Factors: 8-in Lateral

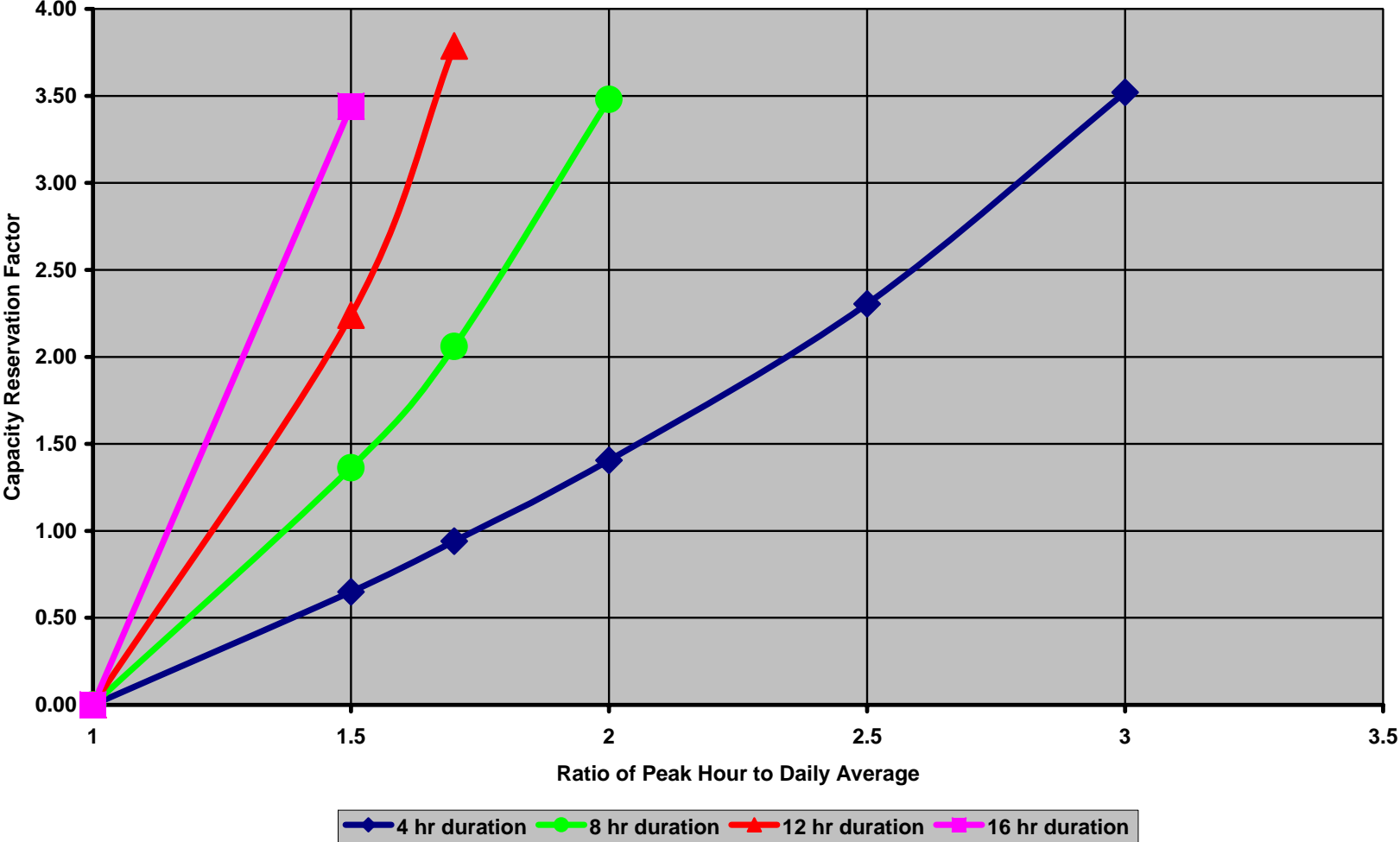




# Capacity Reservation Factors: 10-in Lateral

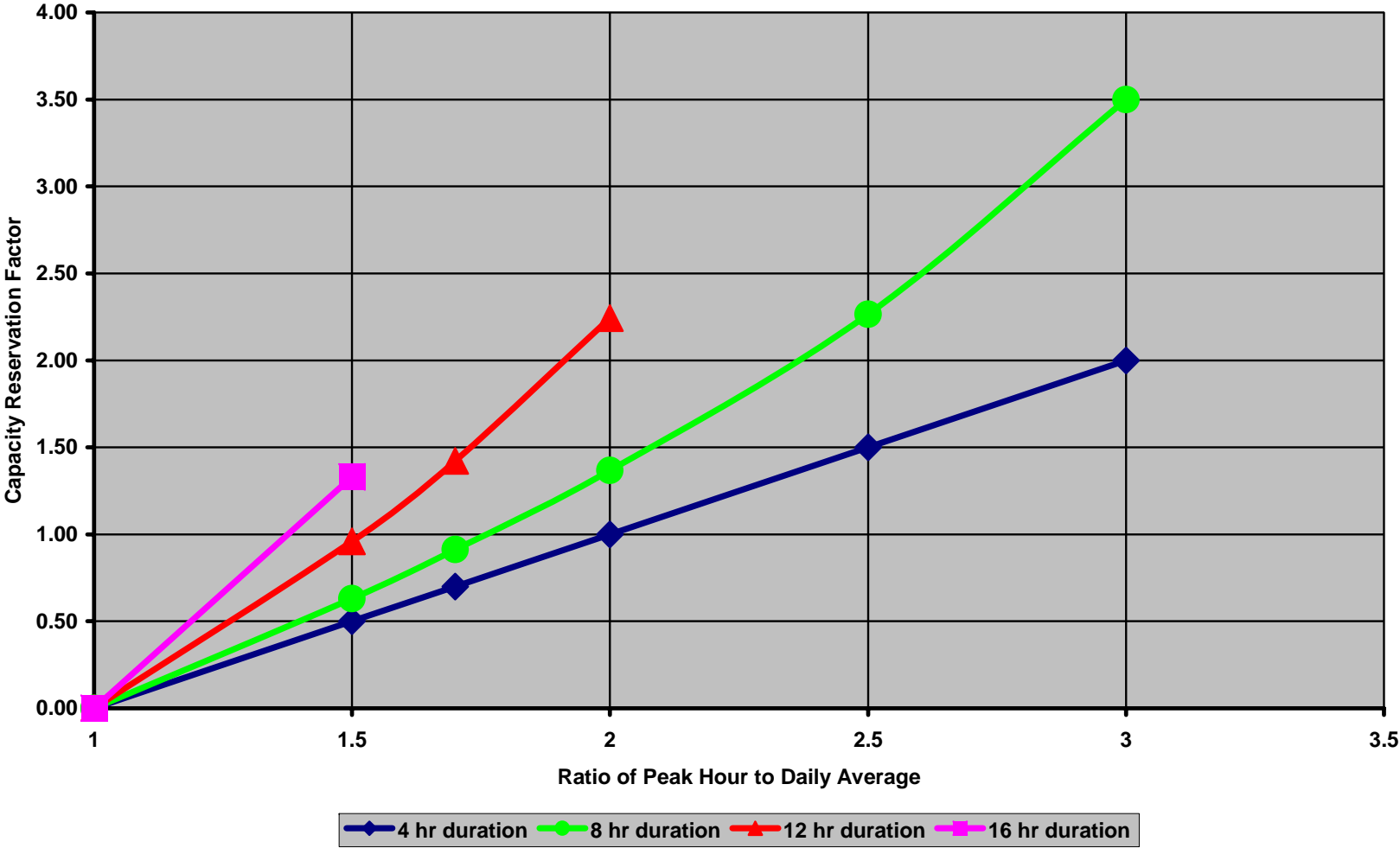


# Impact of Duration at 100 Miles



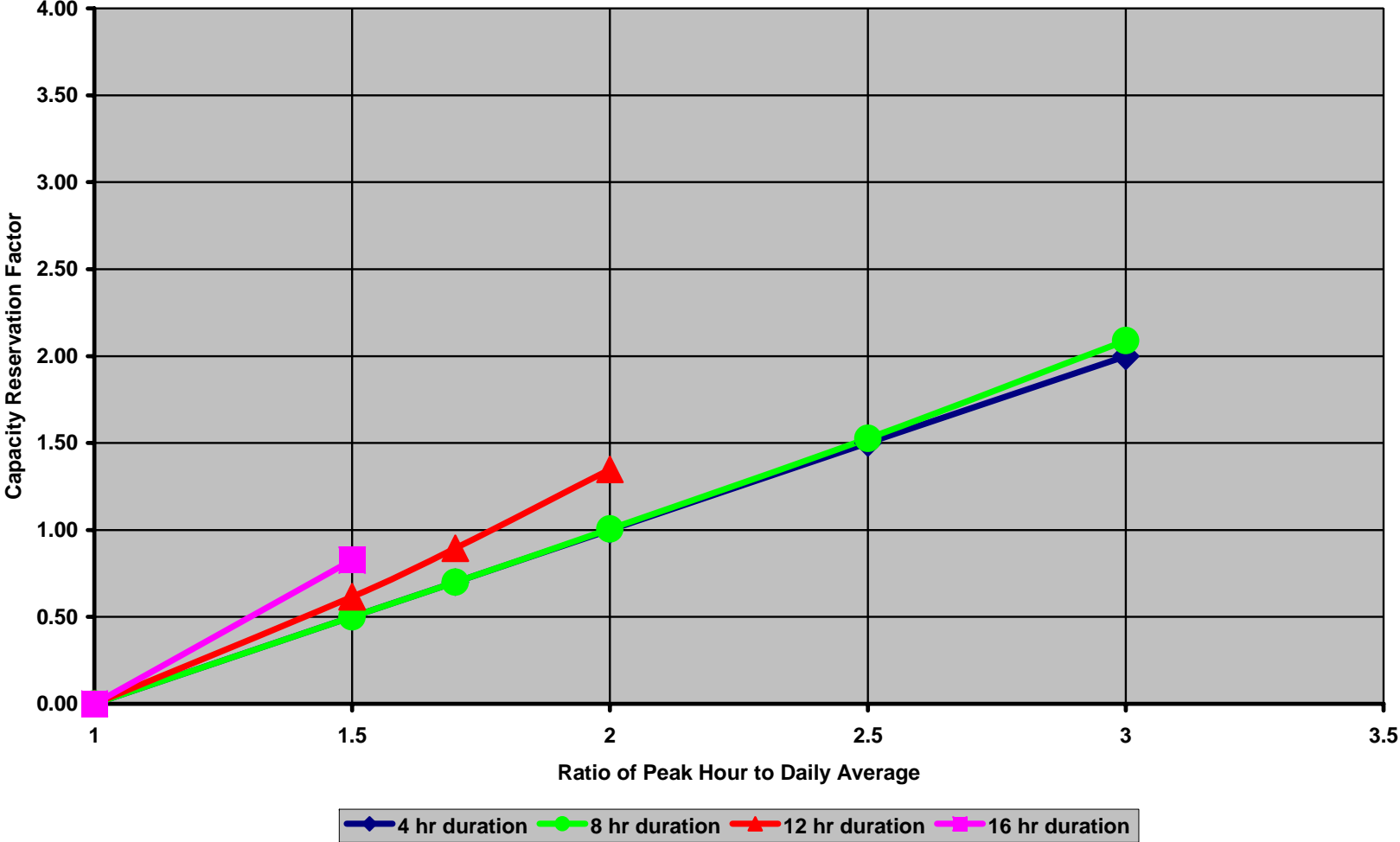
100 miles

# Impact of Duration at 200 Miles



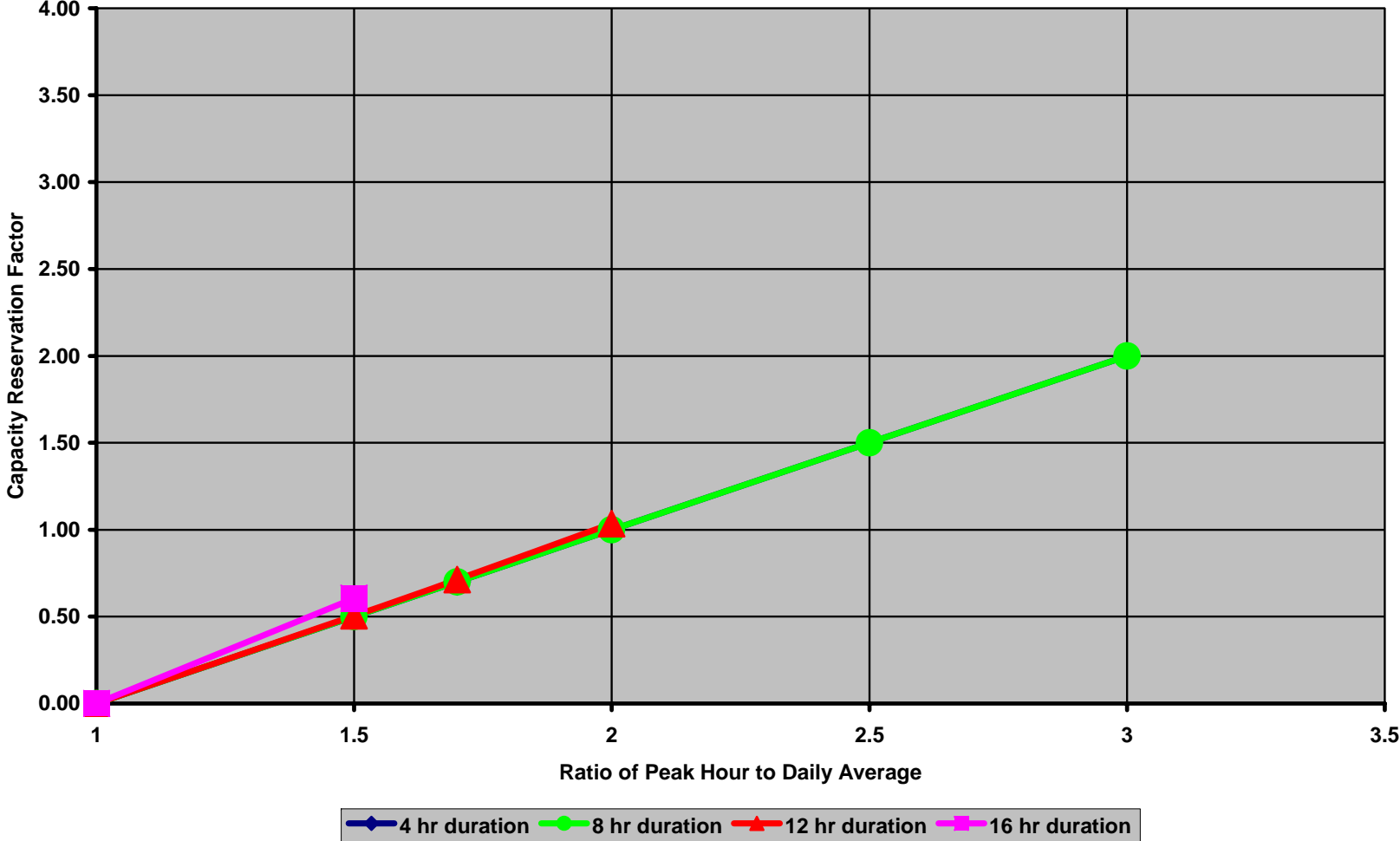
200 miles

# Impact of Duration at 300 Miles



300 miles

# Impact of Duration at 400 Miles

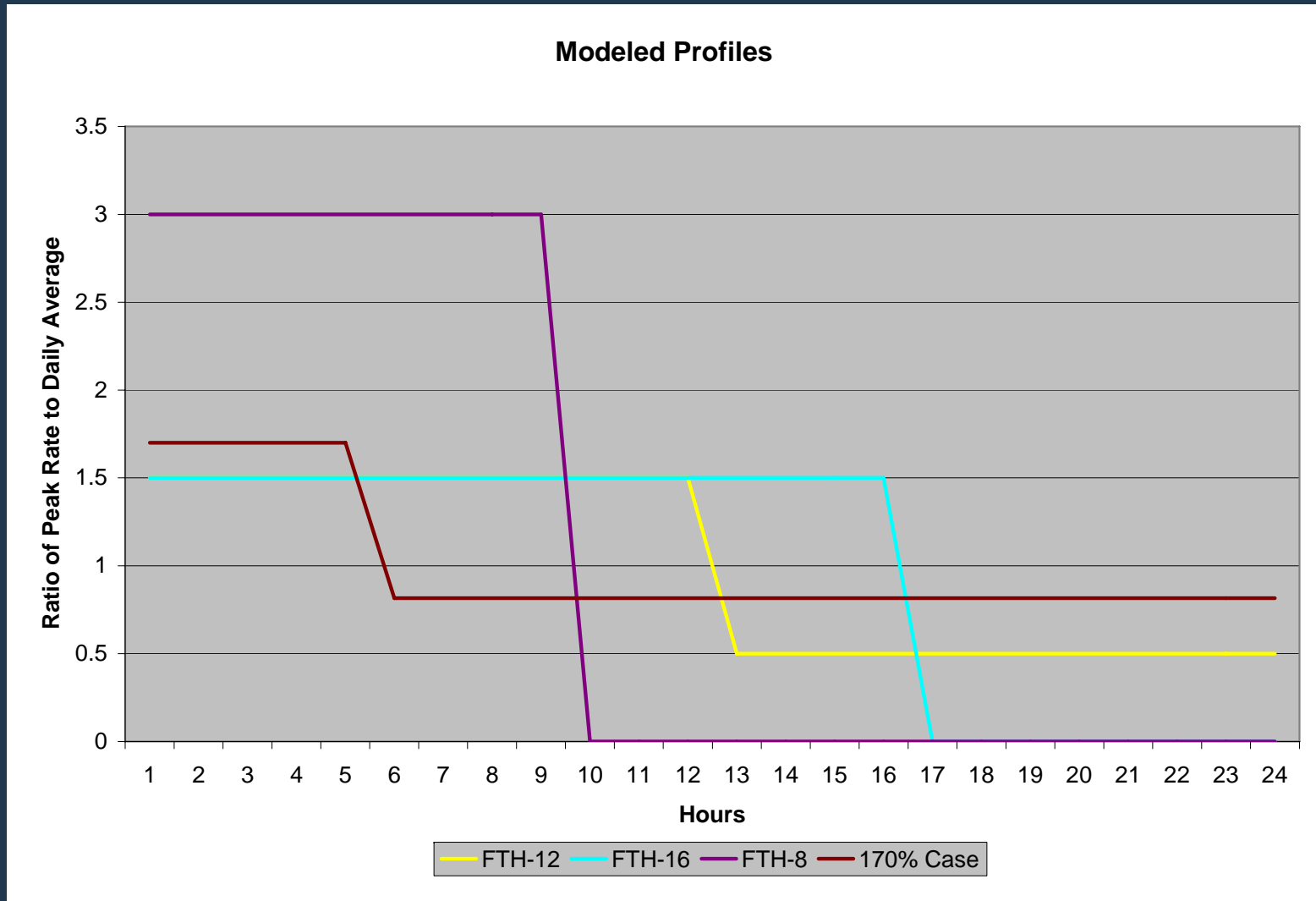


400 miles

# Moderating Capacity Reservation Factors

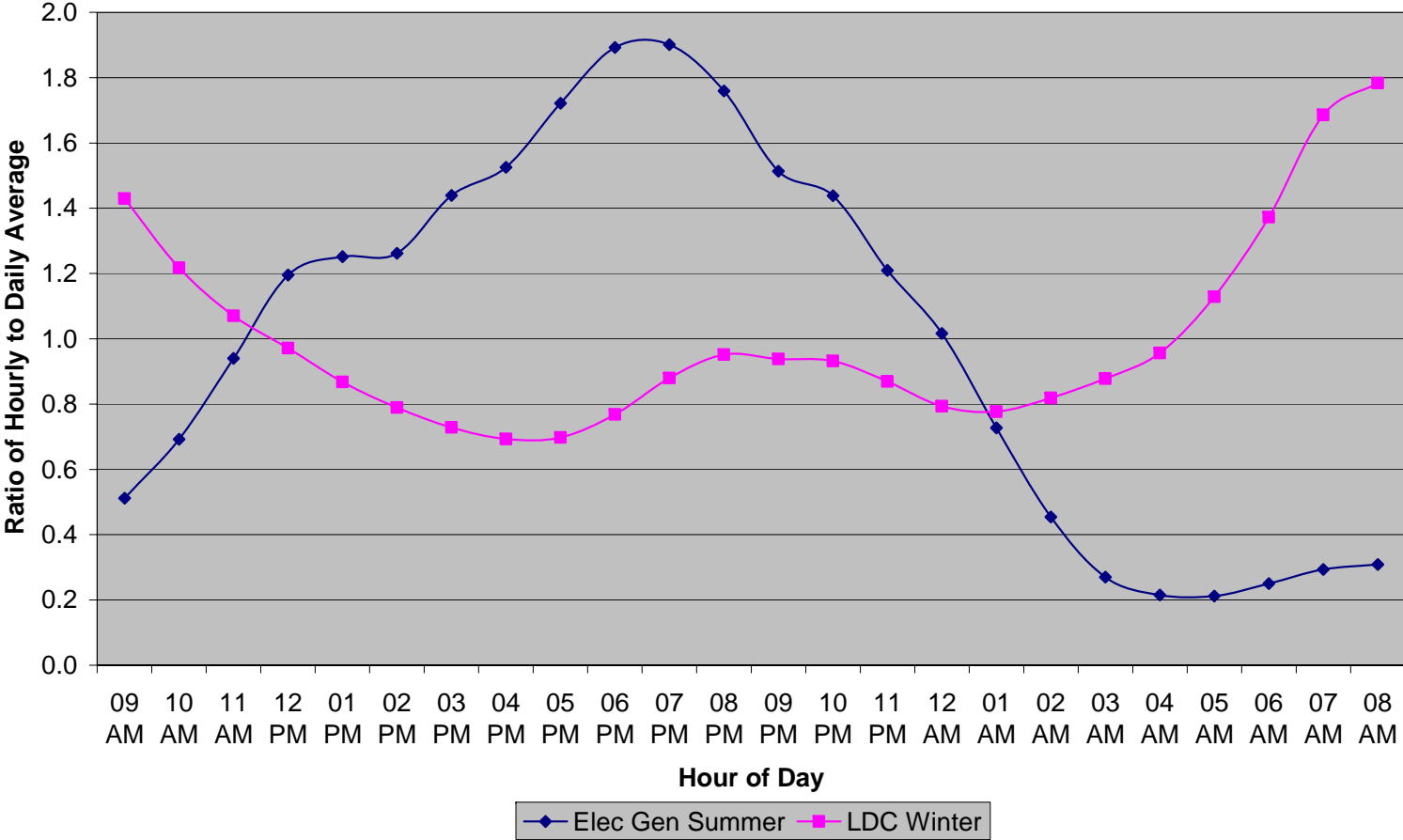
- ⤴ Aggregate profile of similarly situated deliveries
  - Smoothing effect
  - Offsetting peaks
- ⤴ Distribution of deliveries especially on east end
  - No refill potential
  - Space remains for packing and drafting
- ⤴ Rigorous modeling assumptions
  - Full load condition
  - Receipts at one end of pipe, deliveries at other end

# Example Modeled Profiles



# Observed Profiles

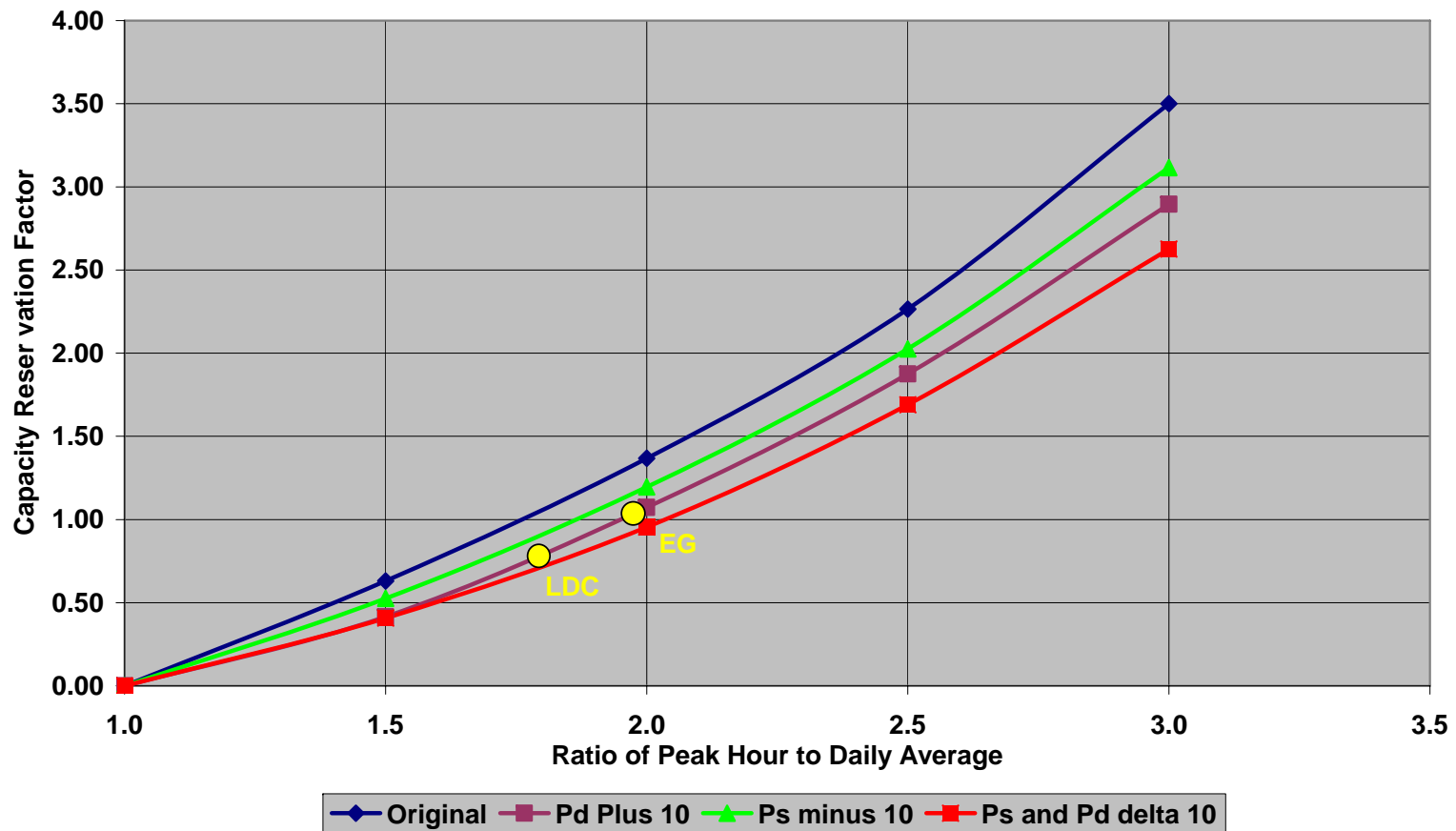
Observed Electric Generation and LDC Group Profiles



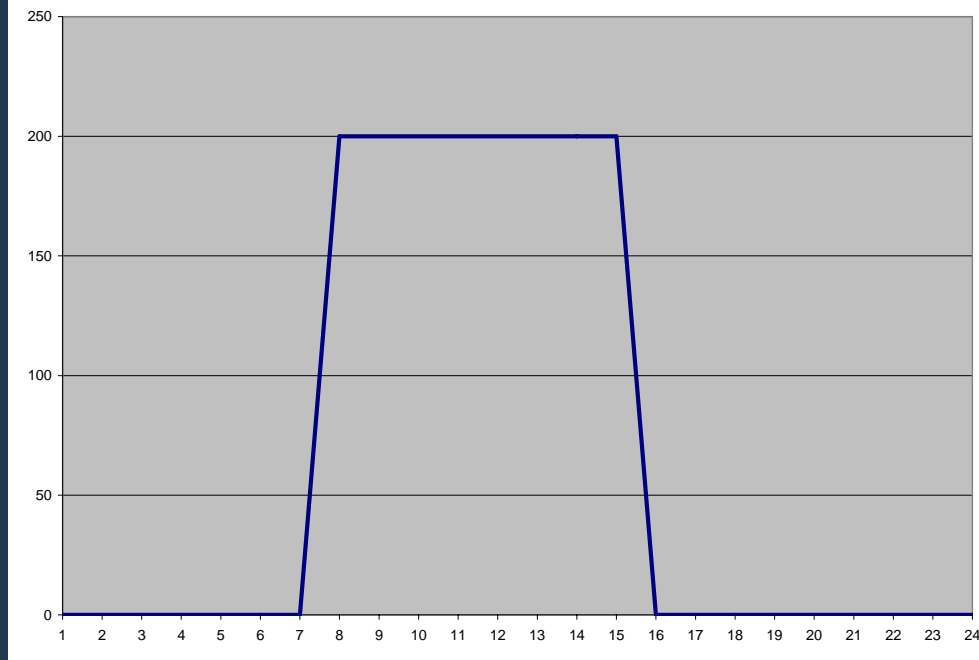


# Results with Observed Profiles

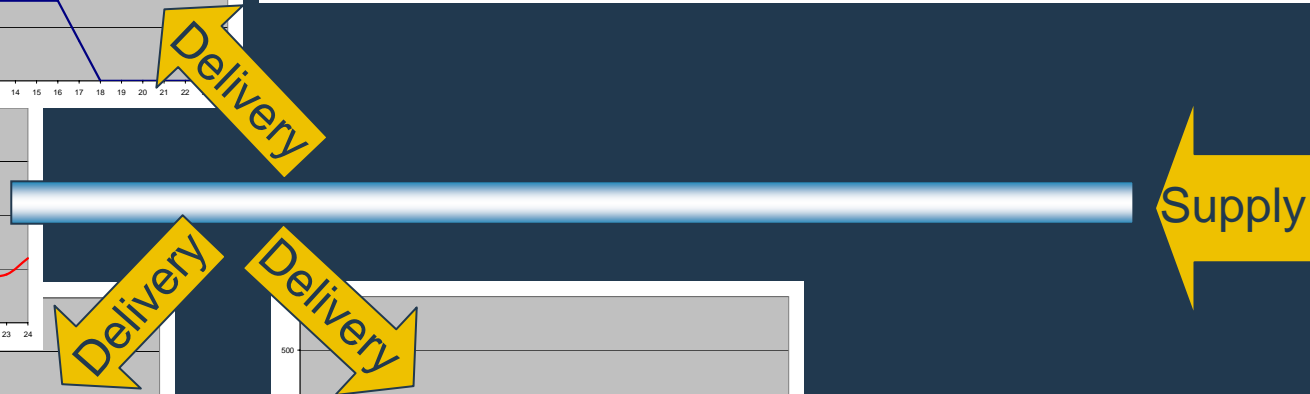
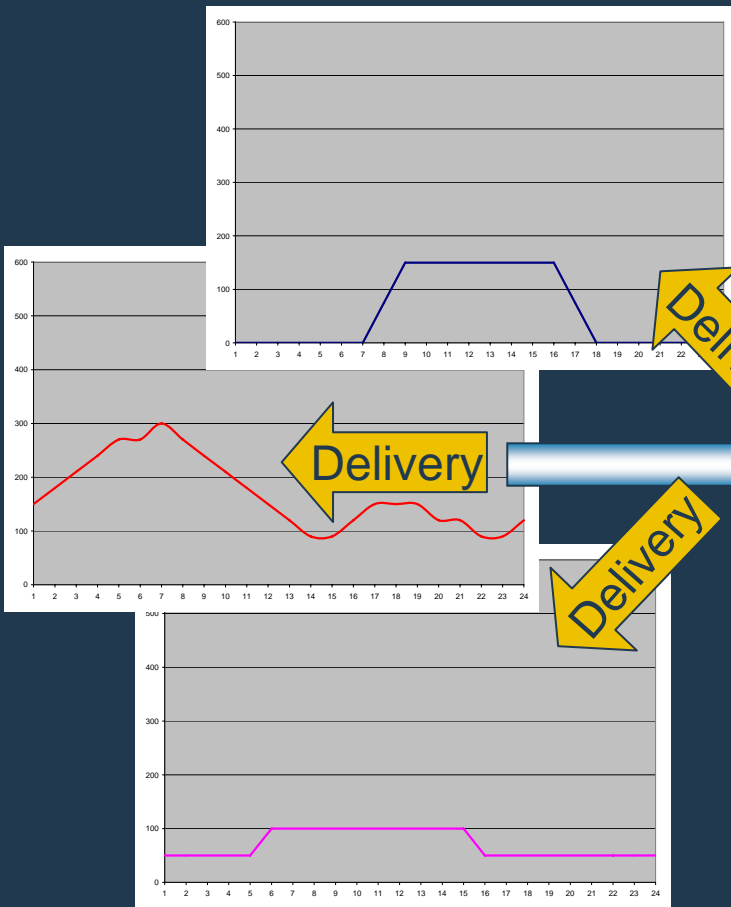
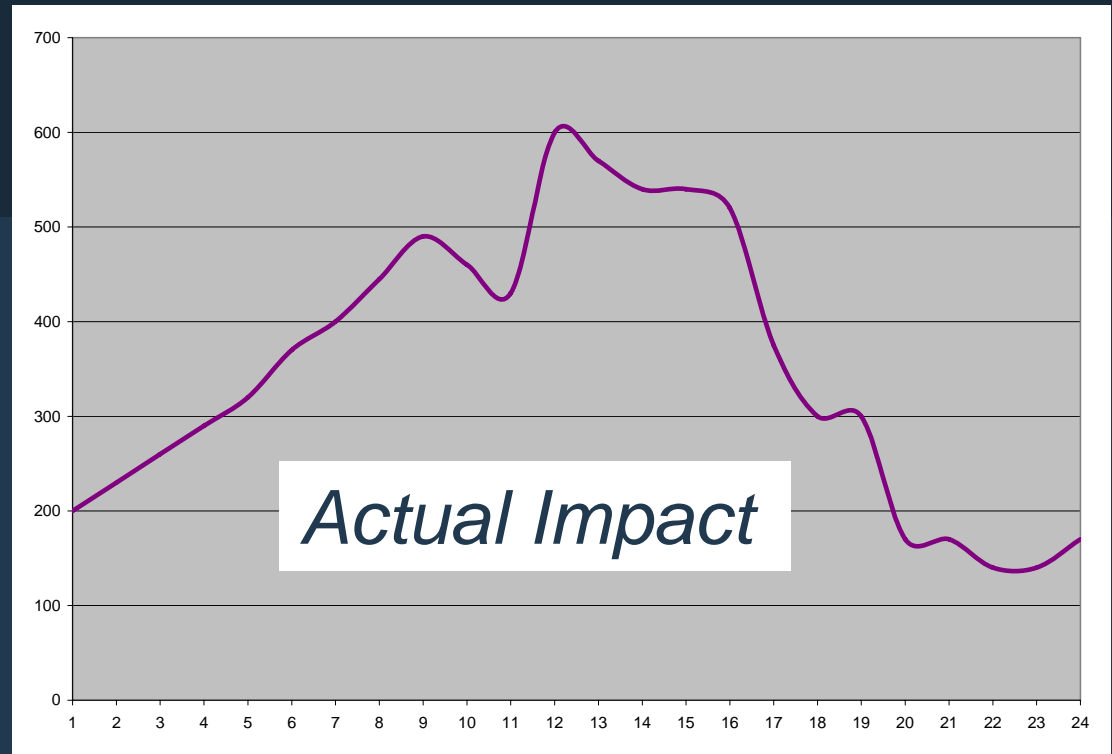
Impact of Convergence Criteria  
(Hourly Volume 100 at 200 miles; 8-hr duration)



# Modeled Deliveries



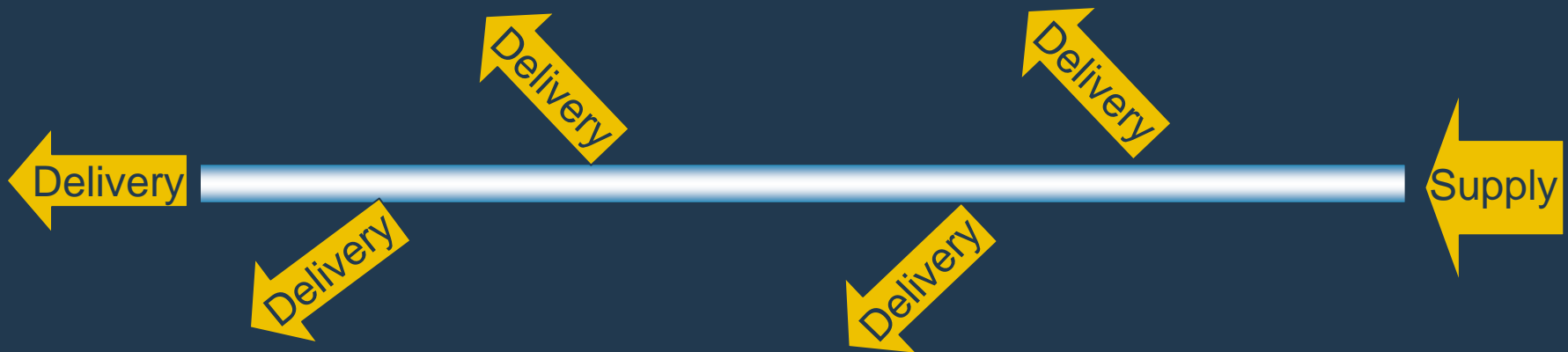
# Aggregated Impact



# Distributed Deliveries



Modeled: Full Load – Full Length



Actual: Progressive Unloading

# Priorities

1 - Reliability of firm service

2 - Maximizing available capacity

# Results

# Presentation of Results

- ▲ Total nominated quantity equals
  - Transport component plus pipe storage component
    - Transport component is daily or “flowing” quantity
    - “Pipe Storage” component is capacity reservation nomination (CRN)
- ▲ Capacity Reservation Nomination (CRN) =  
Capacity Reservation Factor (CRF) \* Transport Nomination
- ▲ Total nominated quantity =  $(1 + \text{CRF}) * \text{Transport Nomination}$
- ▲ Total Factor =  $1 + \text{CRF}$

# Results

- ▲ Facilities required: Approximately 300 miles
- ▲ Capacity required

Service	New CRF	New Total	Old CRF	Old Total
FTH-3, NNTH-3	0.2	1.2	0.1	1.1
FTH-12, NNTH-12	0.3	1.3	0.25	1.25
FTH-16, NNTH-16	0.4	1.4	0.375	1.375
FTH-8	1.7	2.7	1.0	2.0



# Conclusions

## ^ Capacity Reservation Factors

- Will be increased effective Dec. 1, 2008
- Evident in capacity postings such as Operationally Available Capacity

## ^ Possible future adjustments

- Service reliability
- Maximize available capacity

**Questions?**