Evidence of Benefits with Canadian Pacific's Investigation of Safety Related Occurrences Protocol (ISROP)

January 2010

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U.S. Department of Transportation
Research and Innovative Technology Administration

INTRODUCTION

Project Overview

- **Study Team**

  - Sponsor
    - FRA Office of Research and Development

  - Researchers
    - Volpe Center
    - University of Connecticut
    - WreathWood Group

  - CP Coordinators
    - Safety and Regulatory Affairs
    - Mechanical Services Policy Committee
    - Local Health & Safety Committees
    - Canadian Auto Workers

- **Study Phases**

  - Baseline (2004-2005)
    - ✓ Surveys
    - ✓ Interviews and Focus Groups
    - ✓ Feedback Sessions

  - Mid-Term (2005-2006)
    - ✓ Logic Model Development
    - ✓ Additional Data Analysis
    - ✓ Feedback Sessions

  - Final (2007-2010)
    - ✓ Surveys
    - ✓ Interviews and Focus Groups
    - ✓ Additional Data Analysis
    - ✓ Feedback Sessions
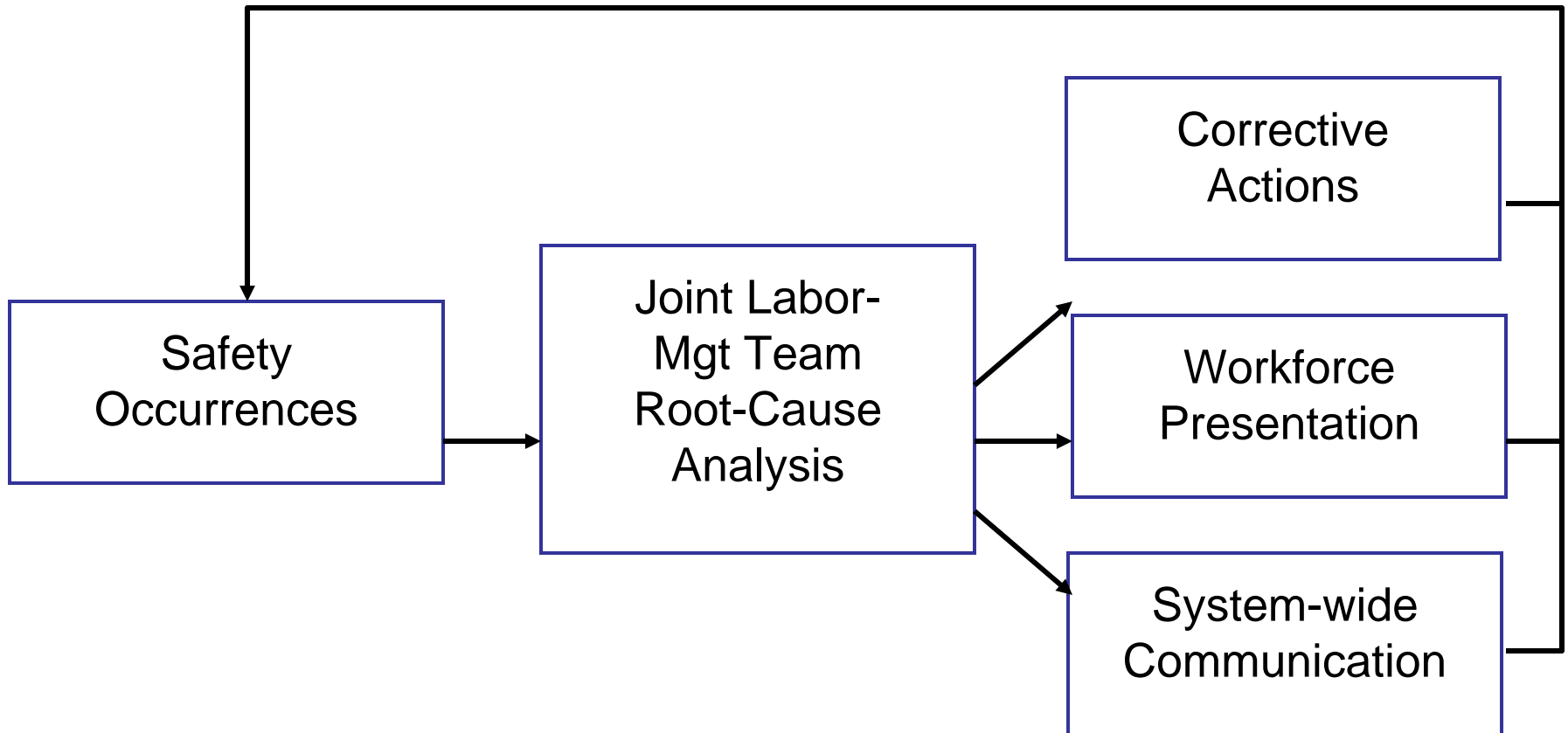   - ❑ Write Final Report

Evaluation Questions

- How effectively was ISROP implemented?
- What barriers and supports were identified?
- To what extent did safety and safety culture improve?
- What lessons learned can be shared with the rest of the railroad industry?

# Investigation of Safety Related Occurrences Protocol: Basic Elements

- Labor-management investigation teams
- Voluntary, confidential, non-punitive participation
- Systematic and objective data gathering, analysis, and reporting
- Investigations conducted within 24 hours and presentations to workforce immediately afterward
- Local problem solving, corrective actions, with escalation options for systemic
- Senior management education at start with all ISROPs reviewed, countermeasures monitored

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ISROP – Overview

ISROP: Investigation of Safety Related Occurrences Protocol
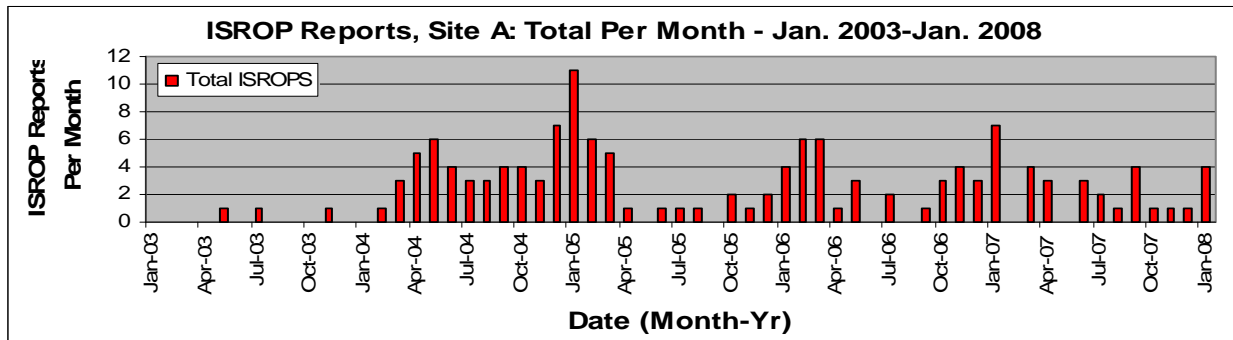
Logic Model: How ISROP Works
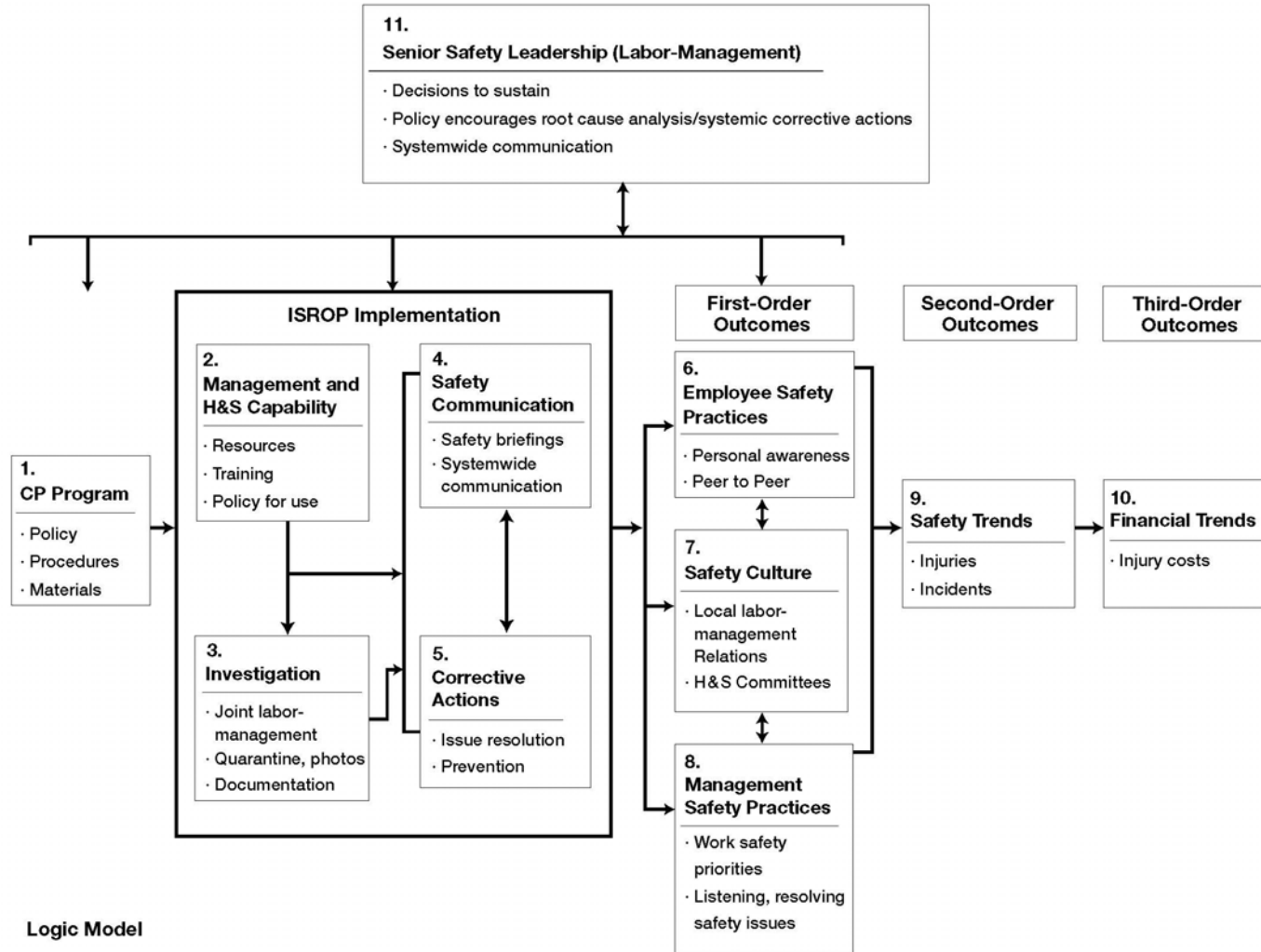
Logic Model

FINDINGS:
ISROPs AND INJURIES
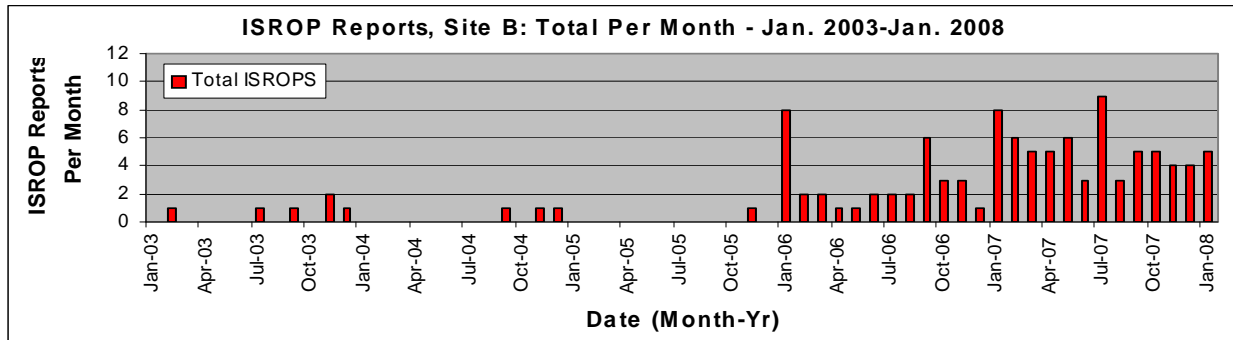
Differences Across the Sites

		Site A	Site B	Site C
Types	Severe	X	X	X
	Minor	X	X	
	Close Calls	X	X	
	Incidents (derails, run thru switches)	X	X	
Elements	Joint labor – management*	X	X	X
	Quarantine Area / Photos*	X	X	X
	Verbal Presentation with Graphs*	X	X	X
	Corrective Actions*	X	X	X
	ISROP distributed Systemwide	X	X	X
Total # ISROPs / Monthly ISROP Rate		142 / 2.35	79 / 1.35	7 / 0.12

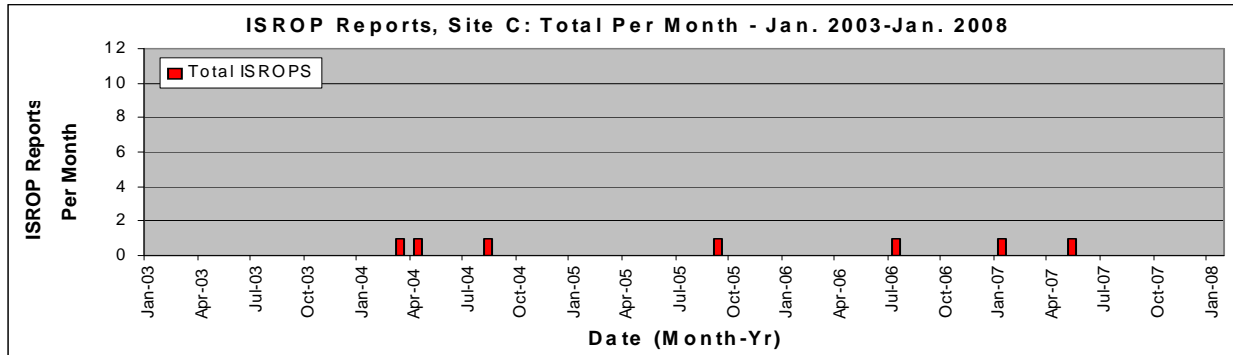*Discussed by interview respondents.
Time period 1/03 – 1/08

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ISROPs at the Three Study Sites

ISROP Reports, Site A: Total Per Month - Jan. 2003-Jan. 2008

Site A ISROPs: 5/03-1/08

ISROP Reports, Site B: Total Per Month - Jan. 2003-Jan. 2008

Site B ISROPs: 2/03-1/08

ISROP Reports, Site C: Total Per Month - Jan. 2003-Jan. 2008

Site C ISROPs: 4/04-1/08

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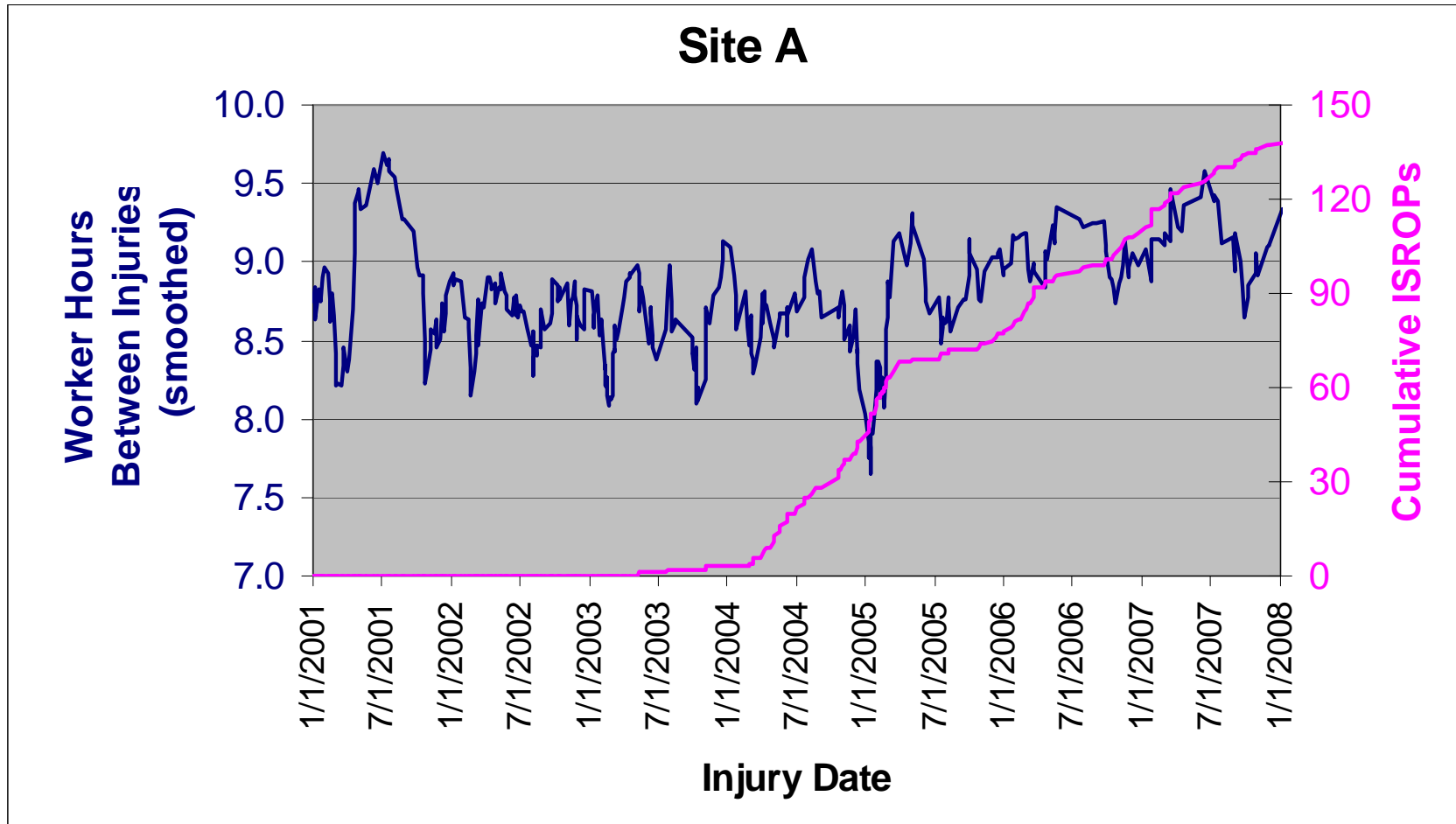
Injury Data Analysis: "Time Between" Injuries

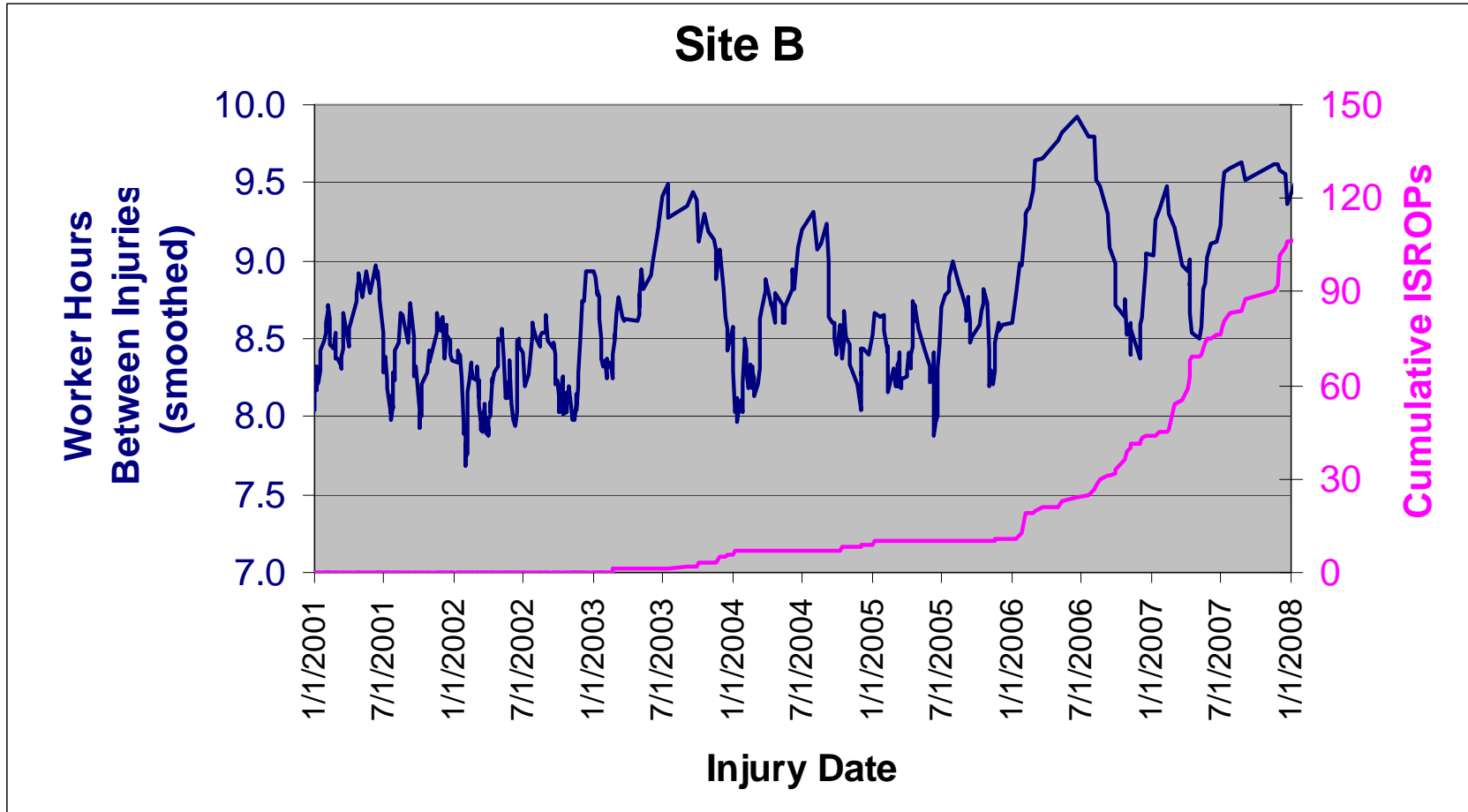Measure

Personal Injuries: 1/03 – 1/08
Unit of Analysis: Worker-Hours-Between (WHB)
Rationale: Normalization and Power
Interpretation: Higher = Fewer Injuries

Significant Positive Correlation: Worker Hours Between Injuries and Cumulative ISROPs at Site A

Site A

* Units on the scale were converted for analytical reasons.

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Significant Positive Correlation: Worker Hours Between Injuries and Cumulative ISROPs at Site B

Site B

* Units on the scale were converted for analytical reasons.

Heading in the Right Direction, but Not Significant Correlation Yet
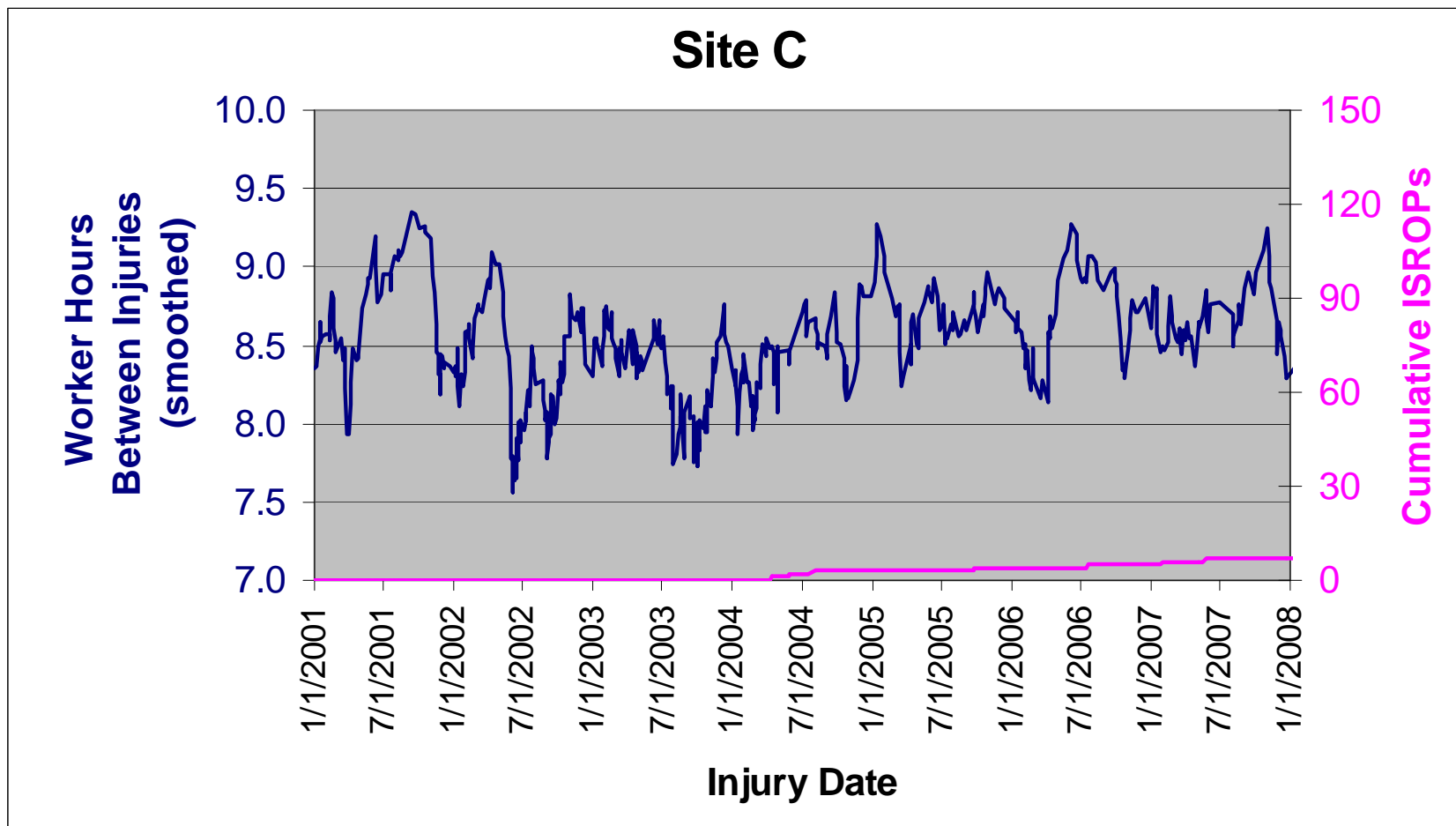
* Units on the scale were converted for analytical reasons.

Increased ISROPs Are Associated with More Time Between Injuries at Each Site

	Total number of ISROPs	Correlation Coefficients	Difference in Correlations
Site A	142	0.21	
Site B	79	0.17	p = 0.11 / p < 0.05*
Site C	7	0.03	p = 0.65

 * Correlation coefficients for Site A and Site C are significantly different (p < 0.05).

Update ISROPs and Injuries: 2008-2009

	Site A	Site B	Site C
Efforts in conducting ISROPs	Conducted mostly on reportable injuries	Conducted on reportable and non-reportable injuries, close calls, and incidents	Conducted mostly on reportable injuries
No. of injuries in 2008 and 2009*	68	49	92
Total No. of ISROPs / Monthly Rate in 2008 and 2009*	26 / 1.73	78 / 5.2	6 / 0.4

	Site A	Site B	Site C
Total No. of ISROPs / Monthly Rate from 2003-2008	142 / 2.35	79 / 1.35	7 / 0.12

* 2009 data up to March 31

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Total Number of ISROPs per Month and Cumulative ISROPs

ISROPs Conducted at the Three Study Sites
(Jan. 2003-Jan. 2008)

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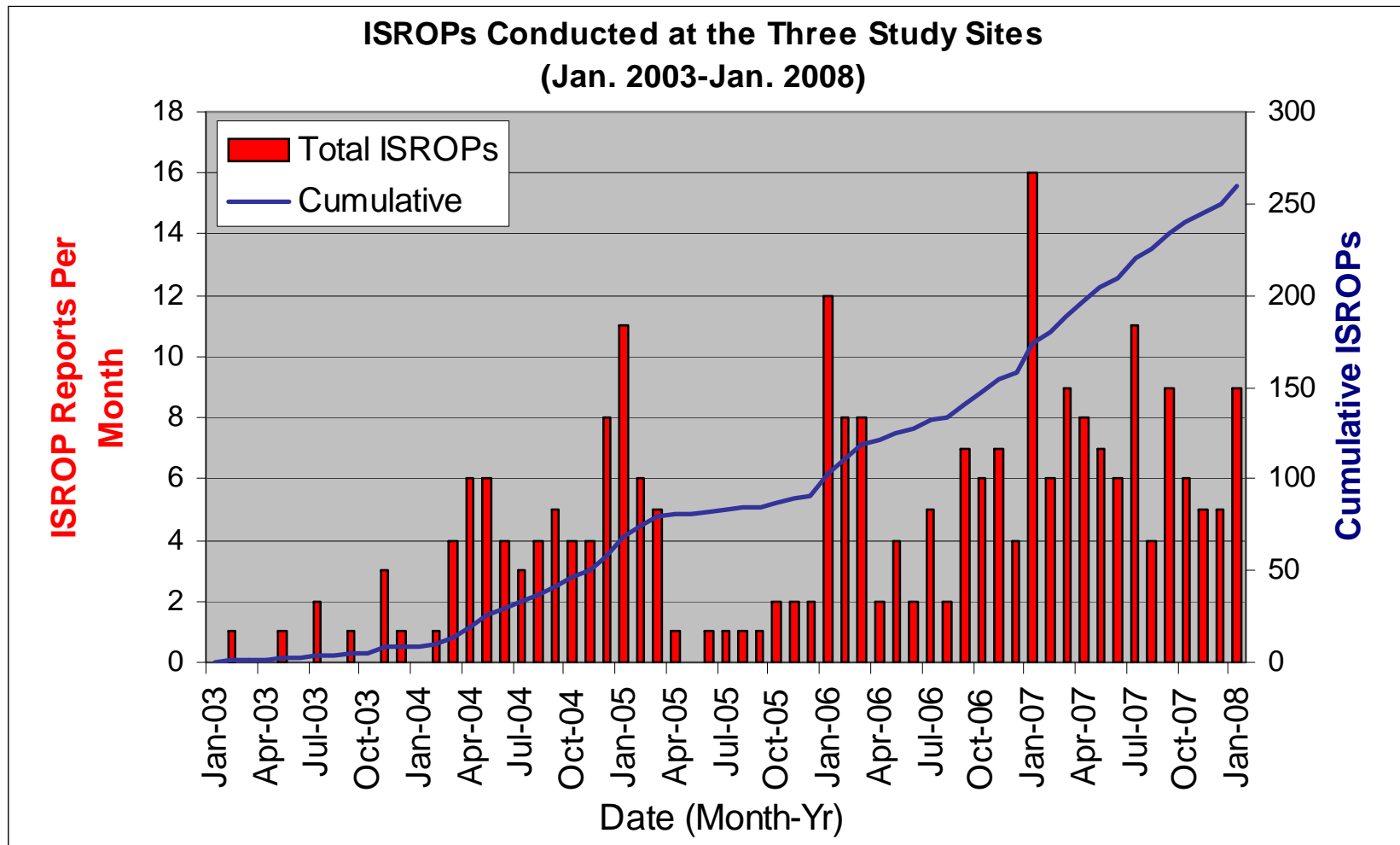
More ISROPs Are Associated with Fewer Injuries

Predicted injury rates that correspond to various levels of accumulated ISROPs

Predictions at 95% Confidence Level	0 ISROPs		70 ISROPs		142 ISROPs	
	Injury Rate (per 200,000 WH)	% Improve-ment	Injury Rate (per 200,000 WH)	% Improve-ment	Injury Rate (per 200,000 WH)	% Improve-ment
Most conservative	48.5	**0**	35.3	**27**	27.3	**44**
Most optimistic	39.2	**0**	24.5	**37**	14.5	**63**

Note: The combined three-site ISROP and injury data set was used to produce this model.
These predictions are thus made for **any** hypothetical site, as they accumulate ISROPs.

Projected Savings Impact of ISROP Implementation Across the Three Sites

Predictions at 95% Confidence Level	Injury Rate Reductions per 200,000 WH	No. of Injury Reductions per Year per Site	FRA Injuries: Cost Reduction
Most conservative	11.9	32.69	$ 291,833*
Most optimistic	34.0	93.04	$ 830,701

Note: The average ratio for FRA-reportable injuries across the three sites is 0.186, or roughly one in five injuries.

*The estimate provided by CPR senior management suggested that the average cost of a reportable mechanical injury was $48,000.

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Summary: ISROP and Injuries

- As ISROPs increase, injuries decrease

- Accumulated ISROPs may be a precursor measure of injury reduction

- These results only are relevant if the ISROP process includes: joint labor-management participation, quarantining/photos, corrective action identification/elimination, and presentations to the workforce

FINDINGS: IMPROVED LABOR-MANAGEMENT RELATIONS THROUGH IMPROVED INVESTIGATION EFFECTIVENESS

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Number of ISROPs and Investigation Effectiveness

As ISROPs accumulate perceived Investigation Effectiveness also seems to improve.
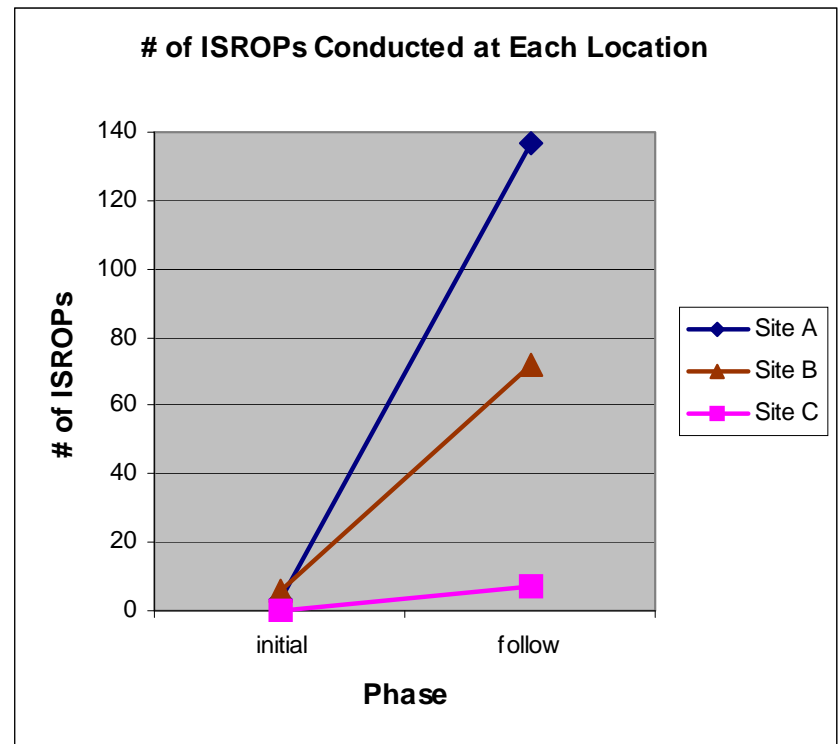
SUMMARY

Summary

Benefits:

- More ISROPs = fewer injuries
- More ISROPs = less cost
- More ISROPs = better investigations
- Not a perfect tool, but adds value

Challenges:

- Needs to be streamlined further ("ISROP Lite" in process)
- Needs to be used – what to do when local management uses infrequently?