WELCOME TO THE

ASCE 142ND ANNUAL CIVIL ENGINEERING CONFERENCE

Prevention Through Design: Construction Safety

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Eli Bintner, *Principal Engineer, Offsite* Infrastructure

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PtD Facts

- PtD is required in EU and other regions and encouraged in other nations.
- Clients and GCs in US are increasingly concerned about safety, in all market sectors.
- Several large DBs/EPCs have initiated PtD programs.
- Several large owners have initiated PtD programs.
- NIOSH is encouraging PtD. OSHA has promoted PtD but has no legislation in works.

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PtD Questions

- Is PtD the ethical thing to do?
- Does PtD deliver tangible benefits?
- Does PtD carry excessive risks to project parties?
- How should ASCE profession respond to the PtD initiative?
- How should individual firms respond to the PtD initiative?

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Eli Bintner

Principal Engineer Offsite Infrastructure

BHP Billiton

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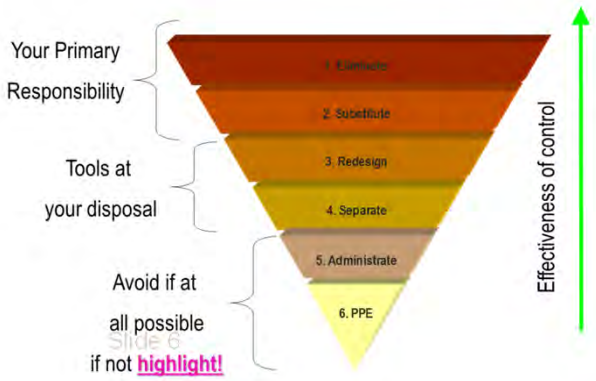
Safety Moment

- http://www.thestarphoenix.com/technology/barns+unsafe+hybrids+driver/5258724/story.html
- **Background:** A minority of the city's fleet are hybrid buses (diesel-electric) which were introduced 5 years ago. They are too tall to enter most of the bus barn.
  - Several incidents since they were introduced
- **Hazard:** Equipment interactions with infrastructure
- **Risk Event**: Explosion due to gas lines being struck and sparks generated
  - Risk = Severity x Likelihood (recurring event with a severe potential and frequent exposure
- **Controls:** Training and Signage



Bus barns unsafe for hybrids: driver

BY JANET FRENCH, THE STARPHOENIX AUGUST 15, 2011

Recommend Tweet 6 +1 0

STORY PHOTOS (4)

Dunlop said another bus barn in the city's north end has plenty of room to accommodate the taller buses, but it could be expensive to shuttle bus drivers back and forth from downtown to pick up and drop off the buses at the beginning and end of the day.

Presentation Overview

- Background on BHPB and Jansen Project
- History of PtD on Project
- PtD Process Overview
- PtD Tools in Place
- Path Forwards

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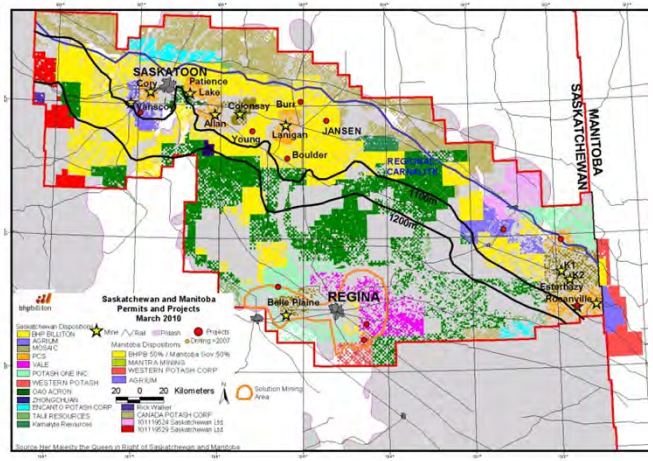
Company and Project Background

Who we are globally and what we are doing in Saskatchewan…



BHP Billiton principal office locations

Ref	Country	Location	Office
37	Australia	Adelaide	Uranium Head Office
38	Australia	Brisbane	Metallurgical Coal Head Office
39	Australia	Melbourne	Global Headquarters
40	Australia	Perth	Aluminium [b] and Stainless Steel Materials [b] Head Offices Iron Ore Head Office
41	Australia	Sydney	Energy Coal Head Office
42	Canada	Saskatoon	Diamonds and Specialty Products Head Office
43	Chile	Santiago	Base Metals Head Office
44	Malaysia	Kuala Lumpur	Global Shared Services Centre
45	Singapore	Singapore	Marketing Head Office Minerals Exploration Head Office
46	South Africa	Johannesburg	Manganese Head Office
47	UK	London	Corporate Office
48	US	Houston	Petroleum Head Office

○ Offices
● Operations

(a) Jointly or non-operated BHP Billiton Assets or Fields.
(b) Aluminium and Stainless Steel Materials form the Aluminium and Nickel Customer Sector Group.
(c) Uranium is part of the Base Metals Customer Sector Group.
Projects and exploration activities are not shown on this map.
Locations are current at 10 September 2012.

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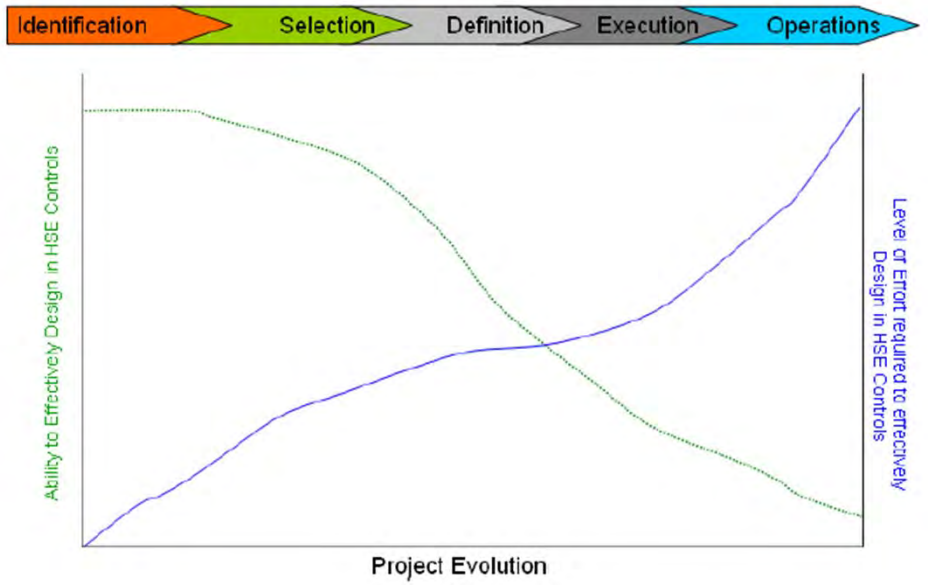
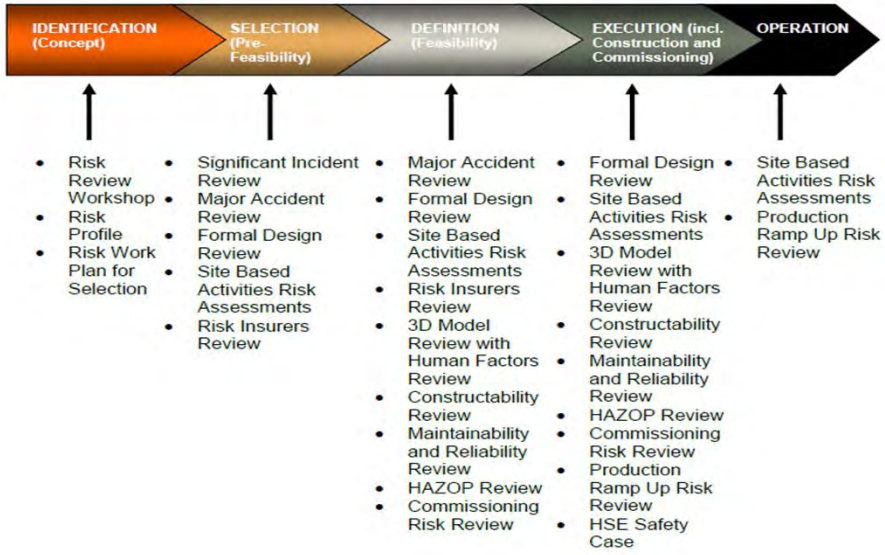
History of PtD on Project

- Informal to Formal

PREVENTION THROUGH DESIGN ILLUSTRATION OF THE BENEFIT TO UNDERSTANDING RISK ISSUES EARLY IN THE PROJECT LIFE CYCLE



BHP BILLITON INVESTMENT PROCESS – MAPPED VS. RISK ACTIVITIES



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PtD Tools in Use

DIAMONDS & SPECIALTY PRODUCTS - POTASH

POT-XXX-XXX-XXX

Prevention through Design Program

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Table of Contents

DIAMONDS & SPECIALTY PRODUCTS - POTASH

POT-XXX-XXX-XXX

FORM – PREVENTION THROUGH DESIGN IDEA

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PREVENTION THROUGH DESIGN IDEA FORM			
Project			
WO Number			
LOG #:			
Area/Location		Idea Type	
Discipline(s) Affected		Initiator Discipline	
Detailed Description			
Originated By		Date Initiated	
Project Engineering Lead		Develop	☐ Yes ☐ No
		Date	

Prevention through Design Program

7.1. KEY PERFORMANCE INDICATOR'S

The purpose of the Key Performance Indicator's (KPIs) developed for this program are: **ntion through Design Log**

Item	Priority	Suggestion / Description	Initiator	Initiator Discipline	Initiated Date	Project Phase	Responsible Contractor	Area	Affected Discipline	Status	Revision Date (week ending, mm/dd/yy)
1	Medium	The description should be as detailed as required to ensure clarity of the item.	Joe Guy		1/24/09					Open	1/24/09

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CIVIL ENGINEERING IN THE NEW GLOBAL ECONOMY

Model Review Checklists – 30/60/90

CLIENT: BHP Billiton Canada Inc. (BHPB) Project: Jansen Stage 1

MAINTAINABILITY 30% FORMAL REVIEW – DISCIPLINE CHECKLIST

Design Area:

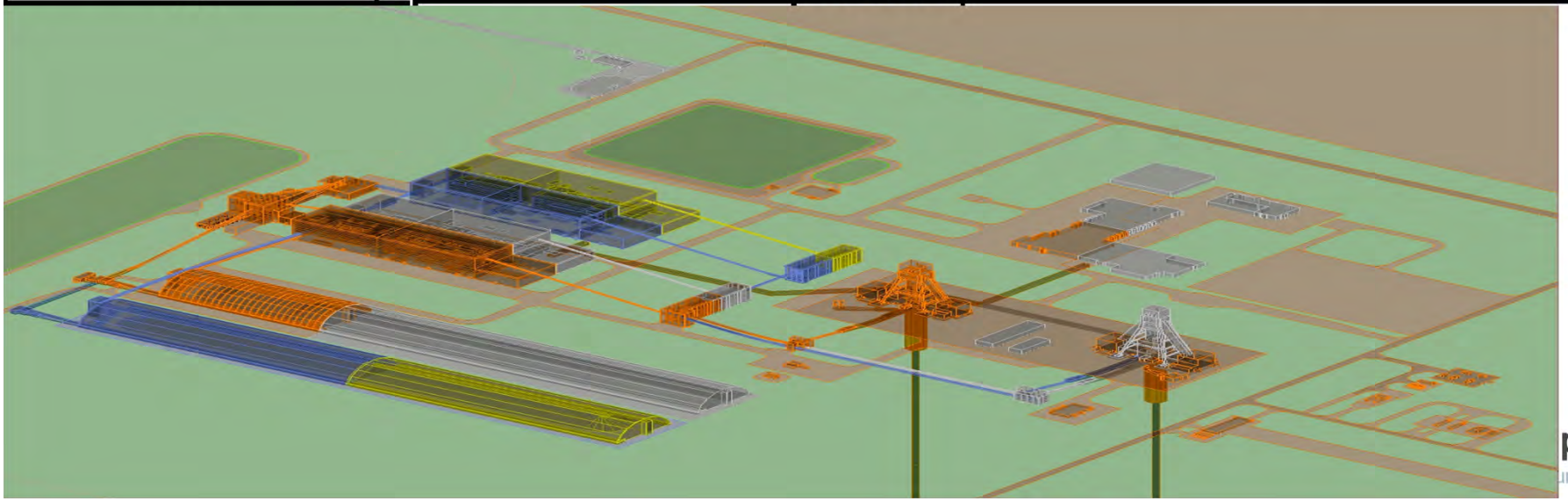
Activity / Work Plan	Confirmed Y	Comments	Action by:
Access – Can we get to the piece of equipment safely and easily?			
Is height or reach a problem?			
Is there potential for personnel to fall 2 metres?			

CLIENT: BHP Billiton Canada Inc. (BHPB) Project: Jansen Stage 1

PREVENTION THROUGH DESIGN / HSE 30% FORMAL REVIEW CHECKLIST

Design Area:

Activity / Work Plan	Confirmed Yes / No / NA	Comments	Action by:



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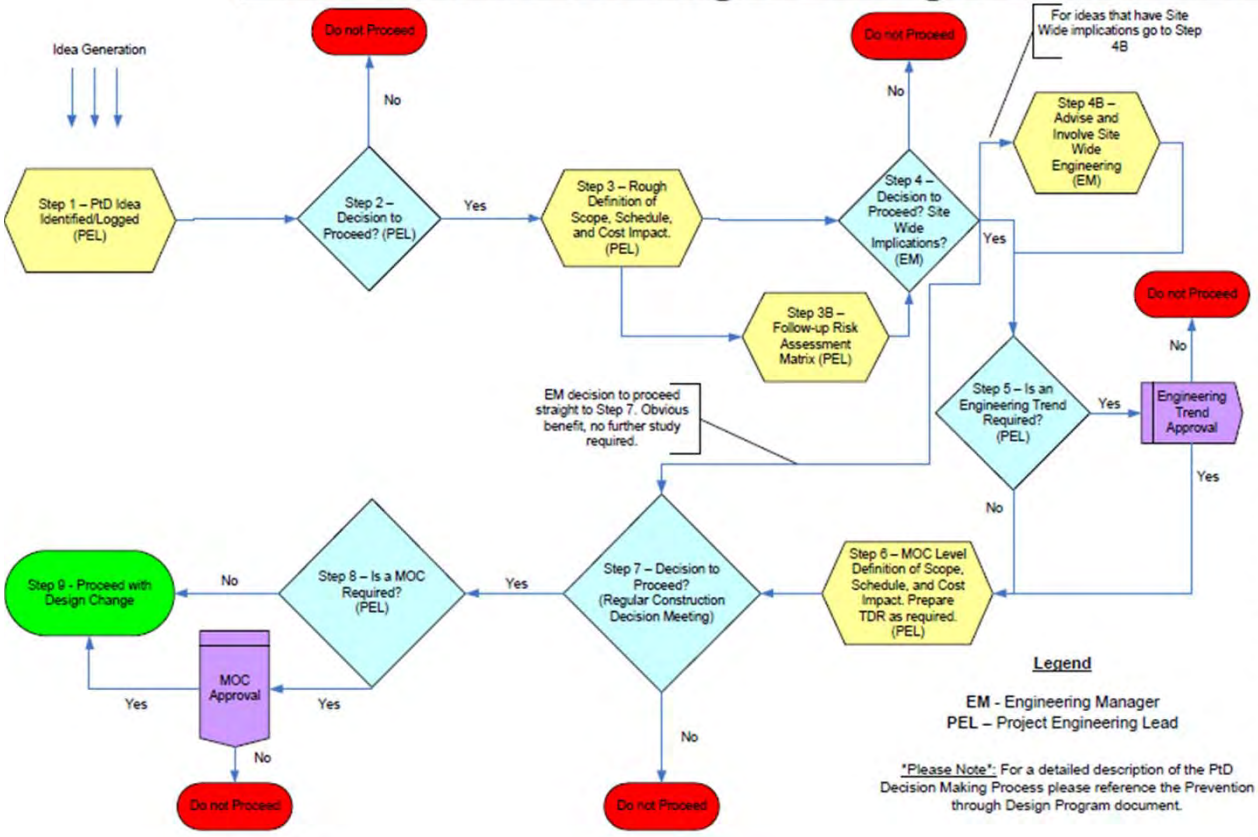
Program Process

Prevention through Design Process – Six Steps

Resolve PtD Ideas

Prevention through Design Decision Process Flow



Risk Reduction Matrix for Evaluating Human Factors in Design

Severity	Consequence				Increasing Probability				
	P	A	E	R	A	B	C	D	E
					Never heard of in the industry	Heard of in industry	Has occurred in BHP or more than once/ year in industry	Has occurred at similar location or more than once/yr within BHP	Has occurred several times per year within a similar operation
0	No injury or health effect	No damage	No effect	No Impact					
1	First aid injury	Slight damage	Slight effect	Slight Impact					
2	Medical treatment injury	Minor damage	Minor effect	Minor Impact					
3	Lost time injury	Moderate damage	Moderate effect	Moderate Impact					
4	PTD or up to 1 fatalities	Major damage	Major effect	Major Impact					
5	More than 3 fatalities	Extensive damage	Massive effect	Massive Impact					

Categories		
Low	Medium	High
Area 1	Area 2	Area 3

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Training

- Leadership Engagement face to face in a "kick-off" style forum
  - By consultants and in-house.
- Online for all designers. Mandatory completion within 10 days of being assigned to project.
  - EPCM, sub-consultants, vendor supplied packages.
- Lunch and Learns for refreshers and updates.

- Training Statistics:
  - 440 designers completed trained
  - Approx 3 hours to complete
  - Positive feedback received

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Accountabilities and Responsibilities

10.1. PTD EXECUTION ORGANIZATION

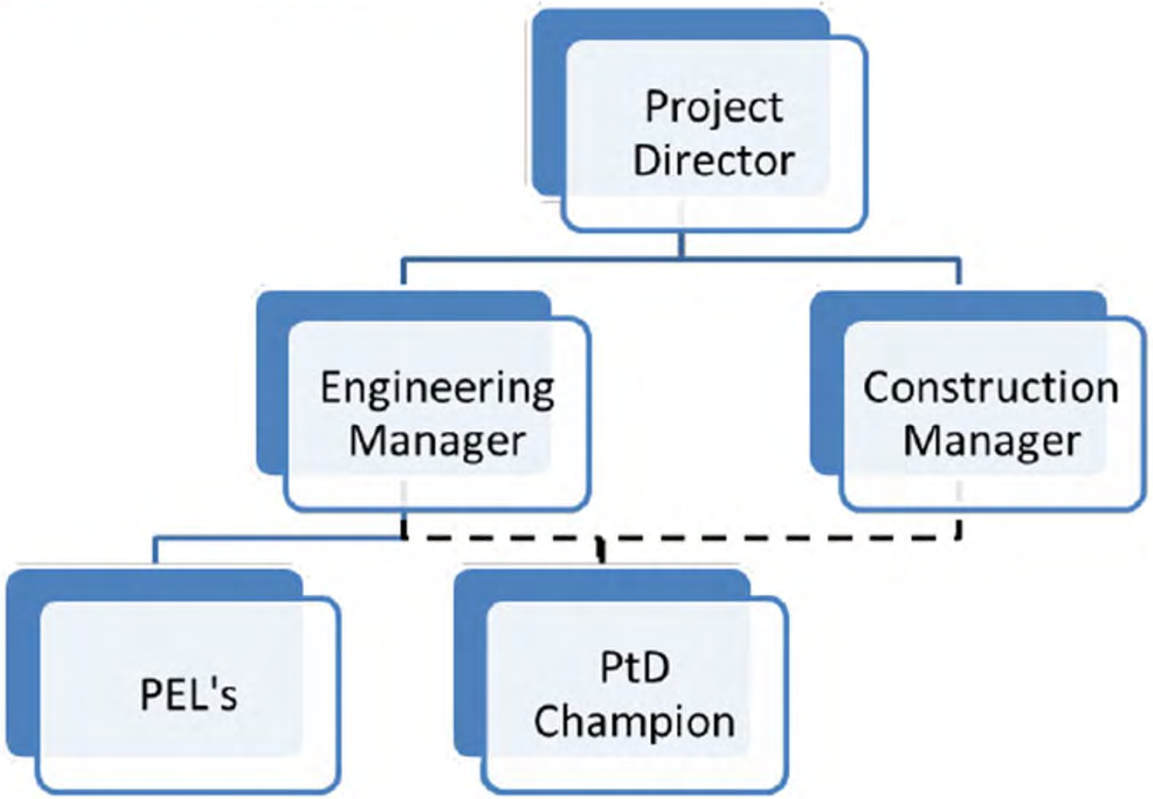
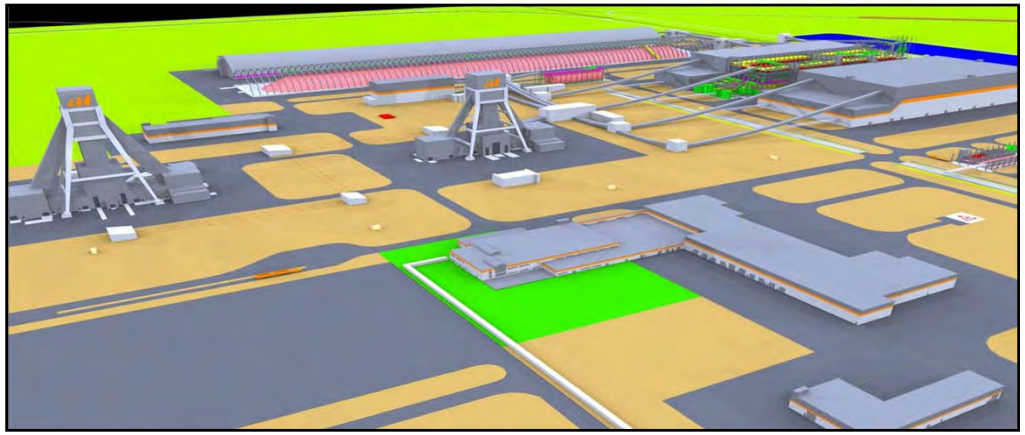


Figure 2 PtD Execution Organization

Where are we going from here……..



- Road to excellence:
  - Leading the way in BHPB with a focus on being the internal standard to follow for Global Projects
- Continual improvement:
  - Upgrading excel based log to online database
  - Implementing new revision of PtD Management Plan with efficiencies
- Use on future projects within Potash:
  - Lessons Learned passed on
  - Ease of use for Vendor design packages (ie: Procurement Process)

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WE LOOK FORWARD TO SEEING YOU NEXT YEAR IN CHARLOTTE, NC!

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