

Risk Communication Outcomes

CERCLA PFAS Exposures at AFFF Sites

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Outline



- -Risk Assessment
- -Exposure Assessment
- -Community Involvement
- -Examples
 - Lavarack Exposure-Based Sampling and Outcomes
 - Pease Exposure-Based Sampling and Outcomes



How is risk evaluated?



https://www.epa.gov/risk/conducting-human-health-risk-assessment

The CSM



Figure 2-19. CSM for fire training areas.

Source: Adapted from figure by L. Trozzolo, TRC, used with permission.

https://pfas-1.itrcweb.org/

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Scoping & Identifying Pathways

Risk evaluation starts before sampling

- Where is the site?
- What is the site use?
- Surrounding community?



Gardening?	Fishing?	Other?
		 Hunting? Shellfish Harvesting? Swimming/wading? Dairy and/or beef cattle?



Communication Avenues

Town Hall Newsletters RAB Letters to Private Landowners Hotlines **Project Inboxes** Interviews Questionnaires Local News Outlets Social Media



Communication Plan Process Diagram (Source: Modified from (NJDEP 2014) Good guidance and resources at <u>https://rct-1.itrcweb.org/</u>



From Exposure Pathways to Risk

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SITE #1 – QUEENSLAND - AUSTRALIA



Site investigation and HHRA: <u>https://www.defence.gov.au/environment/pfas/Lavarack/publications.asp</u>

Lavarack Barracks – Can PFAS Reach Receptors?

- PFOS in former fire training areas
 - Max in GW 380 ug/L
 - Max in SW 13 ug/L
- Adjacent residential private non-potable wells
 - Survey found limited irrigation use
- Popular fishing locations in nearby river



Lavarack - Multiple Potential Receptors Identified



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Golf Course
 PSC 3 – Former Helicopter Squadron
 PSC 4 – Former Fire Station

Surface water runoff
Surface water infiltration
Leaching of soil to groundwater
Induced and and an an Array and Array

- Irrigation using surface water
- Groundwater discharge to surface water
- 6 Surface water discharge to groundwater
- Bioaccumulation within marine ecosystems
- 8 Sediment transport

MIGRATION PATHWAYS

POTENTIALLY COMPLETE EXPOSURE PATHWAYS 1 Human direct contact - ingestion of surface water 2 Human direct contact - ingestion of soil and/or dust 3 Human direct contact - ingestion of sediments 4 Human direct contact - ingestion of groundwater 5 Aquatic organisms ingestion sediment/surfacewater/porewater 6 Terrestrial organisms root uptake 7 Biomagnification in ecosystems 8 Human ingestion of stock or produce grown with groundwater or surface water 9 Human ingestion of aquatic organisms (e.g., fish, shellfish)

Lavarack – Fish and Shellfish

- PFOS in some fish above trigger levels
- Fish consumption of 2 meals per wk = low risk
- 3 meals per wk = elevated risk for two species
 - Longfin Eel
 - Milk Fish
- Shellfish and marine fish all below thresholds



Figure D: Summary of risk results and meals per week

Lavarack – Homegrown Produce

- PFOS in 2 samples
 - 1 Poultry egg distant from site
 - 1 Parsley
- Conservative modeling showed potential risk
- Flooding prevented further sampling





Lavarack – Homegrown Produce Outcomes

- Precautionary advice:
 - Limits on ingesting home-grown vegetables and poultry
- Best practice methods incl.
 - Raised beds and
 - Irrigating plants/watering chickens with town water – not private bore water



SITE #2 – NEW HAMPSHIRE - USA



Expanded Site Inspection (Wood, 2020). Available on OneStop: <u>https://www.des.nh.gov/onestop/</u>



Pease - Can PFAS Reach Receptors?

- PFOS detected in former fire training areas
 - Max in GW 95 μ g/L
 - Max in SW 6.5 $\mu g/L$
- Water Movement Away from Source Areas:
 - Groundwater
 - Surface Water
 - Storm Water
 - Springs



Potentially Complete Pathways





Pease Air Force Base – Shellfish and Fish

- •PFOS in oysters, mussels, & clams
 - -Not above safe thresholds
 - -No consumption advisory needed
- •Migratory finfish in estuary
 - -No samples collected
- Limited freshwater fish
 - -Freshwater fishing already prohibited



RI Field Work – Backyard Produce



- 12 Properties
 - Approximately 3 samples of fruit/vegetable from 11 gardens
 - Pasture grass from 3 farms
- Location selection = PFAS in private wells & residential input/questionnaires wood.

Final Words

• For the most effective results....





Questions?

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