SDMS Doc ID 165431

(1)

7/26 Perchlorate call / Eco
Texas Tech

Phil Smith.
806-885-0316

talk to Ann
re. August conference
toxicity session

- Texas Tech DL 1ppb? USGS as well?
- research within last 2½-3 yrs
- Strategic Env. Research Program - DOE/DoD/EPA
- Congressional allocation from SERP for perchlorate research in partnership with Brooks AFB
- broad team working on perchlorate - Texas Tech.
  - interdisciplinary
  - Ron Porter, Elizabeth Maull } Brooks AFB
- integrate field studies / eco risk
- James Carr / Dept of Biology - aquatic work. - trained as endocrinologist
  - make predictions for aquatic species based on human studies
  - most sensitive thyroid inhibitor / iodide uptake interference
- zebra fish - standard lab model - initial lethal studies @ 117 ppm lethal effects
- lethal effects occur very rapidly after certain concentration reached (threshold)

Ron Kendall, Dave Irwin } PIS

- also tested ammonium hydroxide/ sodium chloride → det ~~that~~ that ClO_4^- contributes to 117 ppm threshold
- doesn't affect embryo ~~survive~~ survivability/ reproduction
- some data to suggest no accumulation (frogs) → clear out of system
- S. African frog - standard model - LC50 for ClO_4^- ppm range
  - also saw threshold effect for lethal
  - developmental effects - thyroid hormone synthesis dependent
    - dev. of both legs
    - loss of tail

    } 38 ppb, 14 ppm } inhibition of thyroid dep. metamorphosis

then when removed dev. proceeded → i.e. effects seem to be reversable - (4 weeks later?) 4-leg emergence

- EPA Endocrine Disruptors Committee test protocol
  - 14.5 ppm amm. perch. significantly inhibits tail loss
  - 14 day exposure - controls - lost tail
    - amm (14 ppm) - sig. # did not lose tails

(3)

- have to go through metamorphosis to reproduce
- normal transport of iodide blocked resulting in impacts on thyroid hormone production
- haven't yet measured blood levels - levels are what animal exposed to in environment
- collected animal from near holding ponds (ditches) - none developed hind legs and lighter body weight (ppm range coll 4/00)
- lots of subjectivity
- ☆ also looking at molecular markers for perchlorate exposure using differential display of genes at a given time
- established baseline pattern of gene expression during normal development and now comparing to perchlorate exposed individuals
  - ↳ we are seeing differences at various pts.
  - ↳ will try to then tie in to some AP exposure

(4)

→ 117 ppt | 117 ppb | 117 ppm DW exposure – deermouse
- tend. for organ weights ↑
- # of active thyroid follicles ↓ w/ ↑ dos.
- pup. survival ↓ in relation to ClO_4^- exposure as compared to control
- length of time for pair of mice to pair up/breed ↑ as exp ↑.
  30 days took to first litter
  117 ppm took 54 days to first litter

- behavioral differences – lethargicness; less ~~prone~~ prone to hide/burrow/escape
- did not see dev. effects in pups

PBPK – consideration of a # of different tissues/pharmacokinetics
- 1-1½ yrs. of work at Langley
- have det. ClO_4^- in brain @ Langley
- # of field studies ready to go – held up by funding issues → rodents, frogs, fish, additl. analytical work, plant studies

- det. limit @ 2.5 ppb – certified by Wright-Patterson

(5)

- Lab data on Longhorn occurrence - soils/water
- fish data - did find very low concentrations of perchlorate in different tissues
  ~~bass~~
- frog data - perchlorate residues - bullfrogs collected (11/99) when pond concentrations 20 ppm
- mammal data thyroid data - rodents
-
- insect data -
- plants - in/around pond - very high concentrations (composited/dry)
  - these data not part of SERP work

- include looks at other contaminants at site-specific cases to answer "interference" questions

---

- phase 3 - look at water ClO_4^- concentrations in field
  - control/exposed animals ↳ watch in labs

- intent to publish all data -