Project Planning Considerations For Emerging Contaminants

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NAVSEA LQAO

Report Documentation Page

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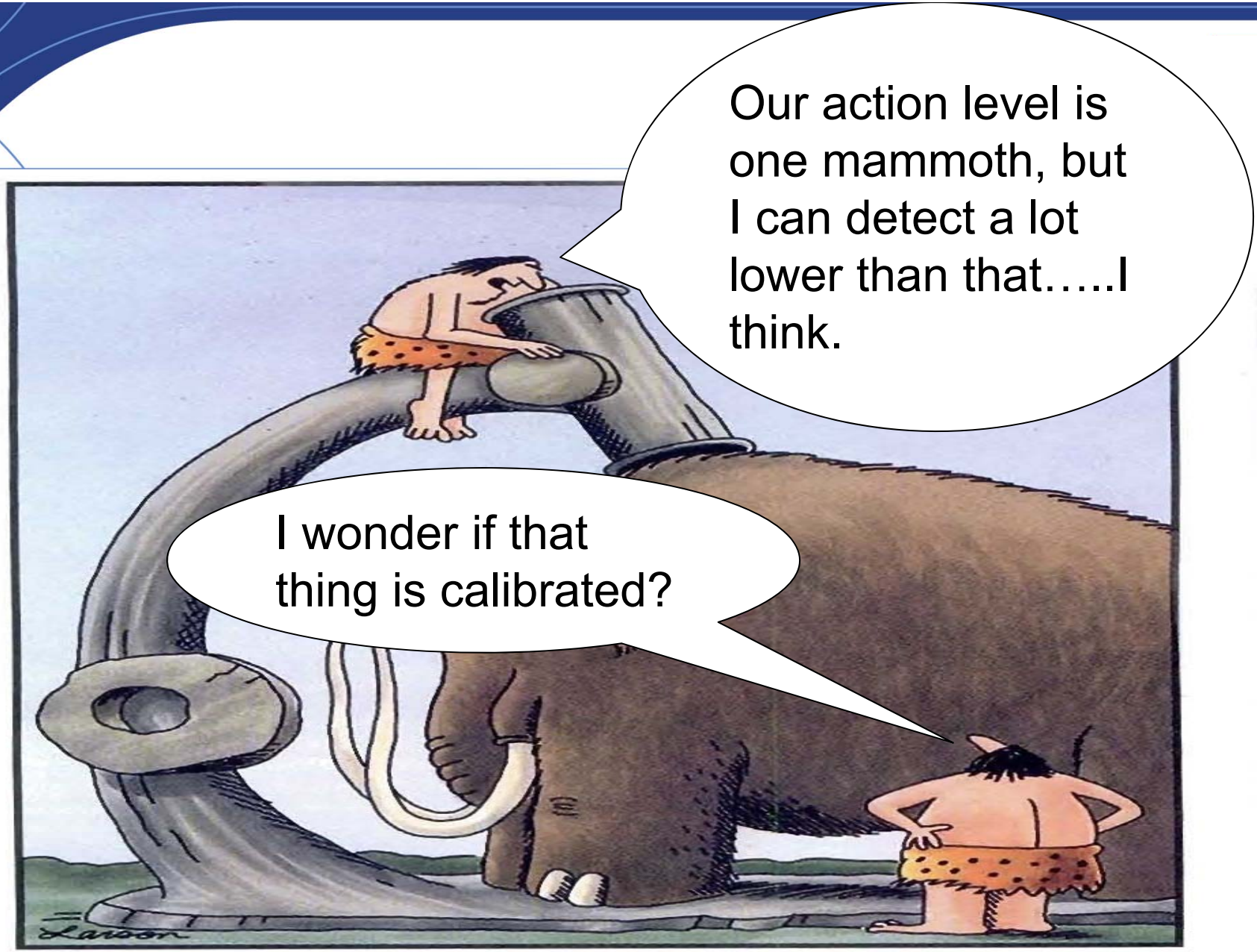
Overview

- Primary Problems
- Current ELAP status on EC's
- Early Planning Considerations
- Recommendations for Project Managers & Labs

Major Hurdles

- No methods exist for the parameter(s) of interest
- No IRIS values exist/interim values
- Lower risk-based values are beyond quantification capabilities of the current method(s)
- No ELAP accredited labs exist for the parameter(s) of interest
- No standards exist for the parameters(s) of interest



Early Sensitivity Issues

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Detection Limits

"The analytical data objective for baseline risk assessments is that the uncertainty is known and acceptable , not that the uncertainty be reduced to a particular level."

"Whenever possible, methods should not be used if the detection limits are above the relevant concentrations of concern. The MDL should be no greater than 20% of the concentration of concern."

"To protect human health, place a higher priority on preventing false negatives in sampling and analysis than on preventing false positives."

Guidance for Data Usability in Risk Assessment, EPA Office of Emergency and Remedial Response, April 1992.

Detection Limits, Cont.

NCP 40 CFR 300.430(e)(2)(i): "Remediation goals shall be developed considering…technical limitations such as detection/quantification limits…"

RAGs, Part A, section 5.3.4 "….SQLs are the most appropriate limits to consider when evaluating non-detected chemicals"

"……reported concentration (i.e., data that are not "tentative," "uncertain," or "qualitative") are appropriate for use in the quantitative risk assessment.

Current ELAP Status for $C6^{+6}$

MATRIX	METHOD	DoD ELAP Labs	Screening Level	LOD	LOQ
Soil	SM 3500CR C	0	0.29 mg/kg	0.05 - 0.16	0.1 - 2.0
Soil	SW 846 7199	1	0.29 mg/kg	0.0596	0.60
Soil	SW 846 7195	1	0.29 mg/kg	140	1300
Soil	SW 846 7196	45	0.29 mg/kg	0.16 - 2.392	0.2 - 10.0

Current ELAP Status for $C6^{+6}$, Cont.-

MATRIX	METHOD	DoD ELAP Labs	Screening Level	LOD	LOQ
Water	SM 3500CR C	0	0.031 ug/L	0.015 - 5.0	5.0 - 10.0
Water	SW 846 7199	1	0.031 ug/L	0.18	0.50
Water	SW 846 7195	1	0.031 ug/L	6.6	25
Water	SW 846 7196	50	0.031 ug/L	0.01 - 25	0.02 - 60.0
Air	SW 846 7196	0	0.000011 ug/m^3		0.10 µg/filter
Soil, Water, Tissue	SW 846 6800 (SIDMS)	1			0.5 µg/L (QL), 0.0125 mg/kg (QL)

Current ELAP Status for TCE

MATRIX	METHOD	DoD ELAP Labs	Screening Level	LOD	LOQ
Soil	SW 846 8260	65	0.91 mg/kg	0.000187 - 1	0.001 - 5
Soil	EPA 624	0	0.91 mg/kg	0.000187 - 1	0.001 - 5
Water	SW 846 8260	65	0.44 µg/L	0.1 - 2.5	0.5 - 5
Water	EPA 624	24	0.44 µg/L	0.1 - 2.5	0.5 - 5
Water	SW 846 8260SIM	2	0.44 µg/L	0.025	0.05
Water	EPA 524.2	11	0.44 µg/L	0.25	0.5
Air	EPA TO-15	21	0.43 µg/m³	0.11 - 2.69	0.21 - 2.7

Current ELAP Status for 1,4-Dioxane

MATRIX	METHOD	DoD ELAP Labs	Screening Level	LOD	LOQ
Soil	SW 846 8270	16	4.9 mg/kg	0.0234 - 0.33	0.0667 - 0.33
Soil	EPA 625	2	4.9 mg/kg	0.0234 - 0.33	0.0667 - 0.33
Soil	SW 846 8270SIM	2	4.9 mg/kg	0.01 - 0.05	0.02 - 0.1
Soil	SW 846 8260	35	4.9 mg/kg	0.025 - 0.25	0.05 - 1
Water	SW 846 8270 Modified	1	0.67 µg/L	0.25	1.0
Water	SW 846 8270	16	0.67 µg/L	0.324 - 10	1.0 - 10

ELAP Status for 1,4-Dioxane, cont.-

MATRIX	METHOD	DoD ELAP Labs	Screening Level	LOD	LOQ
Water	EPA 624	6	0.67 µg/L	0.324 - 10	1.0 - 10
Water	SW 846 8270SIM	2	0.67 µg/L	0.4 - 1	1 - 3
Water	SW 846 8260	35	0.67 µg/L	1.5 - 320	3 - 1000
Water	SW 846 8260SIM	4	0.67 µg/L	1	2
Air	EPA TO-15	13	0.49 µg/m³	0.18 - 1.8	0.36 - 7.2
Tissue	SW 846 8270	1		0.1 mg/kg	0.1 mg/kg

Current ELAP Status for B(a)P

MATRIX	Method	DoD ELAP Labs	Screening Level	LOD	LOQ
Soil	SW 846 8270	66	0.015 mg/kg	0.0004 - 0.625	0.005 - 0.66
Soil	EPA 625	0	0.015 mg/kg	0.0004 - 0.625	0.005 - 0.66
Soil	SW 846 8270 SIM	2	0.015 mg/kg	0.001 - 0.02	0.001 - 0.1
Soil	SW 846 8310	19	0.015 mg/kg	0.0001 - 0.0076	0.005 - 0.01
Water	SW 846 8270	65		0.05 - 10 ug/L	0.2 - 20 µg/L
Water	EPA 625	27		0.05 - 10 µg/L	0.2 - 20 µg/L

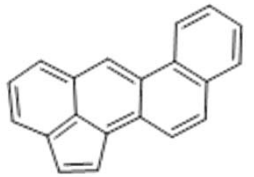
ELAP Status for B(a)P, Cont.-

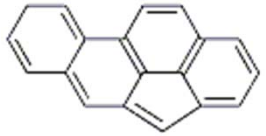
MATRIX	Method	DoD ELAP Labs	Screening Level	LOD	LOQ
Water	SW 846 8270 SIM	4		0.005 - 0.1 µg/L	0.02 - 0.2 µg/L
Water	SW 846 8310	18		0.007 - 0.066 µg/L	0.1 - 0.2 µg/L
Air	SW 846 8270	0		2.0 - 5.0 µg/PUF	2.0 - 5.0 µg/PUF
Air	EPA TO-13	3		2.0 - 5.0 µg/PUF	2.0 - 5.0 µg/PUF
Tissue	SW 846 8260	1		0.0002 mg/kg	0.0005 mg/kg
Tissue	SW 846 8270	2		0.0234 - 0.1 mg/kg	0.1 - 0.4 mg/kg

Additional PAHs from 2010 RPF Assessment

- Anthanthrene
- Benzo[g,h,i]perylene
- Benzo[j]fluoranthene
- Cyclopenta[c,d]pyrene
- Dibenzo[a,e]fluoranthene
- Dibenzo[a,e]pyrene
- Dibenzo[a,h]pyrene
- Dibenzo[a,i]pyrene
- Dibenzo[a,l]pyrene
- Fluoranthene

- Benz[b,c]aceanthrylene
- Benz[e]aceanthrylene
- Benz[j]aceanthrylene
- Benz[l]aceanthrylene
- Cyclopenta[d,e,f]chrysene
- Naphtho[2,3-e]pyrene





- No Calibration Standards with appropriate pedigree currently exist for some.
- SW 846 8270 SIM will likely be sufficient for quantification

Dioxin State Soil Cleanup Levels

State	Unrestricted/ Residential (ppt)	Commercial/ Industrial (ppt)	Target Cancer Risk Level	Terminology for Level
FL	7	30	10E-06	Soil cleanup target level for TCDD TEQ
GM	450	1,800	10E-04	Action level for dioxin TEQ
HI	390	1,600	10E-04	Action level for dioxin TEQ
ME	10	30	10E-06	Generic soil cleanup level for dioxin TEQ
NH	9	300	10E-06	Risk-based soil standard for TCDD
WA	11	--	10E-06	Cleanup level for TCDD

Source: USEPA. 2009. Review of State Soil Cleanup Levels for Dioxin. National Center for Environmental Assessment, Washington, DC. December. Available from http://www.epa.gov/ncea.

Additional Dioxin Levels - California

May 2009 HHRA Note #2

- **http://www.dtsc.ca.gov/assessingrisk/humanrisk2.cfm**
- **PRG based on TCDD TEQ**
  - Residential = 50 ppt residential,
  - Commercial/Industrial = 200-1000 ppt
  - Agricultural = <40 ppt
- **Lesson learned to other states—don't assume there are just residential values…check!**

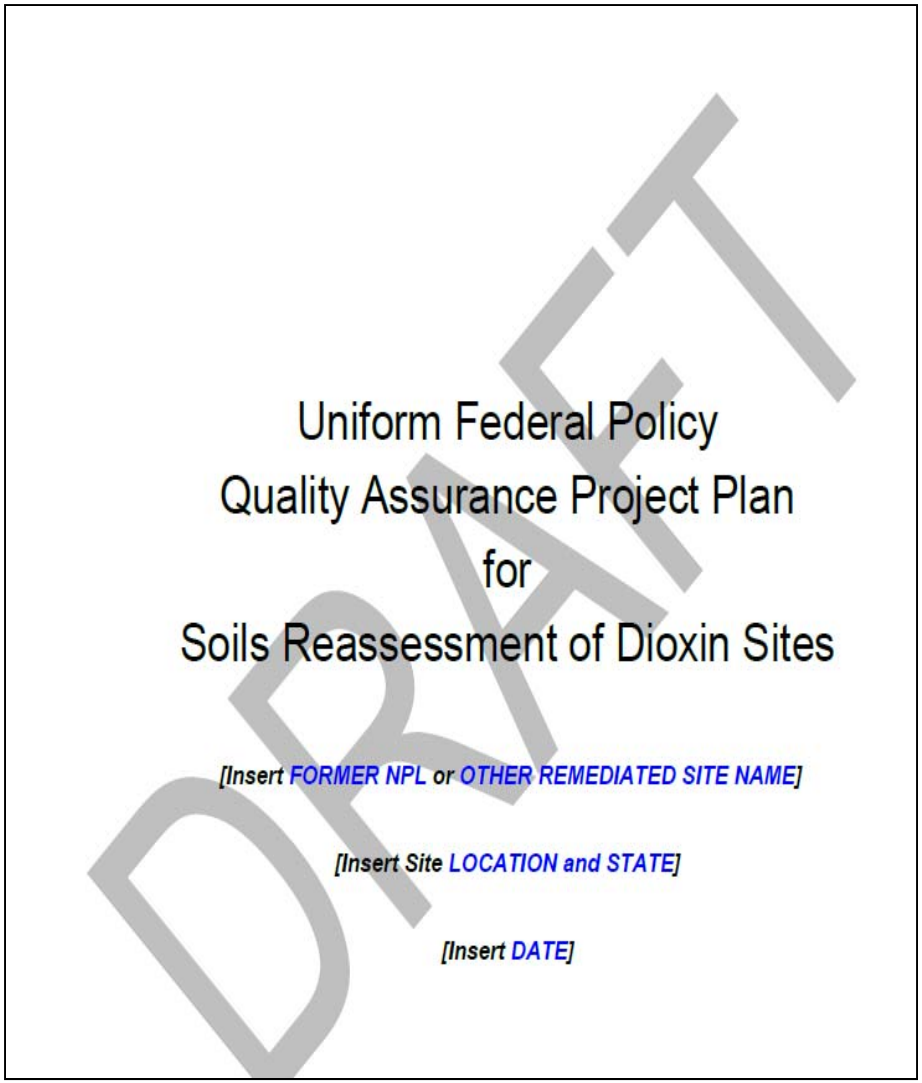
Current ELAP Status for Dioxin

MATRIX	METHOD	DoD ELAP Labs	Screening Level	LOD	LOQ
Soil	SW 846 8280	0	4.5×10^{-7} mg/kg	2.5×10^{-4}	5×10^{-4}
Soil	SW 846 8290	12	4.5×10^{-7} mg/kg	1×10^{-7} – 1×10^{-4}	1×10^{-6} – 1×10^{-3}
Soil	SW 846 1613/ SW 846 8290	8	4.5×10^{-7} mg/kg	3.4×10^{-7}	1×10^{-6}
Water	SW 846 8280	1	5.2×10^{-7} ug/L	2.5×10^{-3}	5×10^{-3}
Water	SW 846 8290	12	5.2×10^{-7} ug/L	2×10^{-6} – 6.67×10^{-6}	1×10^{-5} – 1×10^{-4}

ELAP Status for Dioxin, Cont.-

MATRIX	METHOD	DoD ELAP Labs	Screening Level	LOD	LOQ
Water	SW 846 1613/ SW 846 8290	9	5.2×10^{-7} ug/L	0.002	0.01
Tissue	SW 846 8290	0		1.5×10^{-7} – 1×10^{-4}	5×10^{-6} – 1×10^{-3}
Tissue	SW 846 1613B/ SW 846 8290	0		2×10^{-7}	1×10^{-6}
Tissue	EPA 1613B	1		2×10^{-7}	5×10^{-7}
Air			6.4×10^{-8} ug/m³		

Dioxin Toolkit



- 2010- Prepared by the U.S Environmental Protection Agency (EPA) Office of Superfund Remediation and Technology Innovation (OSRTI)
- Includes UFP-QAPP worksheet templates and Users guide
- Utilizes Incremental Sampling Approach
- Addresses issues regarding:
  - sensitivity requirements
  - uncertainty

Dioxin Reassessment Guide

- Review Historical Data
- Suggest optimal sampling and analytical strategies
- Develop appropriate size, shape, and orientation of reassessment decision units (DUs)
- Determination of constituent background concentrations (1-11 ppt?)
- Substitute for, or augment, current data collection needs
- Perform TEQ-based risk screening by evaluating the total TEQ against the interim Preliminary Remediation Goal (PRG)

Historical Data

- Were quantitation limits sufficient?
- Did data quality indicators meet method performance requirements?
- Demonstration of method applicability (DMA) to establish the comparability between conventional and alternative methods?
- Did any of the historical analytical methods find matrix interferences that warrant consideration when selecting extract cleanup methods for future analyses?
- Are there QC or validation records available?
- Use previous data to help with future events

Dioxin TEQ Considerations

- How will qualified data be used in TEQ calculations?
- How will co-elutions be treated?
- How will non-detects be used?
- How will blank results be used?
- Sampling-containers/solvents certified down to appropriate level
- Clean sampling procedures?
- Document in QAPP

Considerations for Project Chemists

- Defaulting to QSM limits may not be appropriate:
  - "Method Blanks- Use project-specific criteria, if available. Otherwise, no analytes detected ≥ LOD for the analyte or ≥ 5% of the associated regulatory limit for the analyte or ≥ 5% of the sample result for the analyte, whichever is greater, per method."
  - "LCS- project-specific criteria, if available. Otherwise, use in-house control limits. In-house control limits may not be greater than ± 3 times the standard deviation of the mean LCS recovery."

Options for the Lab

- **Modify existing method**
  - **Pre-concentration**
  - **Additional clean-up**
  - **Different wavelength or mass**
  - **Different Sample mass**
  - **Standard Addition**
- **Use an alternative method**
  - **isotope dilution**

Considerations for Project Managers

- Is the EC the only COC driving the risk?
- Does the CSM suggest that EC might be present?
- Background Concentrations
- Risk Management (risk range for carcinogens)
- Alternative risk-based values
- Don't sample until:
  - –Early planning with the risk assessor, chemist, & lab
  - –Work with regulator to plan for data of known quality

Considerations for Project Managers

- Project team should work with project chemist and risk assessor to select a PAL, method, and lab that can achieve objectives with data of known confidence.
- Document objectives, methods, MPC's in a QAPP prior to sampling

Options for Project Managers

- When PAL is firm and no existing DoD ELAP lab is available :

1. Project team should first approach lab to expand their scope of accreditation.
2. Lab contacts AB to coordinate.

Options for Project Managers

- When PAL is firm, identified lab is not accredited and is NOT requesting formal DoD accreditation:

1. Project manager contacts DoD EDQW principal (I
2. DoD EDQW principal will review QAPP and the identified lab's capabilities for a project-specific approval through EDQW.
3. Scope of review, level of effort, and practicability of the project-specific approval is subject to EDQW.

Options for Project Managers

- When PAL is firm and no lab has been identified:

1. Project manager contacts DoD EDQW principal to assist in options.
2. DoD EDQW principal will review QAPP and assist in identifying candidate labs.
3. The EDQW should only be involved as a last resort. Project-specific reviews/approvals will be considered on a limited basis.