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Collect It or Lose It: Harnessing Elusive Ephemeral Data

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Presentation Outline

- What are ephemeral data?
- Why are they important?
- Why are they elusive?
- How can they be collected quickly?
- Example Ephemeral Data Collection Plan (EDCP)
- If all else fails: contingencies?
- Case Study: Humboldt Bay & Chevron's Light Products Terminal Ambient Data Collection Effort

What are Ephemeral Data?

 During spills there is an opportunity to collect critical, time sensitive environmental information that, if not collected, will be forever lost. Such data are referred to as "ephemeral data"



Examples of Ephemeral Data

- Number of oiled & dead birds, marine mammals, and other wildlife
- Degree and extent of shoreline impacts
- Human-use recreational impacts
- Oil toxicity- especially acute toxicity
- Chemistry



Why are they important?

- Evidence in spill investigation
- Critical for subsequent assessment of injuries to natural resources during the Natural Resources Damage Assessment (NRDA)



NRDA

- NRDA examines and quantifies injuries from spills for the purpose of restoring the injured resources and compensating the public for lost use of those resources
- Damages based upon amount of *restoration* needed to "make the environment and public whole" (OPA 90 Rule, CERCLA)



NRDA Injury Questions

- What **type** of natural resource or human recreational use was injured?
- What was the **extent** of the injury?
- What was the **degree** (severity) of the injury?
- How long will it take to recover?



Why Are Ephemeral Data Elusive?

- Lots to do very rapidly during a spill
- Organizing takes time



How Can They Be Collected Quickly?



Answer: Have a Plan

• Too late to plan ephemeral data collection during the spill.





Chevron Products Company, Marketing Division, Light Products Unit

Chevron Energy Technology Company

Department of Fish and Game, Office of Spill Prevention and Response Scientific Branch, Resource Assessment Program, NRDA Unit

EDCP for Chevron's Light Products Terminal - Humboldt Bay

- **Purpose**: expedite and detail procedures for collection and chemical analysis of ephemeral source oil, surface water, sediment, and tissue samples
- Goals:
 - confirm the source of the spilled oil(s);
 - document petroleum hydrocarbon concentrations (i.e., BTEX, PAHs) in water, sediment, and selected marine organisms just before and following oiling

EDCP for Chevron's Terminal -Humboldt Bay (Continued)

- EDCP includes:
 - Safety Procedures
 - Notification Procedures & Command Structure
 - Coordination with Unified Command for Spill Response
 - Sampling Methods
 - Media (e.g., water, sediment, and biological tissue)
 - Sampling Locations (w/ GPS, photographs, driving directions, and beach access points)
 - Chemical Analysis Objectives
 - Key Contacts

If All Else Fails: Contingency for Collecting Chemistry Data

- Time of day, currents, tides, mobilization time, staff availability - All may limit collecting data in unoiled areas immediately (hours) after a spill
- Solution: additional 'ambient' data collection component to the EDCP
 - Purpose: collect surface water, sediment, and tissue samples on a biennial basis in Humboldt Bay; analyze for petroleum hydrocarbons
 - Goals:
 - document petroleum hydrocarbon concentrations in water, sediment, and selected marine organisms before oiling;
 - understand chemical 'Baseline' conditions in Humboldt Bay

Case Study: Humboldt Bay & Chevron's Light Products Terminal

Ambient Data Collection Effort - Nov. 2011

- Study Area & Sampling Locations
- Methods/Media Collected
- Results

Ambient Sampling Study Area & Sampling Locations







Methods/Media Collected Nearshore Surface Water





Methods/Media Collected Sediment Cores

BEACH



Methods/Media Collected Sediment Cores (Cont.)







Methods/Media Collected Tissue

Mussels





Oysters





Results



Polycyclic Aromatic Hydrocarbons (PAHs)

WPCL Lab Number			L-873-11-01		L-873-11-01-Dup		
Sample Identification	Method Blank		HMG8AI-ED-1-111711-WT-1		HMG8AI-ED-1-111711-WT-1		
Date Collected			11/17/2011		11/17/2011		
Time Collected			7:46		7:45		
Date Received			11/18/2011		11/18/2011		
Date Extracted	11/22/2011		11/22/2011		11/22/2011		
Date Analyzed	11/29/2011		11/29/2011		11/28/2011		
Volume Extracted (mL)	1000		600		600		
Reporting Limit ppb (ng/mL)	0.00500		0.01000		0.01000		
	ng/mL(ppb)	DQ	ng/mL(ppb)	DQ	ng/mL(ppb)	DQ	R.P.D.
Naphthalene	<rl< th=""><th>sc</th><th><rl< th=""><th>SC</th><th><rl< th=""><th>sc</th><th>NA</th></rl<></th></rl<></th></rl<>	sc	<rl< th=""><th>SC</th><th><rl< th=""><th>sc</th><th>NA</th></rl<></th></rl<>	SC	<rl< th=""><th>sc</th><th>NA</th></rl<>	sc	NA
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Naphthalanas, C2 -	ARL ARL	*		24		34	NA
Naphthalanas, C4	ARI ARI	-	<ri .<="" th=""><th></th><th>44</th><th></th><th>NA</th></ri>		44		NA
Biobenvi	<ri.< th=""><th>-</th><th><rl< th=""><th>-</th><th>481</th><th></th><th>NA</th></rl<></th></ri.<>	-	<rl< th=""><th>-</th><th>481</th><th></th><th>NA</th></rl<>	-	481		NA
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Dimethylphenanthrene, 3,8-	<rl< th=""><th>sc</th><th><rl< th=""><th>SC</th><th><rl< th=""><th>sc</th><th>NA</th></rl<></th></rl<></th></rl<>	sc	<rl< th=""><th>SC</th><th><rl< th=""><th>sc</th><th>NA</th></rl<></th></rl<>	SC	<rl< th=""><th>sc</th><th>NA</th></rl<>	sc	NA
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Putor and Anna Pytonica, CT -	PI	~	CRL CRL	2	ALC: NO	20	NA
Renzfalanthranene	RI	-	<ri .<="" th=""><th>-</th><th>- ARI</th><th>-</th><th>NA</th></ri>	-	- ARI	-	NA
Chrussee	RI	-	< PI	-	191	-	NA
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Chrysenes, C3 -	<rl< th=""><th>50</th><th><rl< th=""><th>50</th><th><rl< th=""><th>50</th><th>NA</th></rl<></th></rl<></th></rl<>	50	<rl< th=""><th>50</th><th><rl< th=""><th>50</th><th>NA</th></rl<></th></rl<>	50	<rl< th=""><th>50</th><th>NA</th></rl<>	50	NA
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Benzo(a)pyrene	<rl< th=""><th>50</th><th><rl< th=""><th>SC</th><th><rl< th=""><th>sc</th><th>NA</th></rl<></th></rl<></th></rl<>	50	<rl< th=""><th>SC</th><th><rl< th=""><th>sc</th><th>NA</th></rl<></th></rl<>	SC	<rl< th=""><th>sc</th><th>NA</th></rl<>	sc	NA
Perylene	<rl< th=""><th>50</th><th><rl< th=""><th>SC</th><th><rl< th=""><th>sc</th><th>NA</th></rl<></th></rl<></th></rl<>	50	<rl< th=""><th>SC</th><th><rl< th=""><th>sc</th><th>NA</th></rl<></th></rl<>	SC	<rl< th=""><th>sc</th><th>NA</th></rl<>	sc	NA
Indeno(1,2,3-o,d)pyrene	<rl< th=""><th>sc</th><th><rl< th=""><th>SC</th><th><rl< th=""><th>sc</th><th>NA</th></rl<></th></rl<></th></rl<>	sc	<rl< th=""><th>SC</th><th><rl< th=""><th>sc</th><th>NA</th></rl<></th></rl<>	SC	<rl< th=""><th>sc</th><th>NA</th></rl<>	sc	NA
Dibenz(a,h)anthraoene	<rl< th=""><th>sc</th><th><rl< th=""><th>sc</th><th><rl< th=""><th>SC</th><th>NA</th></rl<></th></rl<></th></rl<>	sc	<rl< th=""><th>sc</th><th><rl< th=""><th>SC</th><th>NA</th></rl<></th></rl<>	sc	<rl< th=""><th>SC</th><th>NA</th></rl<>	SC	NA
Benzo(g,h,l)perylene	<rl< th=""><th>sc</th><th><rl< th=""><th>sc</th><th><rl< th=""><th>sc</th><th>NA</th></rl<></th></rl<></th></rl<>	sc	<rl< th=""><th>sc</th><th><rl< th=""><th>sc</th><th>NA</th></rl<></th></rl<>	sc	<rl< th=""><th>sc</th><th>NA</th></rl<>	sc	NA
Surrogate Percent Recovery	Percent Recovery		Percent Recovery		Percent Recovery		
Naphthalene di	81.5		109		119		
BiphenyLd10	82.8		111		113		
Acenaphthene-d10	88.0		89.1		88.0		
Phenanthrene-d10	83.1		110		111		
Pyrene-d10	101		126		124		
Benz[a]anthracene-d12	107		130		129		
Perylene-d12	87.1		103		101		
Benzo[ghl]perylene-d12	88.8		80.8		90.6		
Average	84.0		110		110		

Surface Water Total PAHs



Sediment Cores Total PAHs



Humboldt Bay Sampling Location

Tissue Total PAHs



more northern bay sites

More Plans on the Way...

- Chevron El Segundo Refinery
 - Draft EDCP in preparation
 - Ambient data collected April 2012
- Chevron San Diego Marine Terminal Facility
 - EDCP planning during Summer 2012
 - Ambient data collected August 2012
- Chevron Richmond Refinery
 - Site visit to proposed data collection areas conducted April 2012

Conclusions & Lessons Learned

- Without a plan, data may be lost that directly measures and confirms the magnitude of spill impacts
- Be proactive. Trustee Agencies and Responsible Parties can effectively work together and develop plans for assessing resource injuries before spills happen.

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