



# Leadership: Celebrating the Past and Artfully Moving Forward

W-D2

**March 22, 2023**



25th California Unified Program  
Annual Training Conference  
March 20 – 23, 2023

## Your Presenters Today...



### **John Elkins**

Environmental Program Manager

California Environmental Protection Agency

Emergency Response | Refinery Safety | HMBP | CalARP

### **Dr. Christie Bautista, DPA, MPA**

Environmental Health & Safety Manager

The Huntington Library, Art Museum & Botanical Gardens

# Who is here today?



# The Journey



# Celebrating the Past

“More with Less”



## The Late 1970s USEPA & State Health Agencies

- Original state agencies involved with regulating hazardous waste at large transfer storage disposal type facilities
- California Department of Health Services
- California Hazardous Waste Law enacted in 1978



## The Early 1980s

- Local hazardous waste programs started in about 22 local agencies
- Numerous criminal cases for spills and accidents

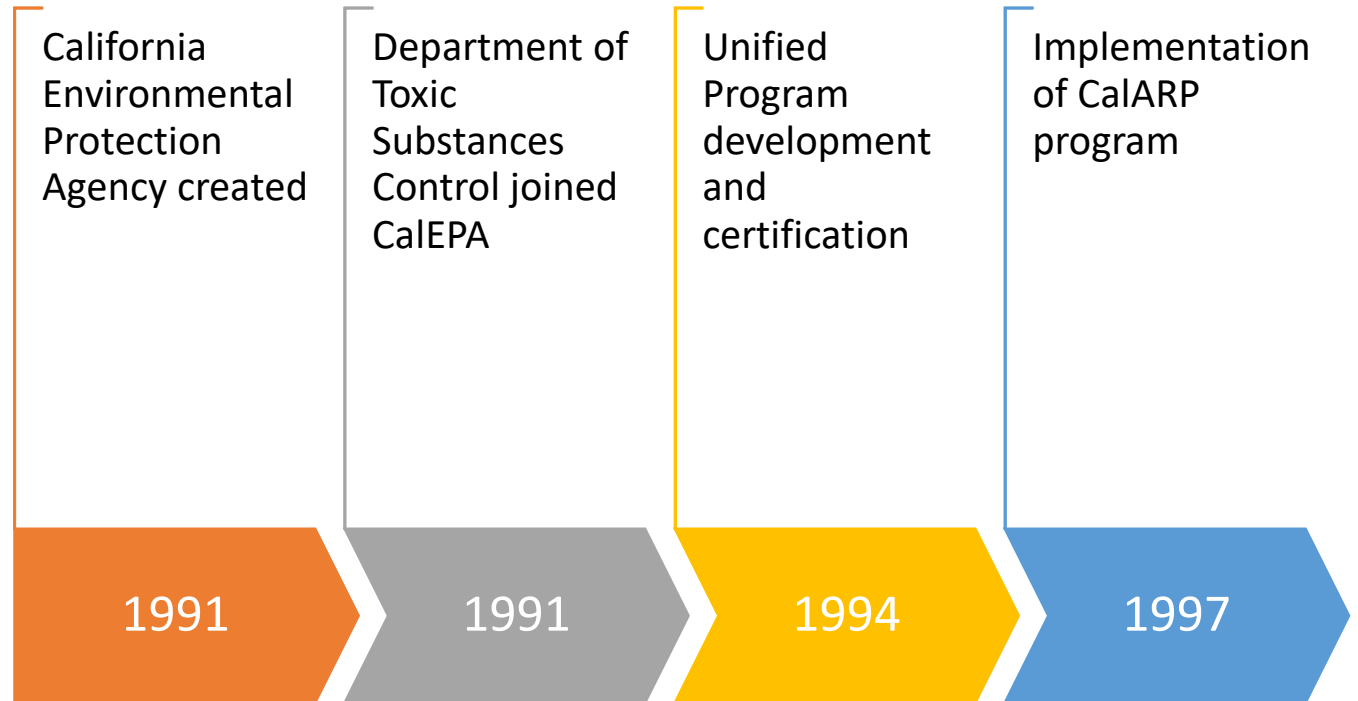
# By the 1980s Explosive Program Growth

- Underground storage tanks – Byron Sher Bill (1983)
- Business plans/Chemical inventories (1986)
- Local oversight program (1988)
- Major cleanup efforts
- Increasing fines, penalties & felonies
- Increased fire department involvement
- Military base closures





By the 1990s



# January 1994 SB1082

- Why was there a need for a unified program?
  - Duplicate programs
  - Duplicate inspections
  - Multiple invoicing and permitting
  - Multiple agencies
- What happened?
  - Legislative process
  - Political climate then and now



# Certified Unified Program Agencies and Participating Agencies



81 CUPAs – most with no PAs



24 PAs via agreements



Most are Fire Department and Environmental Health Department entities



State certification process began in the mid 1990s



1990s CUPA regulations were developed

# SB1082 Unified Programs

Hazardous Waste Generation Program and Tiered Permitting

Hazardous Materials Inventory (Disclosure)

Accidental Release Prevention Program

Underground Storage Tanks

Aboveground Petroleum Storage Tanks

California Fire Code (Hazardous materials plans/Inventory only)

# SB1082 Program Goals



COMBINED  
INSPECTIONS



CONSISTENT  
INSPECTIONS &  
ENFORCEMENT



INTERAGENCY  
COORDINATION



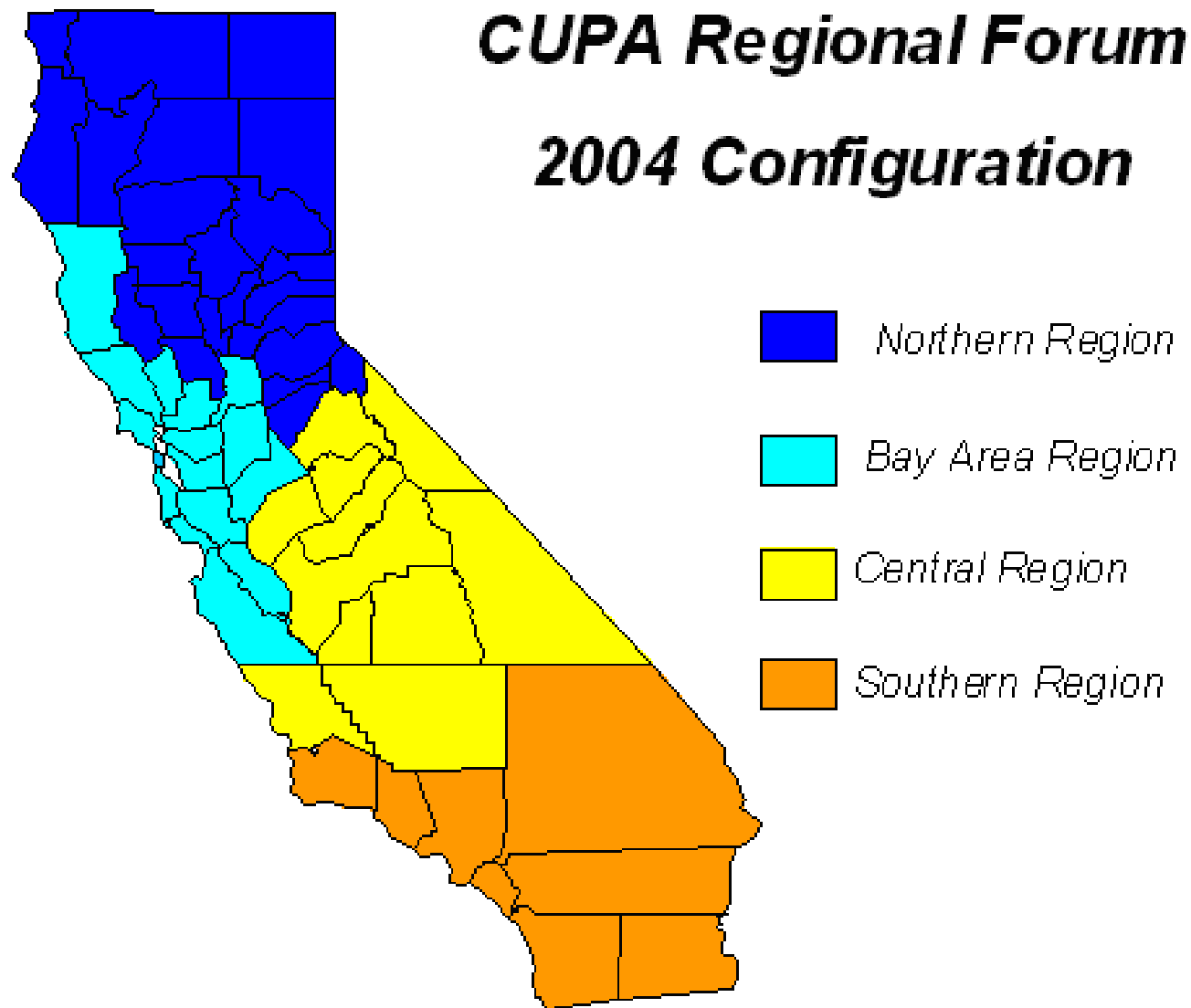
SINGLE FEE SYSTEM



CONSOLIDATED  
PERMIT

## Unified Program Led to the CUPA Forum

- UPAs unite in a CUPA Forum to consolidate efforts and provide a single voice to the State and Federal agencies (1996)
- UPAAG established (1998)
- CUPA Forum begins holding annual conferences (1998)



# Accomplishments

---

- Enhanced and increased interagency cooperation on a wide range of issues
- Large number of stakeholders kept informed
- Increased and consistent enforcement
- Annual training conference





More  
Accomplishments

---

- Major reductions of incidents at high-risk facilities through CalARP
- Improved and streamlined state performance review process
- Tiered permitting program moved to local government
- Standard violation classification
- Statewide enforcement cases
- Administrative Enforcement Orders





# What has changed?



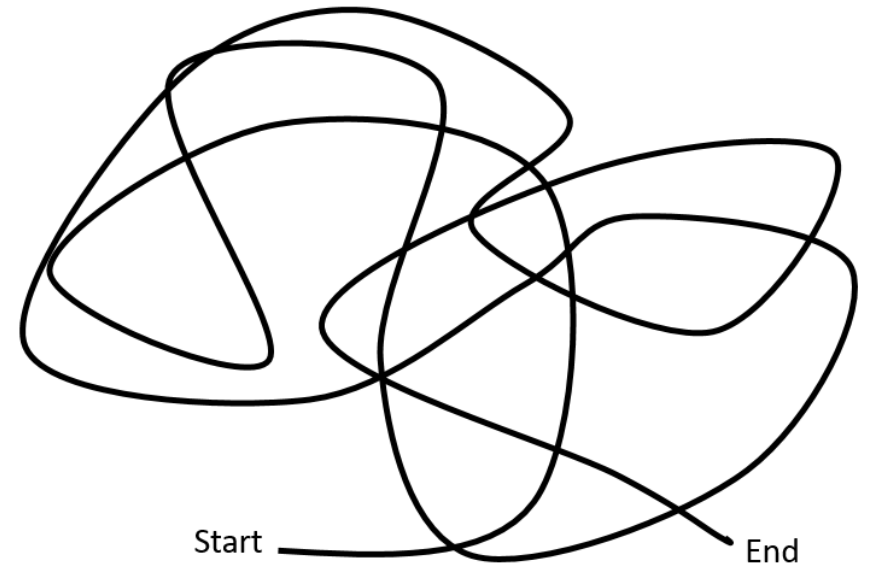
## Technology

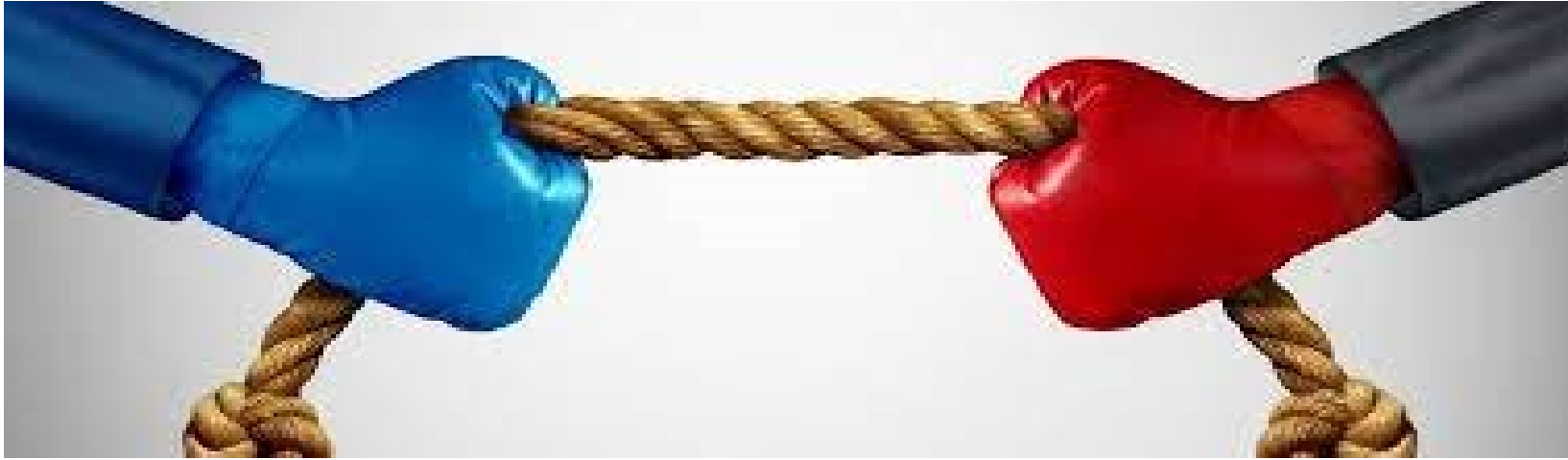
- Full checklist was a quarter sheet of paper
- Paper forms were used instead of reporting in CERS, including business plans
- Paper forms for state reporting were then mailed to the federal government
- Manifests

# What has changed?

## Processes

- Inspections were not being completed regularly
- Little to no enforcement
  - No AEO process
  - Facilities can get away with more
- Little to no consistency among regulators, very isolated in early days
- Inspectors had to read the regulations to be knowledgeable





What has  
changed?

### **Relationships between the CUPA and State**

- Not a lot of oversight
- Many times relationships were adversarial
- CUPA evaluations were done in person
- No Technical Advisory Groups

# What has changed?

---

## Relationships between CUPA management and staff

- Managed staff from 9 to 5 (office based)
- Management style was more command and control
- Boys club, pranks, male-dominated
- Interactions were mainly face-to-face and sometimes email



# Difference Between Then and Now

---

## Technology and Processes

- Checklists are now between 1-3 pages
  - Many CUPAs use electronic devices
- Biggest change is enforcement
  - Much bigger monetary component
  - First AEO cases were around \$1,000
- Today everything must be enforceable and correct
- Everything is online based



# Then and Now

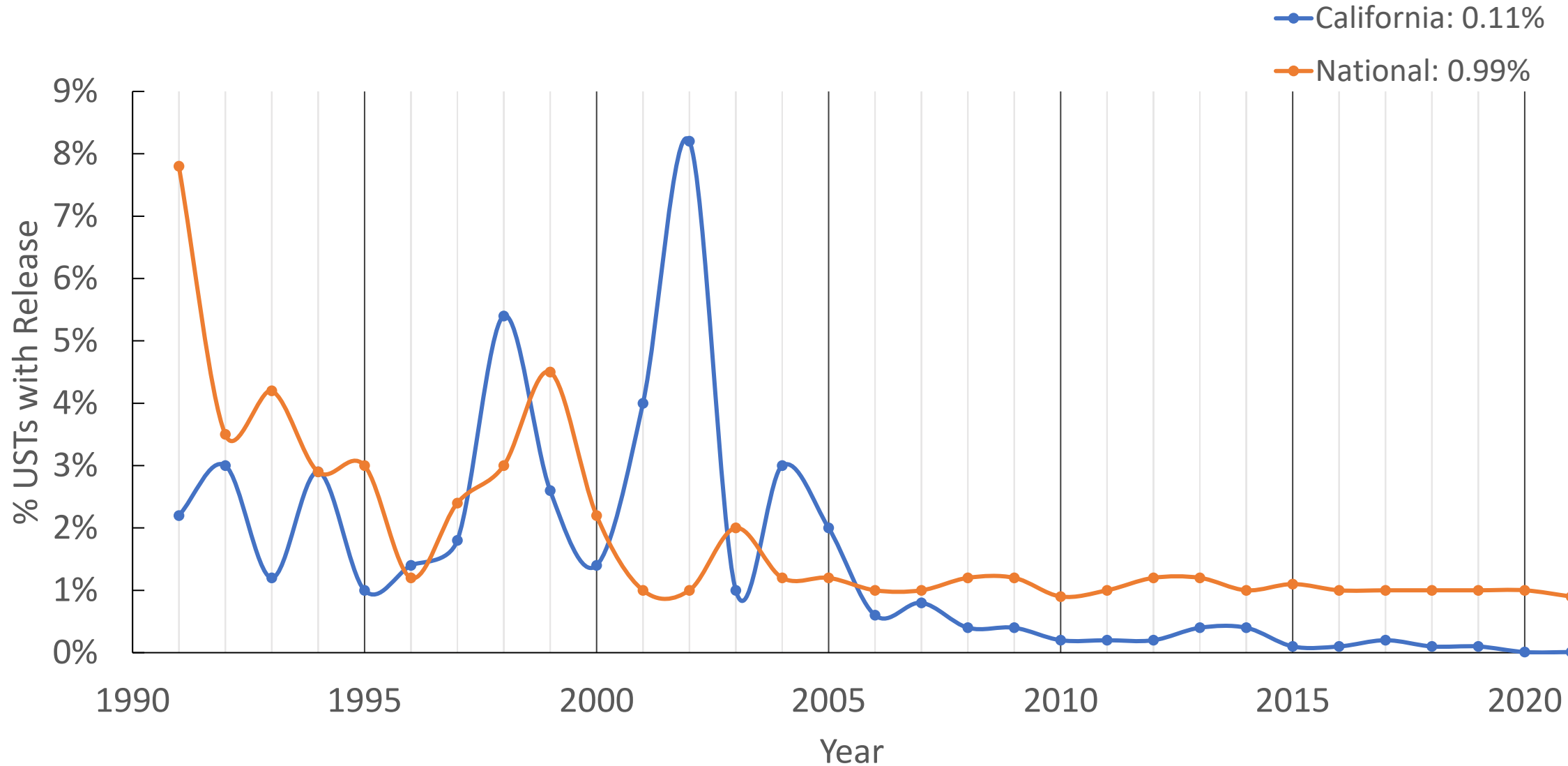
---

## Relationships

- CUPA audits are more formal and mostly virtual
- Employees have computers and telework
- There was no need or use for data
  - The need for data has changed
  - Today is about being data driven



# Percentage of USTs Having a Release Over Time





Inspections traditionally started off with higher penalties and violations. Today, there is a dramatically smaller number of significant violations.

Example: Used Oil Sector

---







**THIS WAY**

**THAT WAY**

**ANOTHER WAY**

Where Do We Go From Here?



Please Fold  
Your Arms

---



Please Fold  
Your Arms  
The OTHER  
Way

---



# Generations

# Generational Mindsets Affect the Workforce

## Five generations are in the workforce:

- Traditionalist (76 to 99 years old)
- Baby Boomer (57 to 75 years old)
- Generation X (41 to 56 years old)
- Millennial (26 to 40 years old)
- Generation Z (25 years old and younger)



# Traditionalists

Believe in lifetime employment

Value hierarchies & professional respect

Working hard will produce rewards

Core values:

- Law and order
- Respect for authority
- Duty, honor, dedication

# Baby Boomers

Equality of sexes

Highly educated women

Raised in an era of optimism, opportunity,  
and progress

Core values:

- Optimism
- Personal growth
- Health and wellness
- involvement

# Generation X

## Grew up in era of

- Two career families
- Rising divorce rates
- Downsizing
- Experienced the rapid development of tech and communication
- More for Less

## Core Values

- Focused on thinking globally
- Balance
- Tech literacy
- Having fun, travel
- Independence
- Informality



# Millennials



Tech savvy



Masters of mobile phones, internet and video games



Raised on heavy praise and self-esteem boosting curriculum



Employ multitasking and collaborate in decisions as much as possible

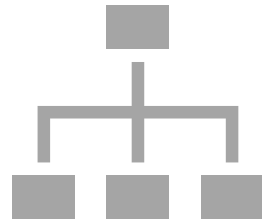


Values optimism, civic duty, confidence

# Gen Z



Loyal to the experience and are invested in their careers, which they see as a way to grow.



Respect the process and follow direction but want to be engaged. Management shouldn't have a one-way conversation with them.



Agile and seek balanced rules, seeing change as simply reality.

What do all  
generations  
have in  
common?

Everyone wants to succeed

Everyone wants to feel valued

Everyone wants to be respected

Everyone needs clear communication

# What are some Challenges?

“The impact of a variety of multigenerational groups working together is that misunderstandings regarding values, work ethics, communication styles, and approaches to problem solving may be common and lead to conflict, disharmony, or an unproductive workforce.”

*- Multigenerational workforce issues and their implications for leadership in nursing by David Stanley*



# Generational Stereotypes

- Traditionalists are old fashioned
- Baby Boomers are workaholics
- Generational X are slackers
- Millenials are demanding, disloyal, and impatient
- Gen Z are hopelessly screen dependent



# What needs to be Changed?



CULTURE



MOTIVATION



COMMUNICATION



MENTORING

# Mentoring

---

**Model**

---

**Encourage**

---

**Nurture capabilities**

---

**Teach**

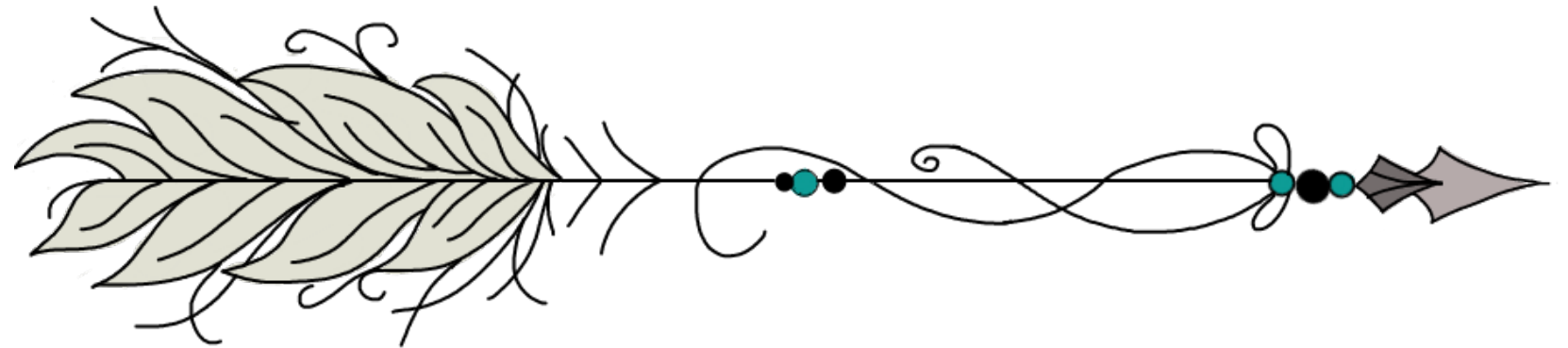
---

**Organizational**

---

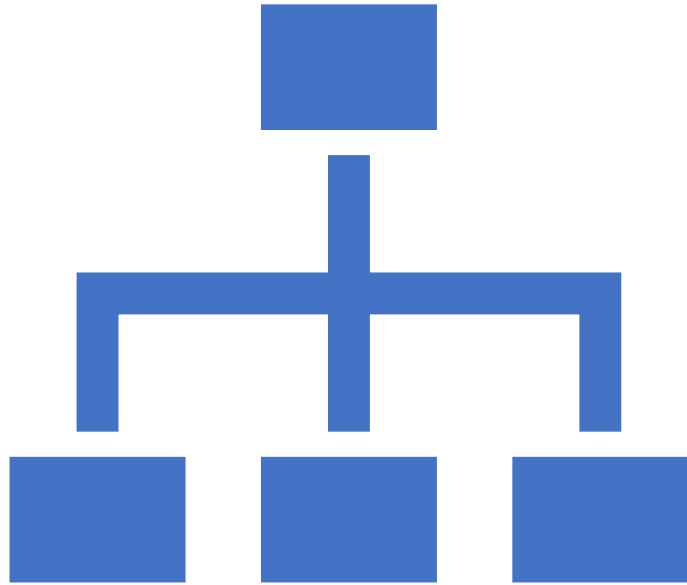
**Reality**

# Artfully Moving Forward





What is the number one complaint across organizations as to why they can't get their work done?



“We don't have enough resources.”

# DTSC Case Study

## The Situation

- DTSC's responsibilities of protecting the environment and public health have significantly grown since 1991
- Staffing levels have remained stagnant
- Ability to carry out its mission has been compromised
  - Unfunded additional statutory and regulatory authorities
  - Fiscal constraints
  - Static fee structure

# The Situation (continued)

- This hampered DTSC's capacity to provide a level of public health environmental protection
- DTSC had struggled to deliver services aligned with its statutory authorities
- This resulted in an erosion of stakeholder trust in its ability to fully meet its mission
- As a result, DTSC made the decision to conduct a workload analyses

# Workload Analyses:

What was its  
purpose?

What did it  
accomplish?

- Provided information on:
  - Current resources
  - How resources were being used
  - Activities not funded to perform
  - Resource gaps
- Began the discussion around the programs and activities DTSC should be delivering

# What factors were considered?

Mission, Goals,  
Mandated  
Authorities

What was  
getting done

What was not  
getting done

Staffing Levels

Gaps in service

Developing a  
compelling  
story



# What Programs were Analyzed?

Three core programs and selected support programs

- Hazardous Waste Management Program
- Site Mitigation and Restoration Program
- Safer Consumer Products



# DTSC Resource Gaps

<b>Positions Gap</b>	<b>Core</b>	<b>315</b>
	Support	196
<b>Total</b>		<b>511</b>
<b>Percent increase over 2020 Budget Act</b>		<b>48.8%</b>
<b>Cost of Gap</b>	Core	\$56.8 million
	Support	\$28.2 million <sup>3</sup>
	IT*	\$20.9 million
	Contracts	\$83 million
<b>Total</b>		<b>\$188.9 million</b>
<b>Percent increase over 2020 Budget Act</b>		<b>54.8%</b>
<sup>3</sup> The Support amount of \$28.2 million also includes information technology resources to support the core program service levels identified in this Executive Summary. * Information technology		

# Site Mitigation and Restoration Program

Program Area	Activities	Additional Positions Gap	Cost of Additional Resources
Cleanup Scenario 1	50 site discoveries and 63 site initiation actions	55	\$9.9 million
Cleanup Scenario 2	150 site discoveries and 130 site initiation actions	114	\$20.5 million
Cleanup Scenario 3	300 site discoveries and 255 site initiation actions	195	\$35.1 million

Additional Costs	Contracts	Support Positions Resources
Cleanup Scenario 1	\$28.3 million	\$5.3 million (39 support positions)
Cleanup Scenario 2	\$49 million	\$11.1 million (77 positions)
Cleanup Scenario 3	\$83 million	\$20.1 million (140 positions)

	Program, Support Positions, and Contracts	% Increase in Program Budget	% Increase in DTSC Budget
Cleanup Scenario 1	\$43.5 million	30.5%	13%
Cleanup Scenario 2	\$80.6 million	56.6%	24%
Cleanup Scenario 3	\$138.2 million	96.9%	42%



# Findings

## “The Story”

- DTSC’s mission is to protect California’s people, communities, and environment from toxic substances, to enhance economic vitality by restoring contaminated land, and to compel manufacturers to make safer consumer products
- The scale of work that DTSC needs to protect Californians is massive
- DTSC was operating at 1991 staffing levels and expected to deliver on its mission
- Gap of 511 positions, a 48% increase over 2020 budget
- Gap of \$188.9 million, a 54.8% increase over 2020 budget
- DTSC’s work is vital to achieving the (Newsom) Administration’s vision of California for All, where every person can prosper, live in a healthy environment, and enjoy California’s beautiful diverse landscape



## Governor Newsom Highlights DTSC Reform Legislation to Protect the Health of Vulnerable Communities

Published: Jul 14, 2021

BELL GARDENS – Governor Gavin Newsom today visited Bell Gardens, a pollution hotspot in Los Angeles County, to highlight comprehensive toxics governance, policy and fee reform legislation that paves the way to safer, healthier communities through increased transparency and accountability at the Department of Toxic Substances Control (DTSC). The legislation also ensures the funds required to investigate and start the process of environmental remediation for the state’s contaminated sites.

“In the California Comeback, no one is being left behind. We’re making transformative investments to ensure that our overburdened communities, which were also disproportionately impacted by the pandemic, will finally have an equitable opportunity to thrive in a healthy environment,” said Governor Newsom, who today met with impacted members of the community. “This comprehensive legislation gives DTSC the tools and sustainable funding it needs to make our communities cleaner and safer and boosts transparency and accountability to the public. I want to thank Assemblymember Cristina Garcia for championing this effort as well as the dedication of Speaker Rendon and Pro Tem Atkins, Assemblymembers Quirk, Santiago and Carrillo, Senators Durazo, Gonzalez and Wieckowski and countless stakeholders for their leadership and collaboration to bring this reform to fruition.”

Signed as part of the state budget Monday, SB 158 restructures and increases fees related to the handling of hazardous substances and hazardous waste, which is expected to **add approximately \$104 million annually in revenue for DTSC beginning in 2022-23**. The additional funding will enable DTSC to deliver on its statutory responsibilities and workload, which has increased significantly over the decades.

Increasing transparency and oversight of the Department and its work, the legislation creates a new Board of Environmental Safety within DTSC, and establishes an Ombudsperson to receive complaints and suggestions, offer assistance to the public and make recommendations to the Department.

“These are generational investments towards creating a toxic free future in California,” said CalEPA Secretary Jared Blumenfeld. “This reform will empower the Department of Toxic Substances Control with the funds needed to develop a comprehensive plan for managing and enforcing against all hazardous waste generated in the state, while also seeking out

# The Power of a Story

# Every CUPA has a Unique Story!

- Importance of understanding your data and being able to tell your story
  - Organization
  - Personal
- Case Studies
  - Imperial County CUPA
  - City of Glendale Fire Department

# Imperial County CUPA

---

Case Study

# Imperial County

---



- Imperial County borders the country of Mexico to the south
- Borders the state of Arizona to the east
- Least populous county in Southern California with 179,851 residents in 2021
- Economy is strongly based on agriculture
- Top employers: Government, Agriculture, Health Care and Social Assistance

# Imperial County Profile

- Environmentally burdened community
- High poverty rate and high percentage of linguistically isolated residents
  - Contributes to increased vulnerability of residents to harmful effects of pollution
- Currently designated by USEPA as not being in attainment with national air quality standards
- Sources of air pollution originate from:
  - Agricultural land uses
  - Farm operations
  - Vehicle air emissions including emissions from the Mexican side of the border

# Imperial County Profile

- 12,000 children are diagnosed with asthma
- CalEPA's CalEnviroScreen indicates that much of the county falls within the top 80<sup>th</sup> and 95<sup>th</sup> percentile of areas in California for:
  - Pesticide applications
  - Residents living in close proximity to solid waste facilities
  - ***Proximity to businesses that generate hazardous waste***



# Imperial County CUPA

## **Mission Statement**

The Imperial CUPAs mission is to protect human health and the environment in Imperial County from the harmful effects of hazardous materials and hazardous waste by employing coordinated efforts of Unified Program inspections and enforcement of environmental laws.

## **Vision**

To provide a cleaner and healthier environment in Imperial County by; ensuring fair and consistent application of Unified Program requirements, educating the regulated community and public, and upholding the principals of Environmental Justice.

# Hazardous Waste Authority

- HSC, Division 12, Part 2, Chapter 1 §§ 13143-13143.9
- HSC, Division 20, Chapter 6.5 §§ 25100-25258.2
- HSC, Division 20, Chapter 6.67 §§ 25270-25270.13
- HSC, Division 20, Chapter 6.7 §§ 25280-25299.8
- HSC, Division 20, Chapter 6.95 §§ 25500-25519 and §§ 25531-25543.3
- HSC, Division 20, Chapter 6.11 §§ 25404-25404.9
- California Code of Regulations (CCR) Title 27, Division 1, Subdivision 4, Chapter 1 Unified Hazardous Waste and Hazardous Materials Management Regulatory Program

# Imperial County CUPA

- Approximately 7.5 available PY
- CUPA Implementation program support activities, tracking, data management, forecasting, reporting, enforcement targeting discussions. (4.59 PY)
- CUPA Inspections – routine planned inspections of USTs, haz waste generator inspections, sampling, evidence collection, summary of violations (2.60 PY)

# 2018-2021 Inspection numbers

## Underground Storage Tank Program

- Averages 94% inspections annually

## California Accidental Release Prevention Program

- Averages 87% facilities inspected over a 3-year period

## Hazardous Materials Release Response Plan (HMRRP)

## Hazardous Waste Generator

- 54% of facilities did not get inspected in a 3-year time period

Overall, inspections are decreasing every year.

# The Story

---

Imperial Valley is an environmentally burdened community impacted by pollution from two countries

---

Majority of residents are in direct proximity to businesses that generate hazardous waste

---

Imperial County CUPA is tasked with a huge mission protect human health and the environment in Imperial County from the harmful effects of hazardous materials and hazardous waste

---

Only 2.6 PY are allocated to inspections

---

As a result, over half of HMRRP and Hazardous Waste Generator inspections were not conducted

---

Overall, inspections are decreasing every year bringing the CUPA further away from meeting its mission and protecting the residents of Imperial Valley, a vulnerable community

# City of Glendale Fire Department CUPA

---

## Case Study



# City of Glendale

---

4<sup>th</sup> Largest city in Los Angeles County

---

Walt Disney Studios and DreamWorks Animation

---

Top employers: City government, Disney, military  
defense manufacturer

---

Glendale water & power, water treatment plant, landfill

---

Have added 12,000 residential units  
(condos/apartments) since 2007

---

Housing expenses are 193% higher than the national  
average

---



# City of Glendale Fire Department

## Fire Prevention Bureau

### Mission

The goal of the Fire Prevention Bureau is to safeguard the community from fire and environmental hazards through programs providing for adherence to fire regulations, public education, and hazard mitigation. *Conducting regular fire, life safety and environmental inspections.*



# Inspection Authorities

---

- CUPA
- Industrial Waste Pretreatment Program
- Household Hazardous Waste Collection Program
- Fire Prevention Bureau



# Staffing Levels

- 1996 – 2 supervisors, 6 inspectors totaling 8 FTE
- The original CUPA application indicated 8 personnel will be allocated full time for the CUPA program
- 2022 – 7.05 FTE budgeted for Hazardous Material Section
  - 3.0 FTE are currently allocated for one CUPA program supervisor and six staff
- Inspection and supervisory personnel has significantly decreased by approximately 63%

# 2019 - 2022 Inspection numbers

## Hazardous Materials Release Response Plan

- Requirement for inspections every three years met

## CalARP

- 100% of facilities are inspected in a 3-year period

## Underground Storage Tanks

- 100% of facilities are inspected annually on average

## Hazardous Waste Generator

- 96% of facilities are inspected in a 3-year period

## 2021 CalEPA Audit – Not consistently ensuring RTC

- Over 90% RTC across all elements in 2022

# Digging a Little Deeper into the Data

---

Can 3.0 FTE meet the inspection requirement for 636 facilities?

---

Did the CUPA meet the numbers because resources were pulled from other programs (Industrial Waste, Fire Prevention, etc.)

---

Are other programs suffering because the CUPA is unofficially borrowing staff to meet mandated responsibilities?

---

Did the CUPA shift staff over to make the CUPA program work and now everything else fell off?

---

3.0 FTE as being sufficient is the story that will be told unless the CUPA takes control of the narrative

# The Story

- City of Glendale is a thriving cosmopolitan city and home to a number of corporate headquarters and tech giants
- The City's Strategic Plan cites a major goal of enhancing awareness of Glendale on a local, national, and global scale
  - Support business attraction & a resilient economy
  - Grow tech and innovation industry
  - Grow the arts, culture & entertainment sector
- Glendale CUPA has consistently met inspection requirements
- City of Glendale Fire Department CUPA has singlehandedly created a level playing field for businesses to thrive in Glendale

# The Story

- Currently 3.0 FTE is allocated across 7 staff.
- Industrial Waste Pretreatment Program and the Fire Prevention Bureau is suffering as a result.
- Staff may be experiencing burnout and workload is not sustainable.
- CUPA's mission is to safeguard the community...conduct regular fire, life safety and environmental inspections will become difficult to achieve and the level playing field may be lost should the economy continue to thrive, and the number of businesses grow as expected in the City's Strategic Plan.

An arrow can  
only be shot by  
pulling it  
backwards.



How do we control the narrative around our data?

We create our story and then take it to the next level...



# Key Performance Indicators

KPI stands for key performance indicator, a quantifiable measure of performance over time for a specific objective. KPIs provide targets for teams to shoot for, milestones to gauge progress, and insights that help people across the organization make better decisions.

# Key Performance Indicators Examples

- % of inspections by element completed within mandated timeframe
- Time to complete AEO (target timeframe)
- Average time to perform initial facility inspection
- Average time to review/respond to CERS submittals

# Dashboarding

- Dashboarding is a fundamental means of displaying key business information to measure progress against goals, for any aspect of any organization or business, all in a highly visual manner
- Tool for tracking how well you're progressing toward your mission and goals

## Pretreatment Dashboard

85% Reporting Compliance | 91% Discharge Limit Compliance | 52/206 Authority Monitoring Sampling Complete | 10 User Reported in SNC

**Non-Compliance Actions**

**Inspections**

**Action Required**

Facility Name: Kilrush Metal

Action: Violation Notice

Assigned to: Mike Dunn

**Analytics**  
Sep 1 - Sep 31, 2021

Violations = 6  
Reporting Events = 11  
Inspections completed = 6

**Permitted Dischargers**

- Compliant
- Action Required
- Non-Compliant

## WORKPLACE INSPECTION DASHBOARD

**Site A** 63%  
Target: 900 Actual: 571

**Site B** 58%  
Target: 900 Actual: 526

**Site C** 58%  
Target: 900 Actual: 521

**Site Inspection Comparison**

Month	Site A	Site B	Site C
January	83	92	73
February	86	56	87
March	86	57	41
April	53	91	70
May	51	50	80
June	62	45	53
July	90	62	91

**Site Inspection Trend**

## Inspections Dashboard

Ancient Oak Preserve (10004) | Last 90 days (until now)

**Time Period**

**Inspections**

6 total

- Incomplete
- CA Required
- Pass

**Stats**

6 Inspections

4 Checklists | 24 Notes | 1 Pictures

1 Inspectors | 1 Projects | 3 Resp. Parties

**Project**

Ancient Oak Preserve 6

**Phase**

101 3 | 102 3

**Location**

Location 1 3 | Location 1 1 | Location 2 1 | Location 2 1

**Responsible Party**

Canyon Creek Cabinetry 3 | A1 Painter 2 | AAA Contractors 1

**Inspector**

Caldeira, Ed., 3731 6

**Checklist**

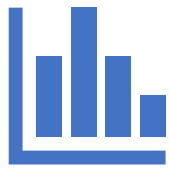
Cabinet - Cabinet Checklist 3 | General - Sample Checklist 1 | General - Dynamic Matrix (Custom Headers) Checklist 1 | Concrete - Form Reinforce Slab 1

**Inspector Type**

Inspector (Gen) 6

**Status**

# Why Use Dashboarding?



Makes Data  
Actionable



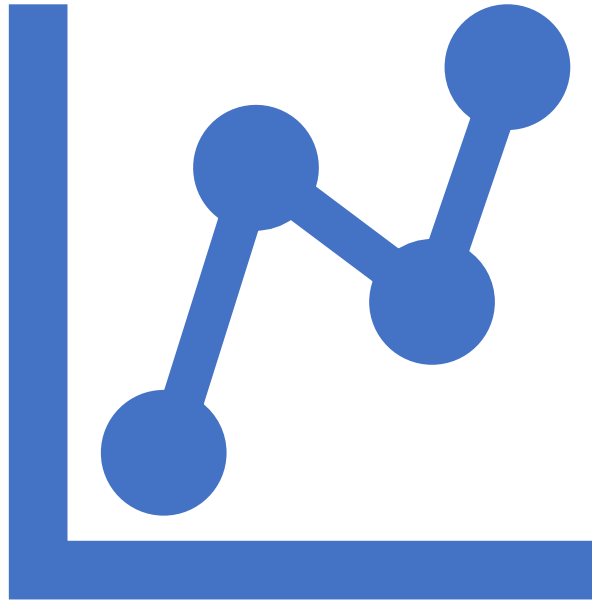
Saves Time in  
Understanding



Drives Clarity



Creates Agility



# Control the narrative of your data

- Create metrics around data you already have
- It does not have to be complicated
- “Meaningful” Data
- Analyze data and understand how to tell the story around it
- It’s okay to show you are failing because that shows you need more resources
  - DTSC demonstrated they were failing
- It will require an investment of time to gather the information but it’s worth it in the end

# Things to Consider

You must show a gap

More with Less?

Tell your stories or your stories will be told for you

Big picture for CUPA but these stories can be told at multiple levels

A tool for supervisors or manager to advocate for their staff

THANK YOU!

JOHN ELKINS

John.Elkins@calepa.ca.gov

CHRISTIE BAUTISTA

cbautista@huntington.org



# References

- Bautista, Christie Joyce G. "Policy Actors, Influence, and the Environment: A 30-Year Journey of California's used Oil Recycling Program." Order No. 13864749 University of La Verne, 2019. United States -- California: *ProQuest*. Web. 24 Feb.2023.
- Dashboarding - 8 clear steps to begin dashboarding*. Graphable. (2023, February 3). Retrieved March 16, 2023, from <https://www.graphable.ai/blog/business-intelligence-dashboarding/>
- Department of Toxic Substances Control | DTSC*. Department of Toxic Substances Control. (2021). Retrieved March 16, 2023, from [https://dtsc.ca.gov/wp-content/uploads/sites/31/2021/01/WkFor\\_AnalysisJanuary15.pdf](https://dtsc.ca.gov/wp-content/uploads/sites/31/2021/01/WkFor_AnalysisJanuary15.pdf)
- Fire Prevention*. City of Glendale Fire Department. (n.d.). Retrieved March 16, 2023, from <https://www.glendaleca.gov/government/departments/fire-department/fire-prevention>
- Imperial County Initiative Report - Calepa.ca.gov*. California Environmental Protection Agency. (n.d.). Retrieved March 16, 2023, [https://calepa.ca.gov/wpcontent/uploads/sites/6/2019/10/Imperial\\_County\\_EJ\\_Initiative.a.sw\\_.hp\\_.pdf?emrc=013710](https://calepa.ca.gov/wpcontent/uploads/sites/6/2019/10/Imperial_County_EJ_Initiative.a.sw_.hp_.pdf?emrc=013710)
- Smith, A. (2021, September 12). *Generational mindsets affect the workforce*. SHRM. Retrieved February 23, 2023, from <https://www.shrm.org/resourcesandtools/hr-topics/global-hr/pages/generational-mindsets-affect-workforce.aspx>
- Stanley D. Multigenerational workforce issues and their implications for leadership in nursing. *J Nurs Manag*. 2010 Oct;18(7):846-52. doi: 10.1111/j.1365-2834.2010.01158.x. PMID: 20946220.
- What is a key performance indicator (KPI)? guide & examples - qlik*. Qlik. (n.d.). Retrieved March 16, 2023, from <https://www.qlik.com/us/kpi>