

PIPELINE INCIDENT DATA VISUALIZATIONS

USING VISUALIZATION TO HELP GOVERNMENTS DEMOCRATIZE DATA



DR. WESLEY WILLETT
UNIVERSITY OF CALGARY



**UNIVERSITY OF
CALGARY**

Office national
de l'énergie



National Energy
Board

**GOVERNMENTS GENERATE
LOTS OF DATA**

BUT CURRENT OPEN DATA PRACTICES


LIMIT CITIZEN UNDERSTANDING

AND **REDUCE ACCOUNTABILITY**

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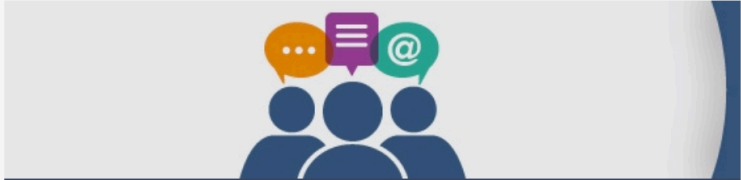
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Item 4 of 4

Pause

Open data

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'OPEN DATA' SHOULDN'T JUST MEAN THIS

ENABLING
GOVERNMENTS TO
MAKE DATA ACCESSIBLE
BY **VISUALIZING IT**

Office national
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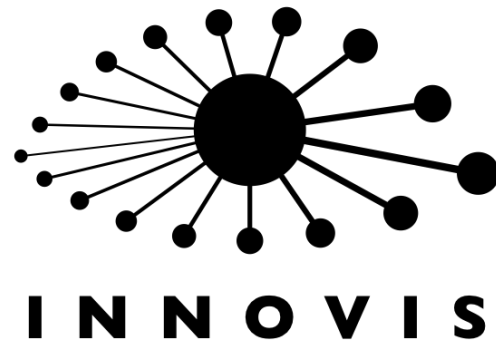


National Energy
Board



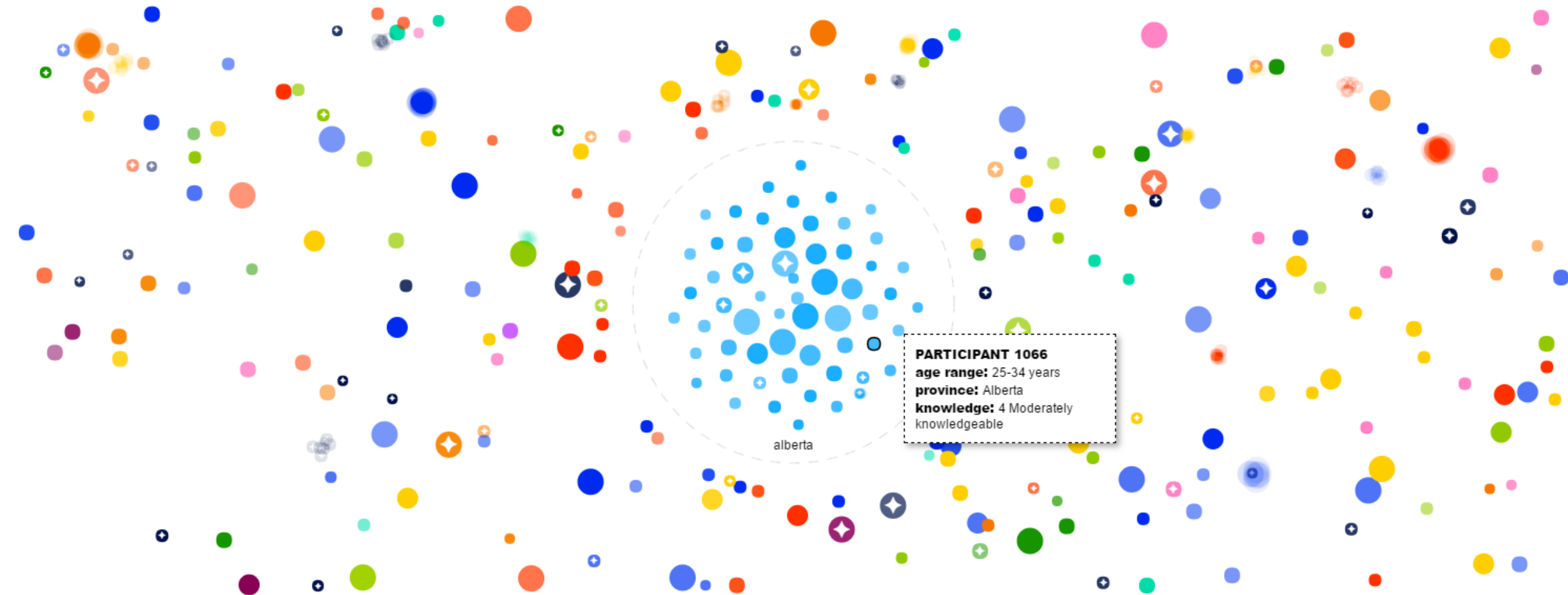
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VISUALIZATION + DESIGN



DATA  EXPERIENCE LAB

VISUALIZATIONS FOR PUBLIC ENGAGEMENT



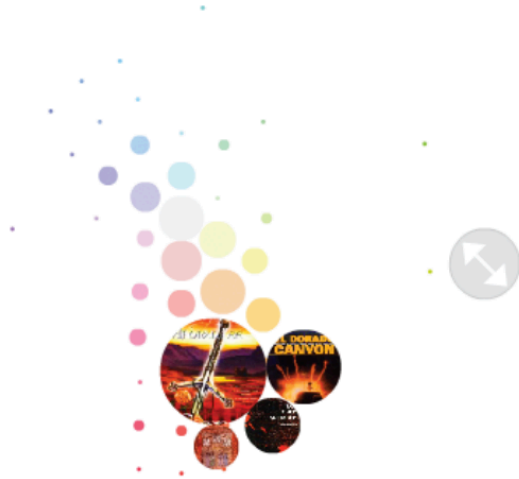
Fireflies: visualization of a Canadian attitudinal survey of HIV/AIDS

Fireflies: Biomimicry-Inspired Infovis for Exploring Public Opinion about an Infectious Disease
Bon Adriel Aseniero, Charles Perin, Marjan Eggermont, Sheelagh Carpendale



VISUALIZATIONS FOR **SEREDIPITOUS** EXPLORATION

COVER COLOUR
Browse Books by Colour



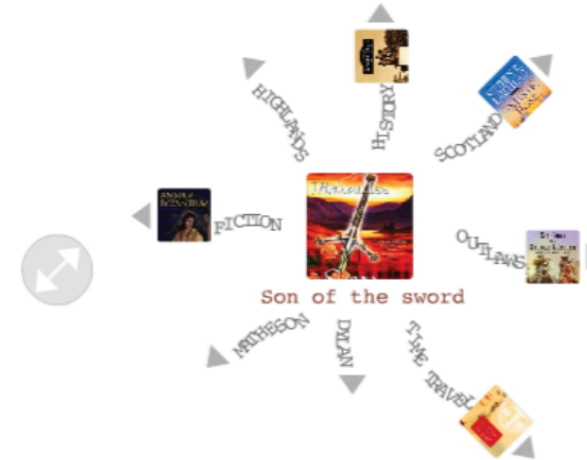
NUMBER OF PAGES
Browse Books by Page Count



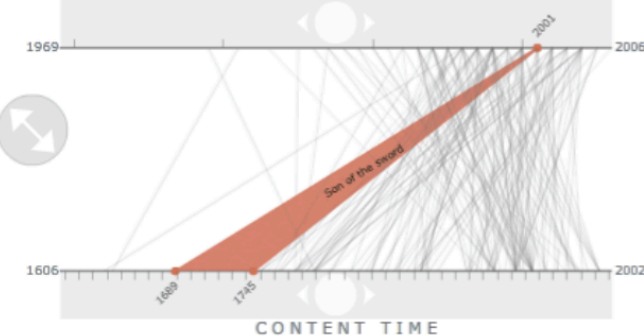
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Follow Keyword Chains to New Books



TIME PUBLISHED



The Bohemian Bookshelf: Supporting Serendipitous Discoveries through Visualization

Alice Thudt, Uta Hinrichs and Sheelagh Carpendale



VISUALIZATIONS FOR COLLABORATIVE DATA ANALYSIS

Search

Tagged As **Hypothesis** **Question** **To-Do**

Linked As **Evidence For** **Evidence Against**

All Comments **(3) Current View** **+ Comment**

UC San Diego....what?!? | Why are you so expensive and not a great bang for your buck -Kathy Oct 14 2010

UC System
The UC system looks like they cost a little more but definitely are better in terms of ROI

-Kathy Oct 14 2010 **Reply**

Come to think about it, I'm surprised how expensive UC schools are, even state schools as well in California. Isn't in-state tuition only \$15,000/yr? (and I use the word 'only' relative to what it's listed as on this graph). Is this graph including cost of living, etc?

-kennyboy256 Oct 14 2010

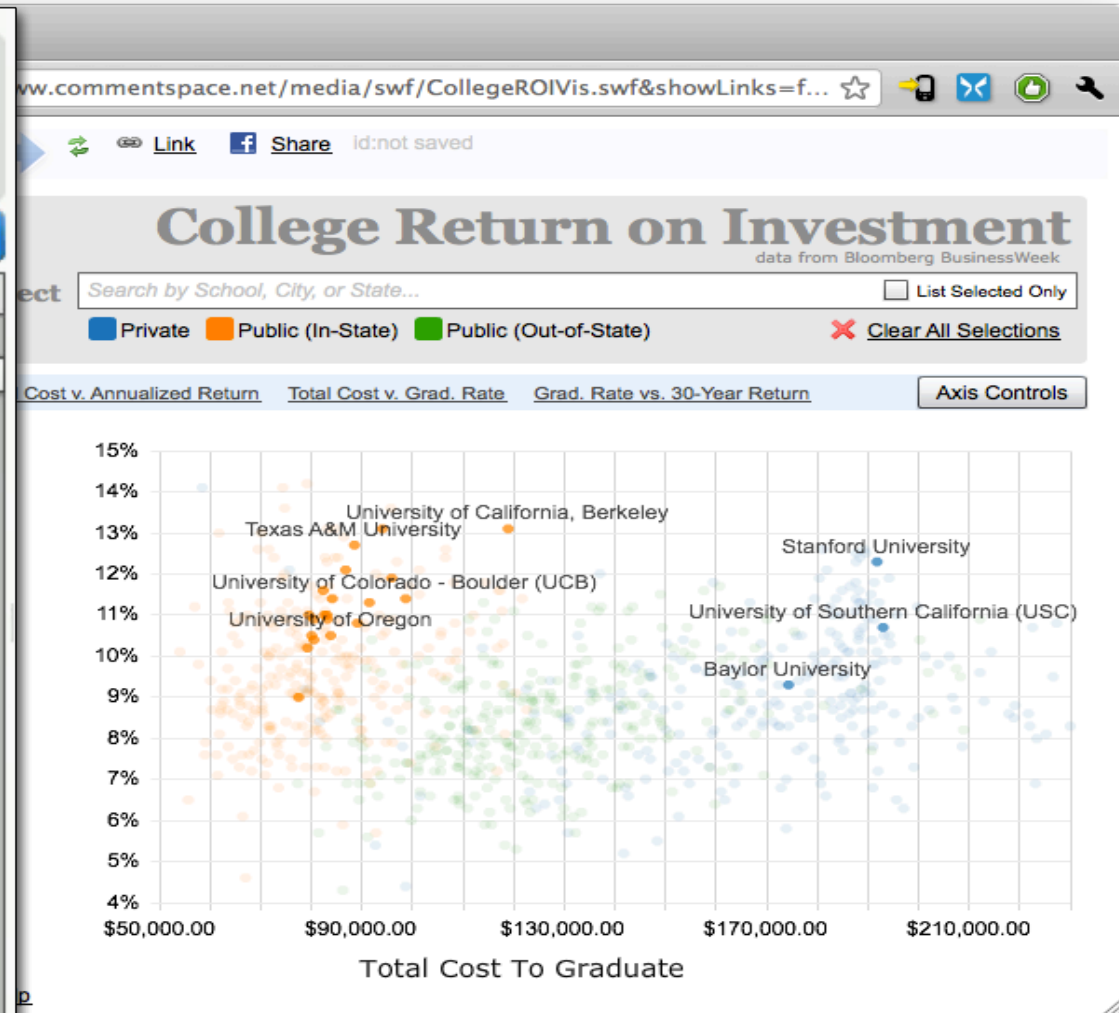
No UC Merced or San Francisco? | Somehow UC Merced and UCSF don't show... -kennyboy256 Oct 14 2010

Yea i was noticing that as well.... -Kathy Oct 14 2010

Show me the money! | It also looks like I've improved my market value.....yay for that! -Kathy Oct 14 2010

Go Bears | And it also seems as I have definitely

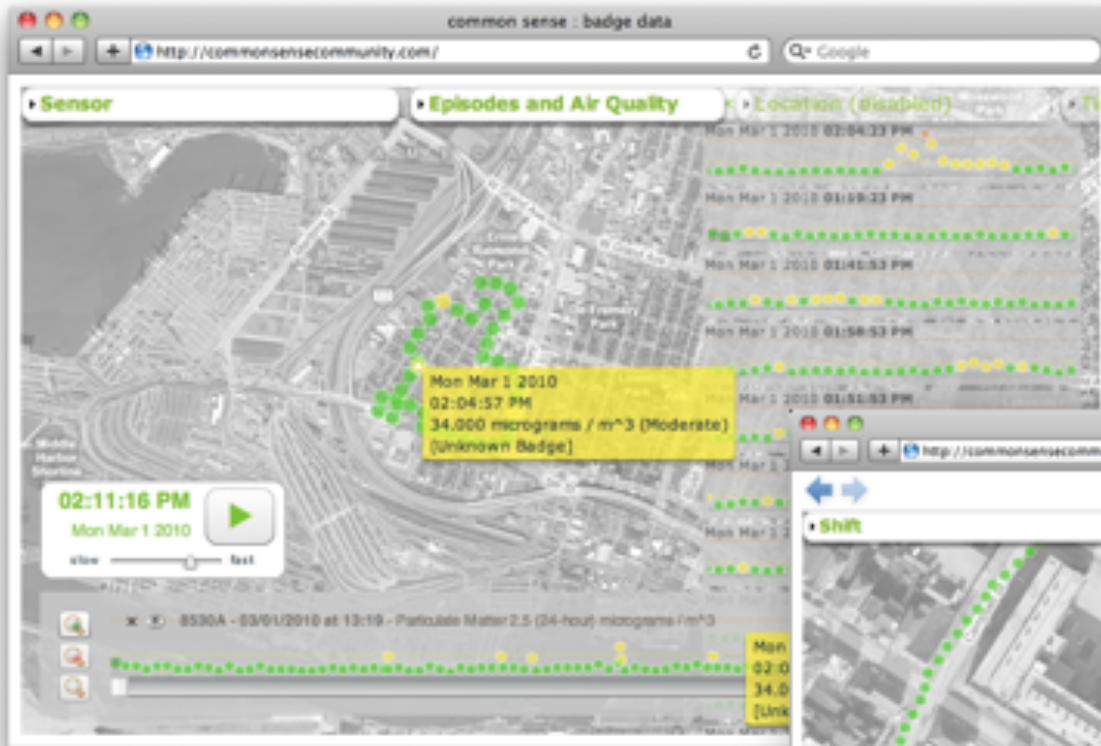
[-] [+] **showing 233/233**



CommentSpace: Structured Support for
Collaborative Visual Analysis
Willett et al.



VISUALIZATIONS FOR CITIZEN SCIENCE



Common Sense Community
Willett et al.



THE VALUE OF
OPEN DATA VISUALIZATION
FOR **PUBLIC INSTITUTIONS**

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VISUALIZING PIPELINE INCIDENTS

A CHALLENGING PUBLIC DATASET

NEB REGULATES

73,000^{KM} OF PIPELINE

ONGOING PROCESSES FOR

NEW PIPELINES

100+ INCIDENTS/YEAR

HANDLED BY NEB INSPECTORS



**COMMITMENT FROM NEB LEADERSHIP
TO MAKE THIS DATA ACCESSIBLE AND
OPEN TO PUBLIC SCRUTINY**

DON'T JUST RELEASE DATA,
MAKE IT ACCESSIBLE

DON'T FORGET THE INFORMATION
REQUEST FORM ???

REPORTS OF LEAKS AND BREAKS IN

PIPE LINE

COMPANY: — INTERPROVINCIAL PIPE LINE LIMITED

N.E.B. FILE NO.: — 1795 — J1

LOCATION OF INCIDENT MILE POST & LAND DESC.	DATE OF OCCURRENCE	DESC OF FAILURE	PIPE SPECIFICATIONS DIAMETER & WALL THICKNESS	REMEDIAL ACTION TAKEN FOR REPAIR	LOSS OF PRODUCT	INJURIES OR FATALITIES	REMARKS
			1976				
Lot 26, Con 6, Twp. Cornwall, Ctn. Stormont 2-1-69/D-16-274-0	4-12-76	Sharp 1 3/8" dent in pipe. Leak was detected while pipe was excavated during upgrading program.	30" OD	54" Plidco split sleeve installed.	Approx. 5-6 Barrels	None	
6 EDMONTON TANK FARM	12-12-76		34" OD	A SECTION OF THE 34" TANK LINE WAS CUT & BLINDED		NONE	CRUDE OIL WAS ELECTRICAL MANHOLE
76 GREINA PUMP STATION SE 1/4 8-1-1-WPM-MAN.	11-12-76	Small leak developed on a bonnet gasket of the 12" gate valve causing oil spill	16" OD	Leaky valve repaired	10 TO 15 BARRELS	NONE	SHUTDOWNS OF LINE #3 (Incident No. 43-76) CAUSE
76 MR. 1585 LAKEHEAD P/L NOT NEB	29,12,76		30"	LINE SHUT DOWN - REPAIRS COMPLETED 30 DEC 1976	APPROX 100BBL ON SURFACE	NONE	LOSS OF THROUGHPUT
				1977			
-77 EDMONTON TANK FARM SE 5-35-23-4 ALTA	26-01-77	OIL OVERFLOWED TANK NO. 20. OIL CONTAINED WITHIN OILED AREA OF TANK OIL OIL-FLAMED TANK 211	N/A	PIPE TO BE CLEANED, FLEET 1000 (SEPARATE WHEELS) BLANK REPAIRED.	ESTIMATED OIL SPILL 1000BBL	NONE	(defective equipment & piping)
77 SARNIA TANK FARM	01-02-77	2000 BBL TANK DEVELOPED A LEAK 1500 BBL ESCAPED	N/A	VALVE DEVALVED, PUMP IN LINES TO TANKS IN TANKS.	ESTIMATED OIL SPILL 1000 BBL	NONE	
-77 GLENAUGH PUMPING STATION CLOVER STA. NE 17-9-28-W	15-02-77	200 BBL LEAK IN SUCTION LINE TO TANKS 103, 104, 105	N/A	LINE HAS BEEN ISOLATED	ESTIMATED OIL SPILL 1500 BBL	NONE	(defective equipment & piping)
0-77 EDMONTON TANK FARM SE 1/4 5-53-23-4 ALTA	06-04-77	OIL LEAK OF A 34" TANK FARM PIPE WAS DISCOVERED BY PATROL	34" d	LINE REPAIRED, RECONSTRUCTED & REVALUED	500 BBL OF CRUDE OIL ESCAPED IN DITCH 10 BBL OF OIL LEAKED	NONE	TANK WING RUMPER TAKEN & MAINT. LINE NOT REPAIRED
2-77 REGINA PUMP STA.	03-05-77	OIL LEAK FROM BOTTOM SCAM TANK 74	N/A	REPAIR TO TANK MADE, EXCESS OIL REMOVED	100 BBL OF CRUDE OIL	NONE	
30-77 CLARKSON PUMPING STATION	13 MAY 77	CRUDE OIL DISCOVERED IN STATION YARD-IMMEDIATE REPAIR FROM TANK 2 & 3 (both shut down) RELIEF TANK (NOT I.P.L.L.) OVERFLOWED ESTIM. 300BBL OF CRUDE	N/A	LINE 2 & 3 SHUT DOWN, MAINT. CREW WORKING TO FIND LEAK 20" I.P.L. LINE SHUT DOWN PENDING REPAIRS TO RELIEF VALVE OF GULF OIL	N/A	N/A	TANK ON CLARKSON TERMINAL LINE 1 SHUT DOWN FOR 1 1/2
31-77 CLARKSON TERMINAL SE 3-7-14 WPM	2 AUG 77	FIRE IN ELECTRICAL CUBICLE	N/A	ELECTRICITY WAS DISCONNECTED. REPAIRS MADE REI. DONALDSON TRAILER, THE PROPERTY OF KROON GOMMA	N/A	N/A	one man injured, treated for injuries to one leg, returned to work same JULY 84 (1500 HP HALF HOUR UNIT)
31-77 GLENAUGH PUMP STATION	9 Sept. 77	Injury to one man while cutting a/c line	N/A	DAMAGED SEAL WAS REPLACED	40 BBL	NONE	
NUMBER REGINA PUMP STATION SITE	30 Oct. 77	TANK OVERFLOW NOT I.P.L.L.	N/A				
NUMBER GULF'S CLARKSON REFINERY	2 AUG. 77	Tank 2 Pump Seal in Unit 3-4					
46-77 CLARKSON PUMP STA SITE	23 Nov 77						
				1978			
4-78 Lot 24, Con 3, Twp. Cornwall, Ctn. Stormont 100 E of Duncan Rd	14 JUNE 78	CRACK IN 30" MAIN LINE OIL GASKET SEEN AFTER STRIKE 10000 A METER 3400	30" N/A	oil contained in drainage ditch. Recon sections to be replaced NARROW STR. OIL CONTAINED IN DITCH	large amt 110 BARRELS	NONE	NO INTERRUPTION OF SERVICE
10-78 Lot 34, Con 6 Twp. Lancaster, 6 mi from Quebec border	14 JUNE 78			1979			
37-78 CLARKSON PUMP STA	25 DEC 78	oil on surface of water, pipe resting on rock	30"	PIPE SLEEVES	2 BARRELS	NONE	NORMAL SCENIC LIFE 200,000
				ENG. REPAIR	N/A	NONE	LINE SHUT DOWN 1 1/2 HRS
	8-1-79	ENG. BREAK DOWN.	N/A	LINE 3 SHUT DOWN 1 1/2 HRS WHILE LEAK WAS ISOLATED	10 BARRELS	NONE	
2-79 Lot 9, Con 6 Twp. Cornwall, Ctn. Stormont 100 E of Duncan Rd	9-1-79	oil spraying from cracked 1/2" nipple on a pressure transmission line	N/A	A PLIDCO SPLIT SLEEVE BEING INSTALLED	2 BARRELS	NONE	ABOUT 1/2 H. P. PUMPING LOST.
3-79 ST LEON PUMP STA	26-2-79	PINHOLE LEAK	N/A	A PLIDCO SPLIT SLEEVE INSTALLED	20-25 GAL	NONE	A REDUCTION IN LINE 3
9-79 KEYSER PUMP STN.	3-22-79	PIPE PUNCTURED	N/A	SEALING REPLACED	UNKNOWN	NONE	CLEAN UP 95% COMPLETED.
11-79 70-204 LOT 34, Con 3, Twp. Cornwall	13-4-79	PUMP SEAL FAILURE	N/A	SOME OVER FLOWED IN DITCH CONFIRMED TO COMPANY	25 M ³	NONE	IPLL WILL SUBMIT FURTHER
12-79 70-204 LOT 34, Con 3, Twp. Cornwall	21-4-79	LINE PRESSURE VALVE	N/A	LINE 3 SHUT DOWN UNTIL REPAIR MADE	5,000 BBL	NONE	

DATA UNDERSTANDING AND COLLABORATIVE DESIGN WITH NEB EXPERTS



FOR ANY GIVEN INCIDENT...

LOCATION

DATE

PROVINCE

TYPE OF INCIDENT

COMPANY

WHAT SYSTEM COMPONENTS

WAS THE SYSTEM UNDER CONSTRUCTION? IN OPERATION? RETIRED?

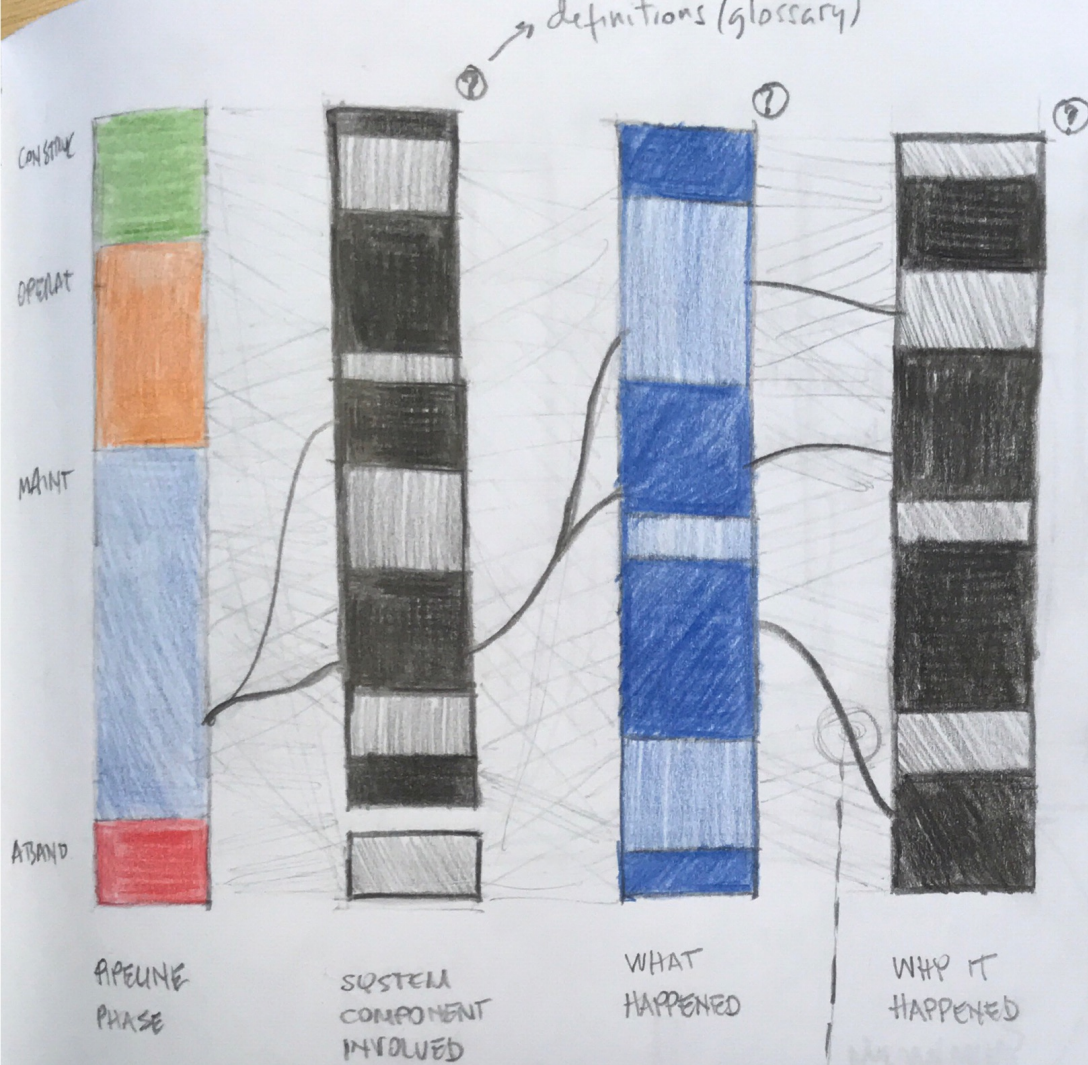
RELEASE TYPE/SUBSTANCE/VOLUME

WHAT HAPPENED?

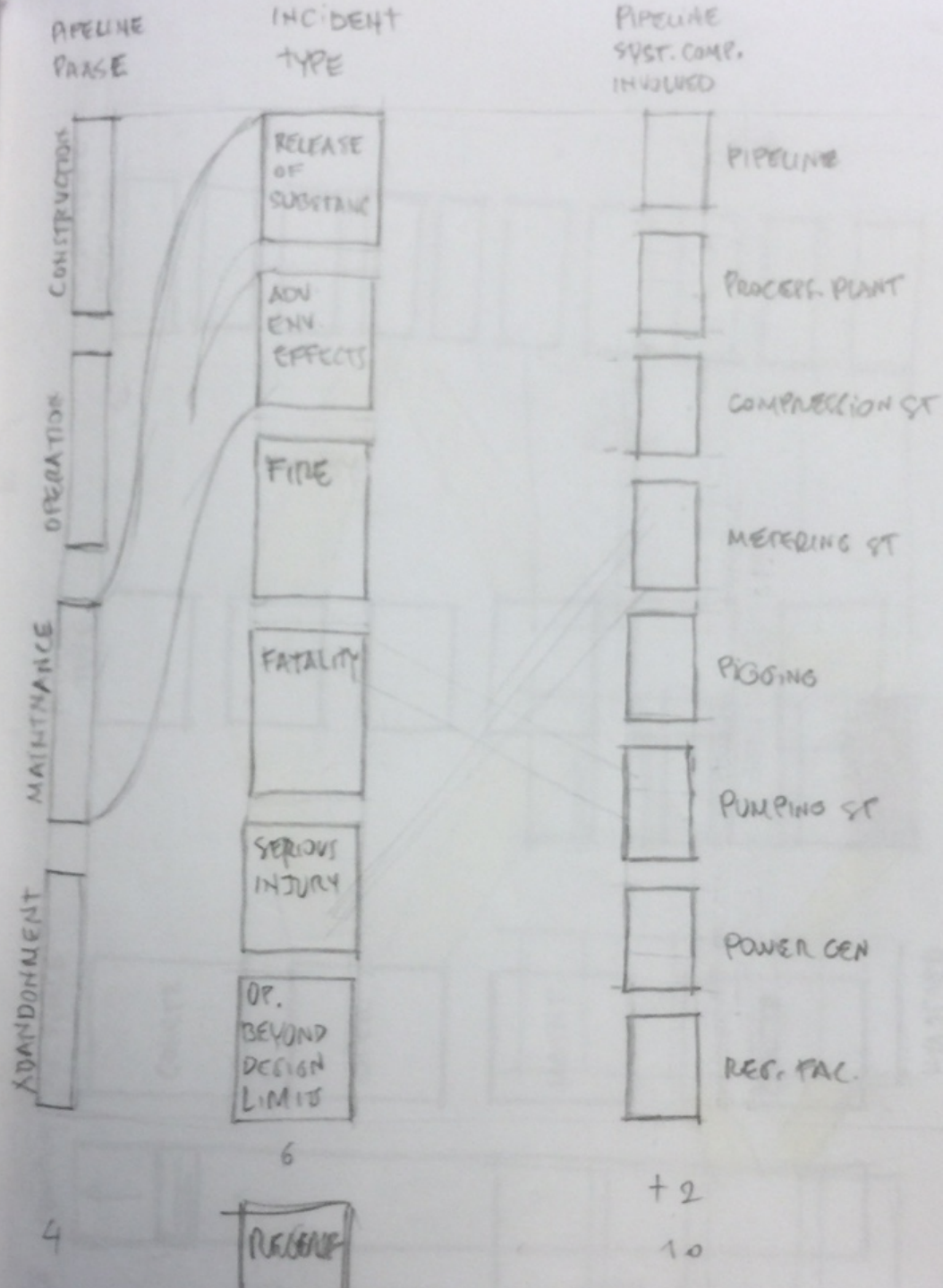
WHY DID IT HAPPEN?

...

100+ PIECES OF
INFORMATION
PER INCIDENT

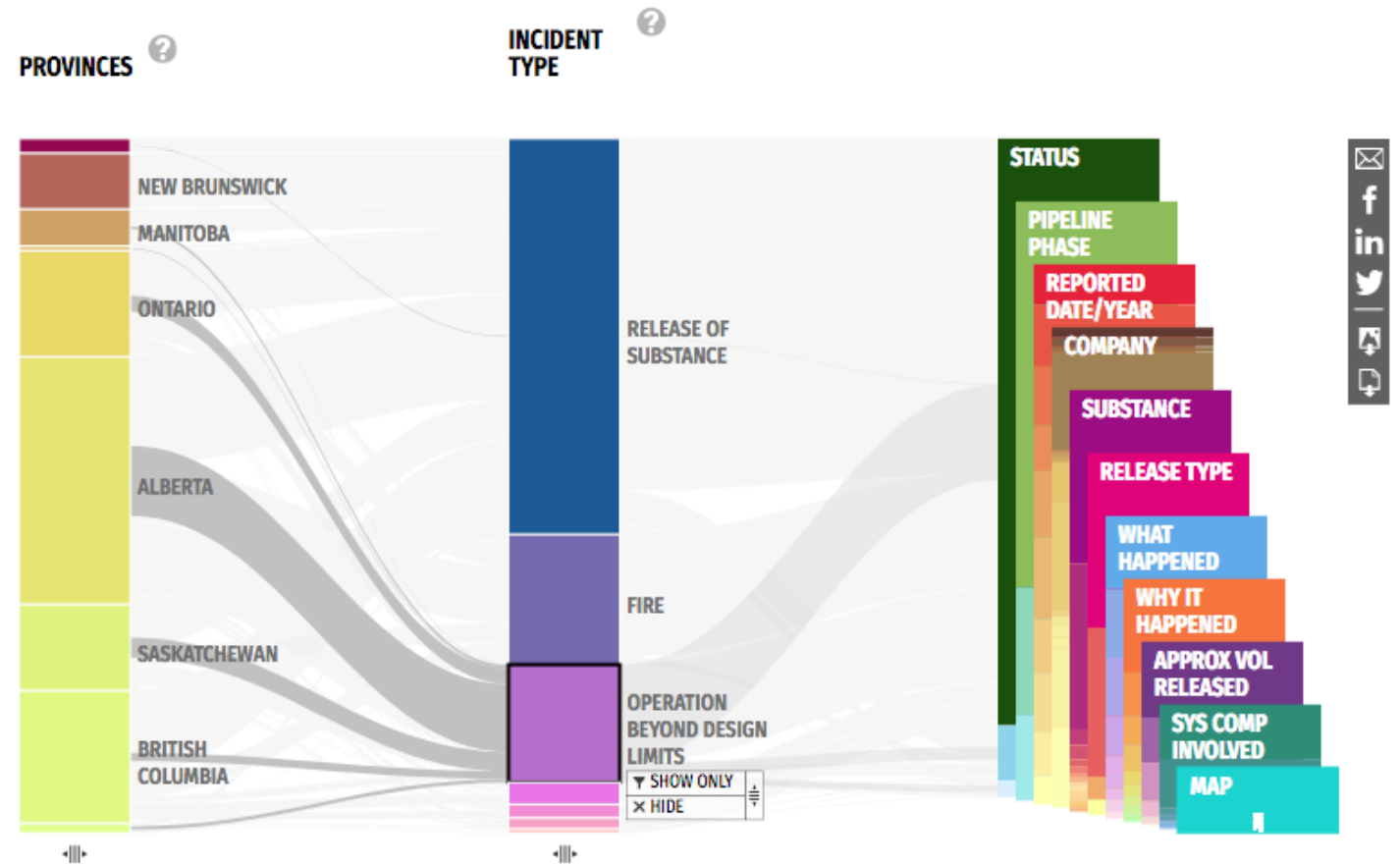


INCIDENT DURING MAINTENANCE INVOLVING PIPELINE AND POWER GENERATION, EQUIPMENT FAILURE AND



NATIONAL ENERGY BOARD PIPELINE INCIDENTS

<https://apps2.neb-one.gc.ca/pipeline-incidents>



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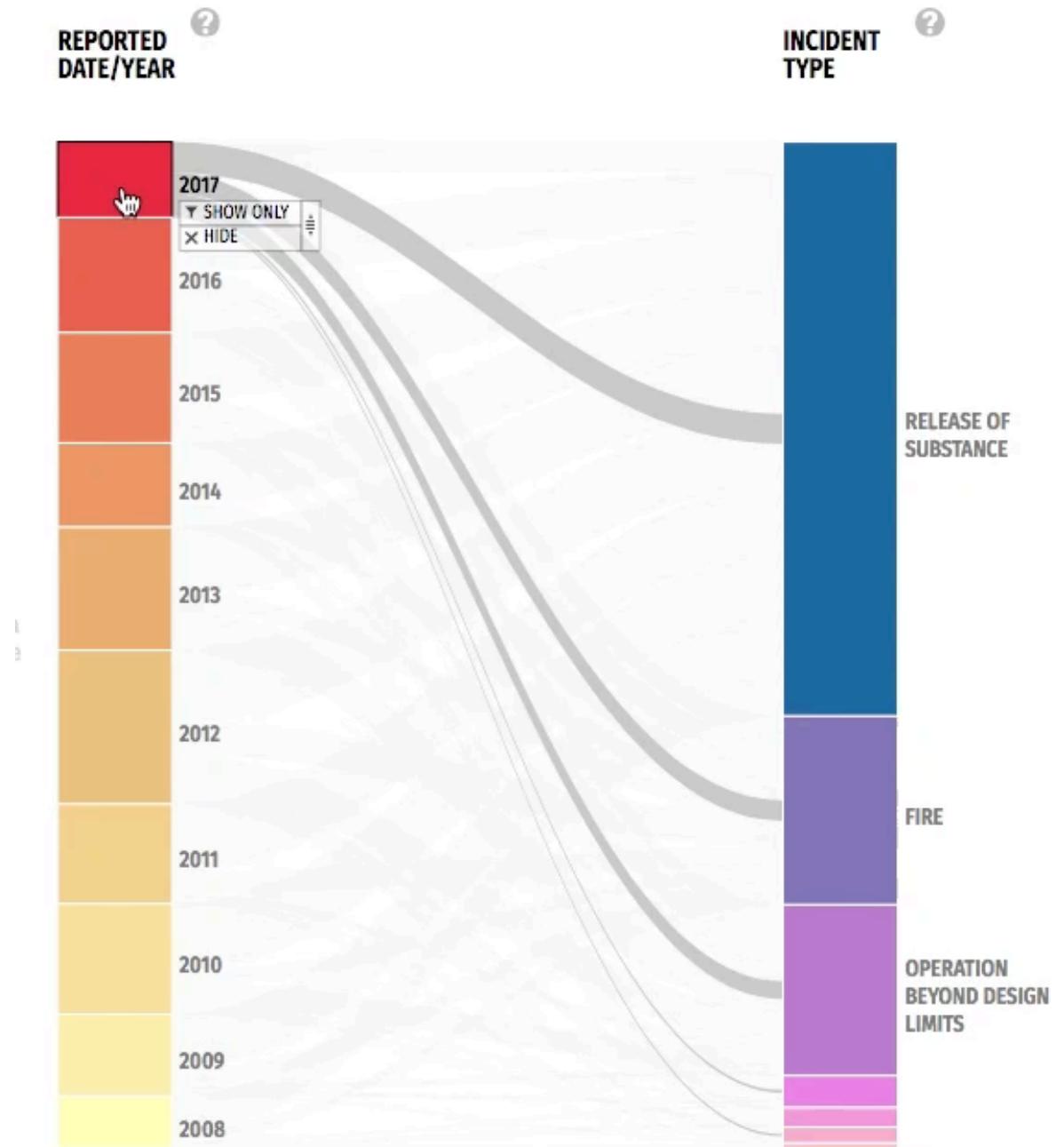
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THE HESTER
VIEW

1,040 PIPELINE
INCIDENTS
FROM 2008-2017

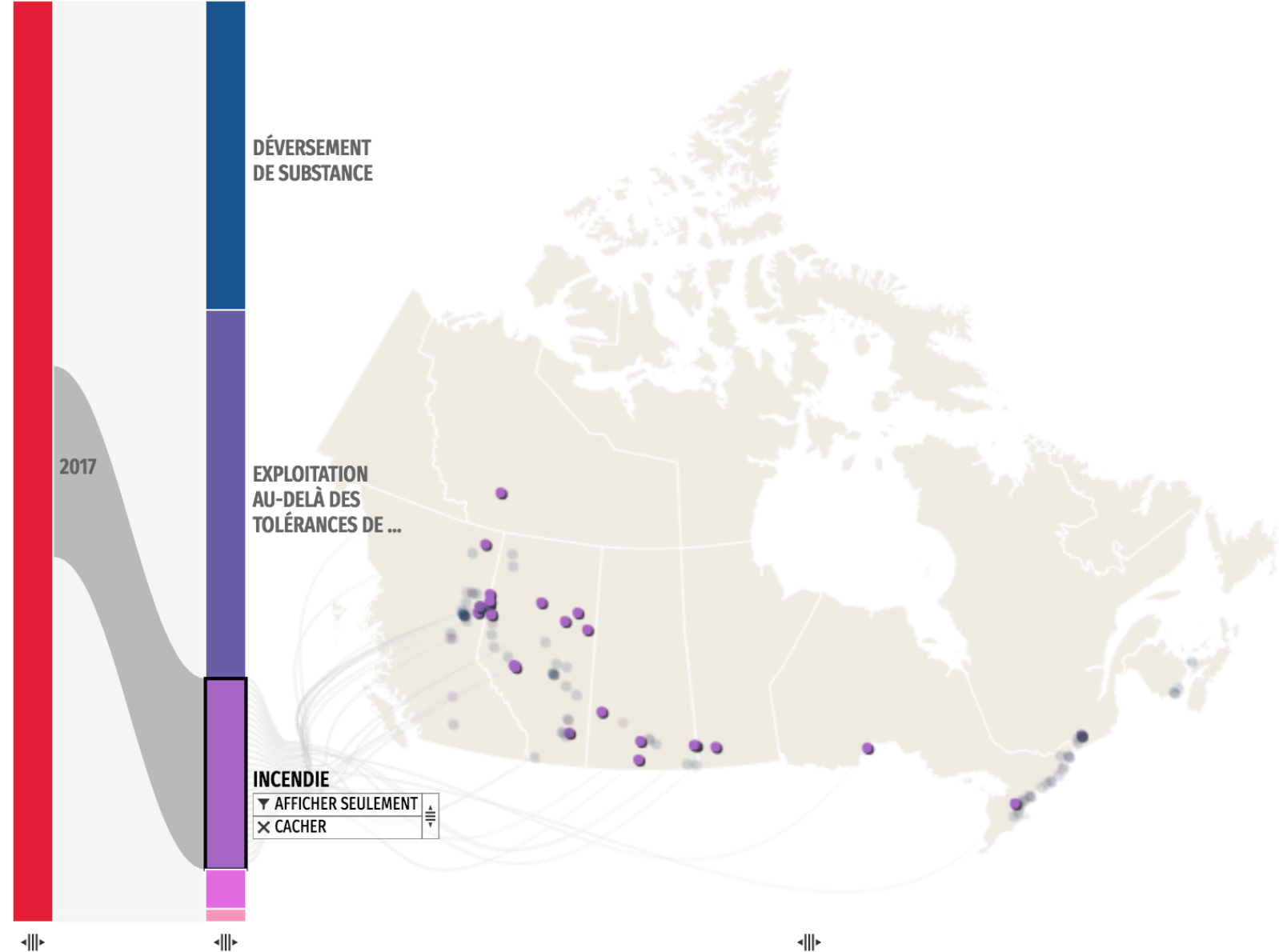
14 KEY PIECES OF
INFORMATION
PER INCIDENT

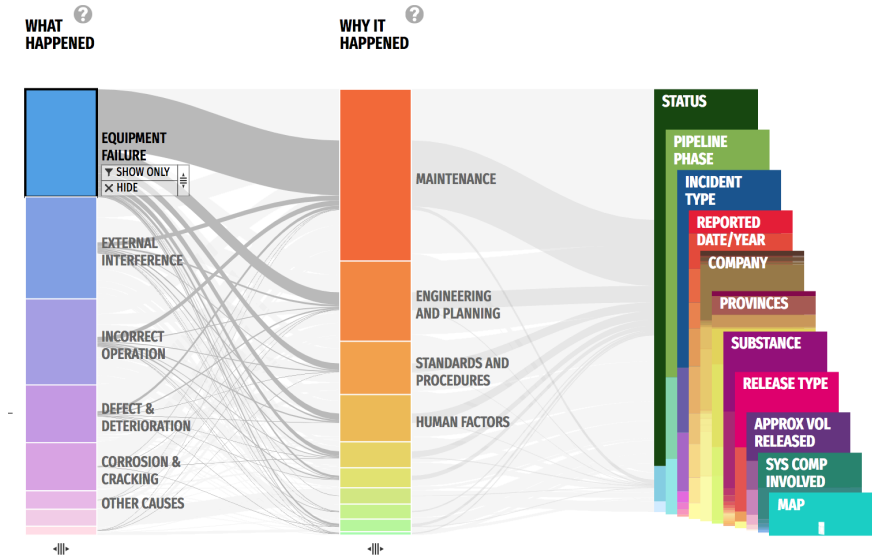
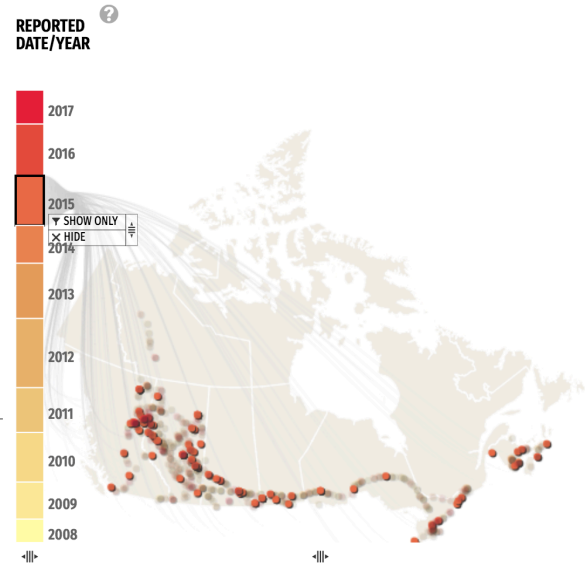
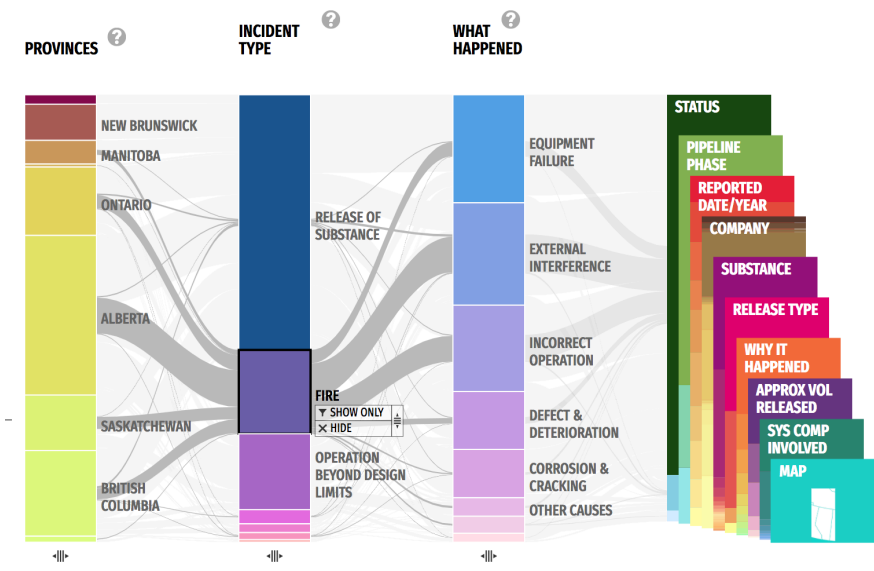


ANNÉE DU
SIGNALEMENT ?

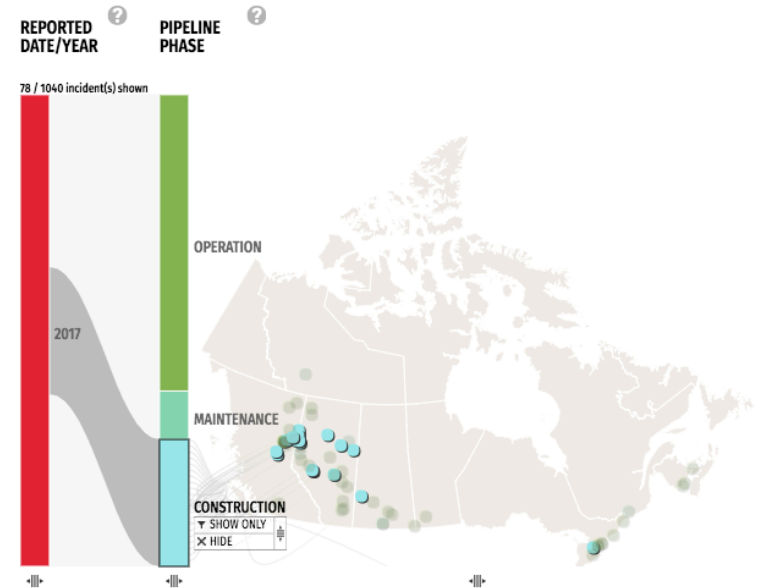
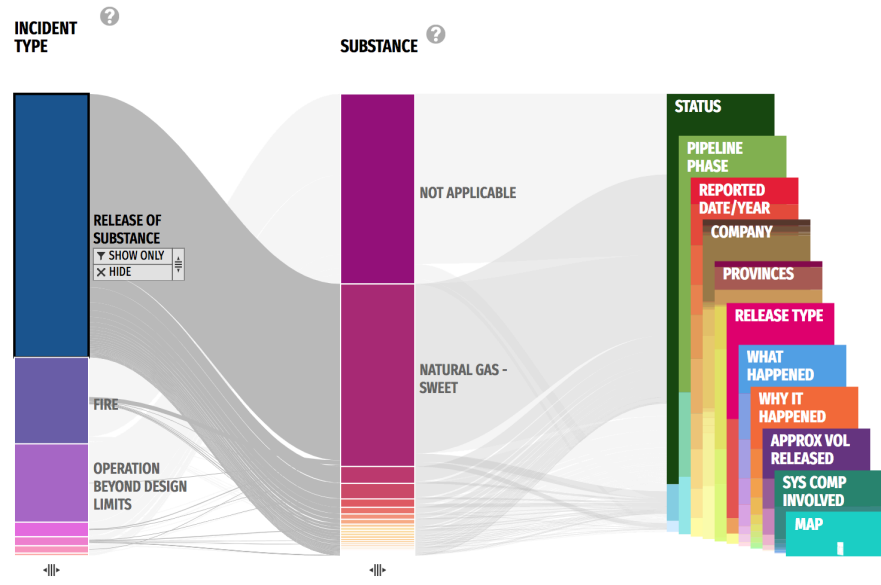
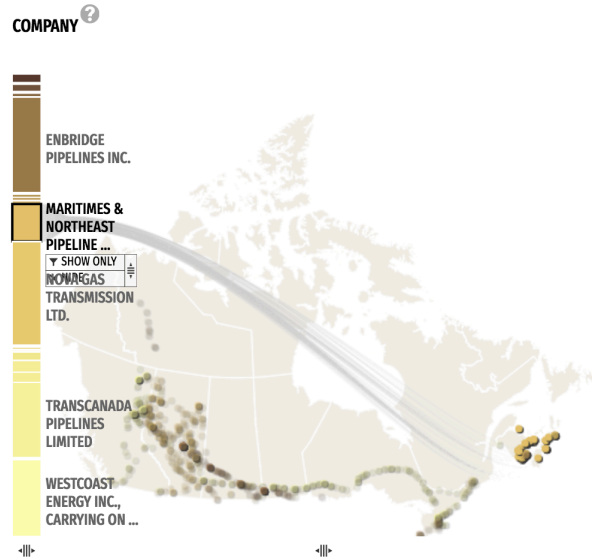
TYPE
D'INCIDENT ?

140 / 1112 incident(s) affiché(s)



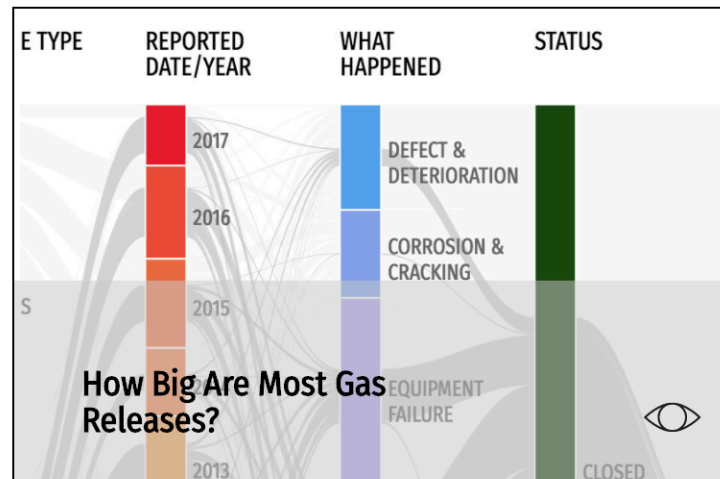
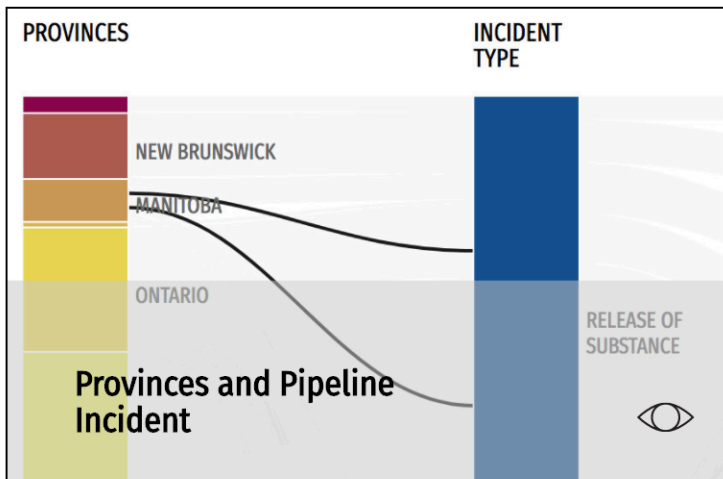


NOT JUST ONE VISUALIZATION, BUT A VISUALIZATION SYSTEM



A STORYTELLING PLATFORM

BOTH FOR **NEB EXPERTS**
AND FOR **THE PUBLIC**





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Official account for the National Energy Board. Terms: neb-one.gc.ca

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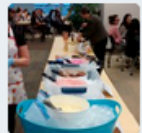
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661 Photos and videos



Stage for LNG liq

Temperature

Delius

Delius

Delius

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75

Followers
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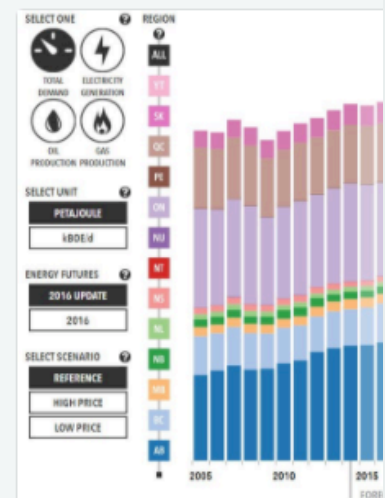
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October 12 at 8:51am ·

Feature Article: 25 Years of Atlantic Canada Offshore Oil & Natural Gas Production - This year marks a quarter century of offshore oil and natural gas production in Atlantic Canada. From fields discovered as far back as 1969, production from Nova Scotia and Newfoundland and Labrador has allowed those provinces to fill growing global demand for oil and natural gas. While some fields are winding down, new discoveries are being made and new projects announced, leading to the expectation that Atlantic Canada will continue to be an active participant in Canada's oil and gas sector for many years to come. <http://ow.ly/NUg030fPFvT>

Map of Offshore Oil and Gas Activities in Atlantic Canada



Government Organization in Calgary, Alberta

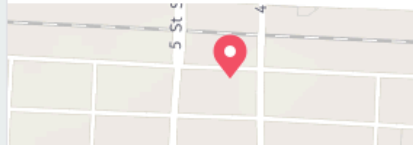
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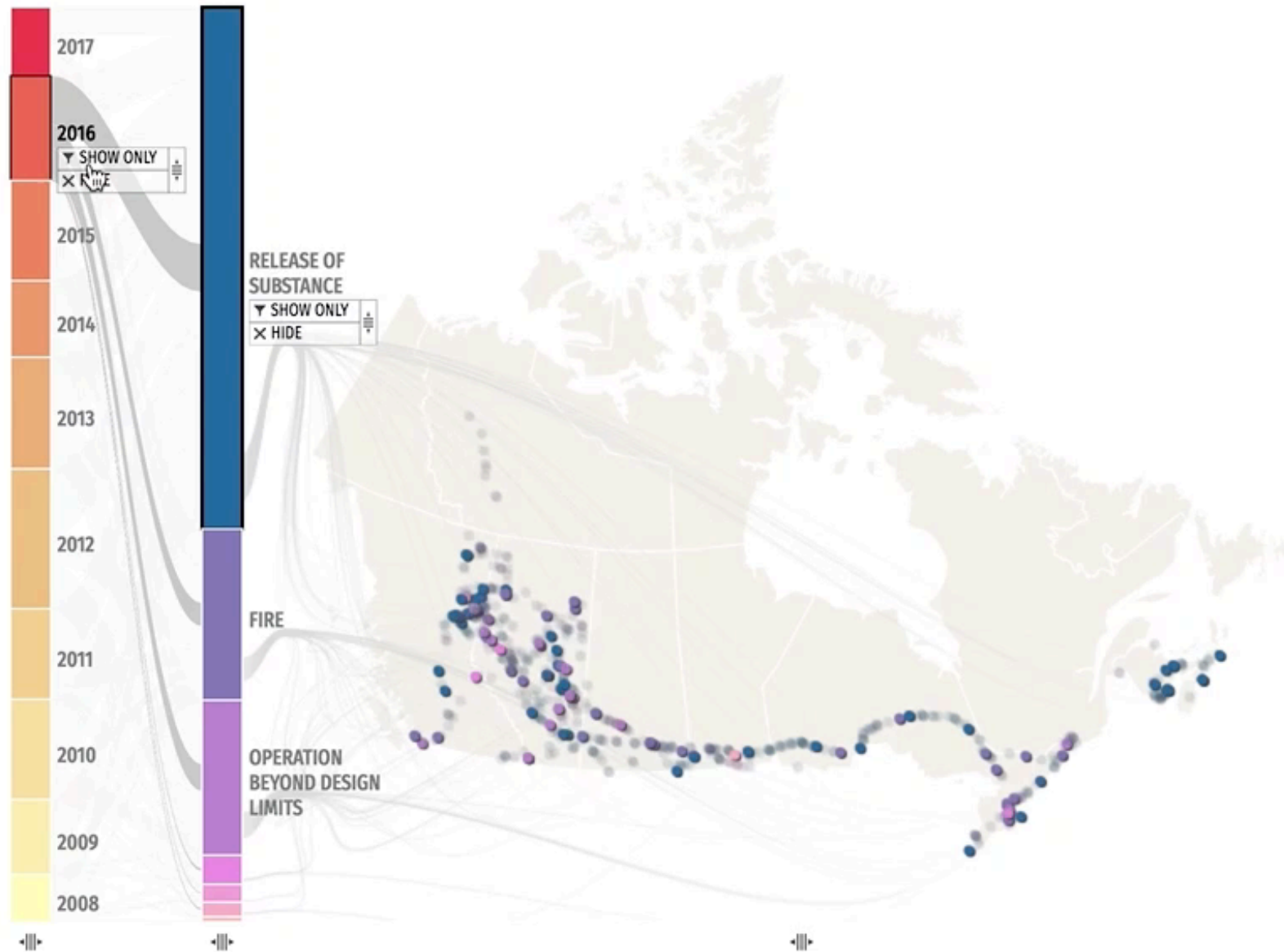
People

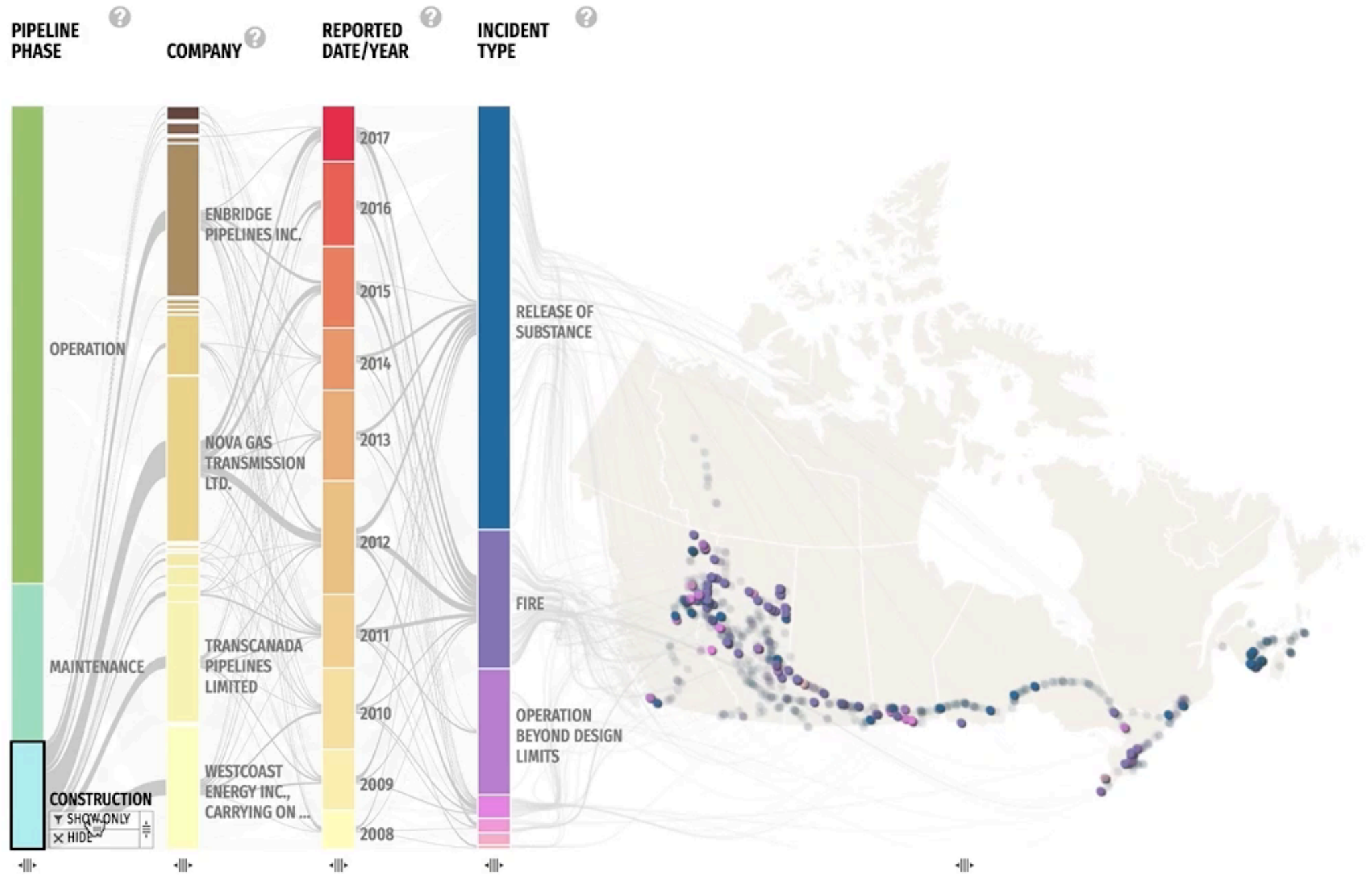
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HELPING CANADIANS
UNDERSTAND PIPELINE INCIDENTS

REPORTED
DATE/YEAR ?

INCIDENT
TYPE ?





ENCOURAGING PUBLIC DIALOGUE
GROUNDING IN DATA

INCIDENTS



RELEASE TYPE



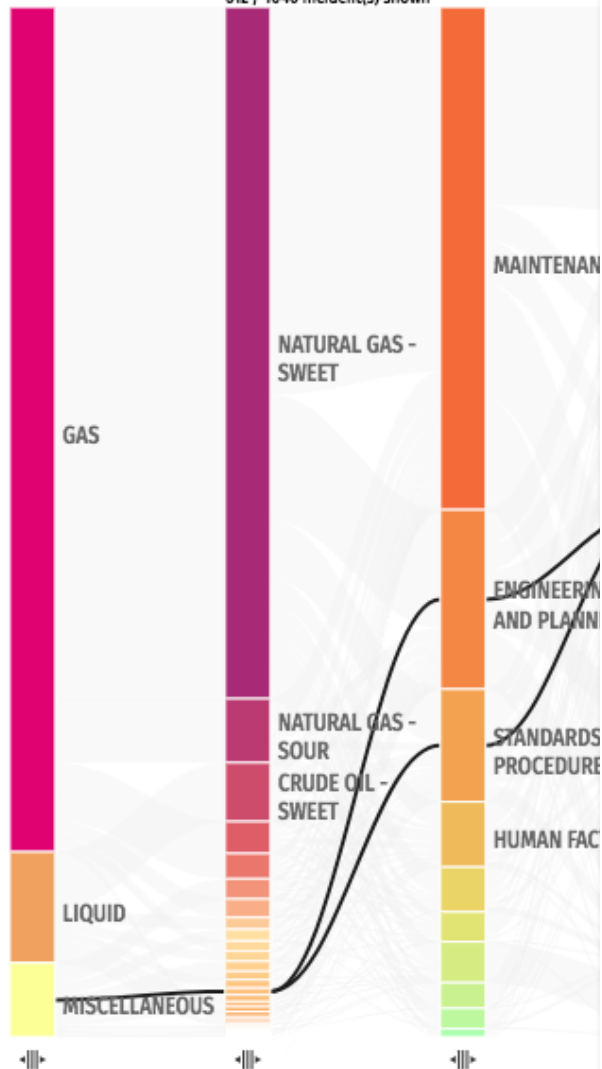
SUBSTANCE



WHY IT HAPPENED



612 / 1040 incident(s) shown



INC2015-138

Near Chetwynd, BC

Reported Date:

11/26/2015

hide incident list

Show empty categories

Chemical leak shuts down Spectra Energy gas plant in northeastern B.C.

The leak is the second emergency incident in as many weeks at plant, near Chetwynd, B.C.

CBC News Posted: Nov 27, 2015 6:21 PM PT | Last Updated: Nov 29, 2015 7:57 AM PT



A chemical leak shut down a Spectra Energy gas processing plant in northeastern B.C. (Spectra Energy)

Related Stories

- NEB not 'impartial referee,' says economist who quit Trans Mountain review
- Public review started for pipeline emergency response plans
- Gas development poses 'low' risk to human health: government study

A hazardous chemical leak has forced the shut down of gas plant in northeastern B.C.

Spectra Energy's vice-president of external affairs, Gary Weiling, says the company shut down its Pine River gas plant near Chetwynd after it released a chemical called amine on Thursday.

Amine is a solvent used to process natural gas. It's corrosive and can irritate or burn skin, eyes, and lungs.

There are no reports of injury.

"Plant personnel shut down the plant. We're still assessing the full root cause," said Weiling. "We're doing a full review of what happened."

It's the second recent emergency incident at the plant.

Two weeks ago, 40 workers were evacuated to muster stations after a hydrogen sulphide leak. Nearby residents were also notified of the incident.

Weiling says the National Energy Board has issued an inspection order, and the plant will re-open once safety is assured, preventative measures are in place, and the regulator's order has been lifted.

With files from Betsy Trumpener

GIVING INSTITUTIONS
A NEW LENS ON THEIR OWN
DATA PRACTICES



MAKING DATA **TRULY ACCESSIBLE** ISN'T EASY...

PRACTICAL AND INSTITUTIONAL BARRIERS TO DATA TRANSPARENCY

VISUAL TOOLS A CHALLENGE **VISION-IMPARED** AND **LOW-LITERACY** GROUPS

NO **ONE-SIZE-FITS-ALL** DESIGN SOLUTIONS

...**BUT WE'RE JUST GETTING STARTED**

SHOWCASING THE VALUE OF OPEN DATA VISUALIZATION FOR GOVERNMENTS

HELPING BUILD THE CAPACITY TO **CREATE TOOLS THAT EMPOWER THE PUBLIC**



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