Hanford's Contamination Expected to Grow From Unacceptable Levels Today to Incredibly Unacceptable Levels in One Hundred Years and Thousands of Years… 10x Worse if USDOE uses Hanford as a National Radioactive Waste Dump

Source: USDOE's Own TCWMEIS
(Tank Closure Waste Management Draft EIS)
Presented by Heart of America Northwest 2010

TCWMEIS – Tank Closure Waste Management Environmental Impact Statement

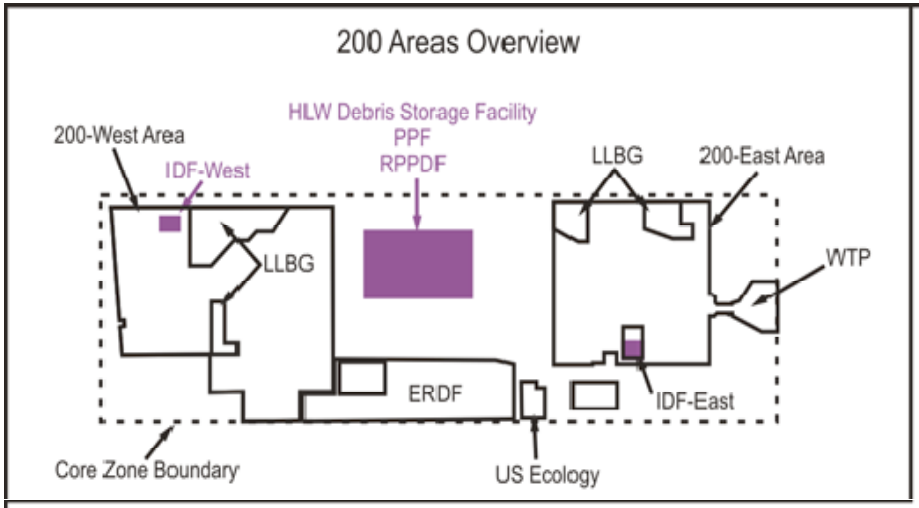
- TCWMEIS was required due to legal and scientific errors in the 2004 Hanford Site Solid Waste EIS, which USDOE sought to rely on to use Hanford as national waste dump
- "Preferred alternative" proposes to use Hanford as national mixed radioactive hazardous and low level waste dump – once vitrification plant is "operational"
  - But, USDOE could start importing and disposing waste sooner, including extremely radioactive GTCC waste with Plutonium. Impact analysis missing from this EIS for adding GTCC wastes.
- "Closure" of Hanford's High-Level Waste Tank Farms – USDOE prefers leaving contamination in tank bottoms and in soil.

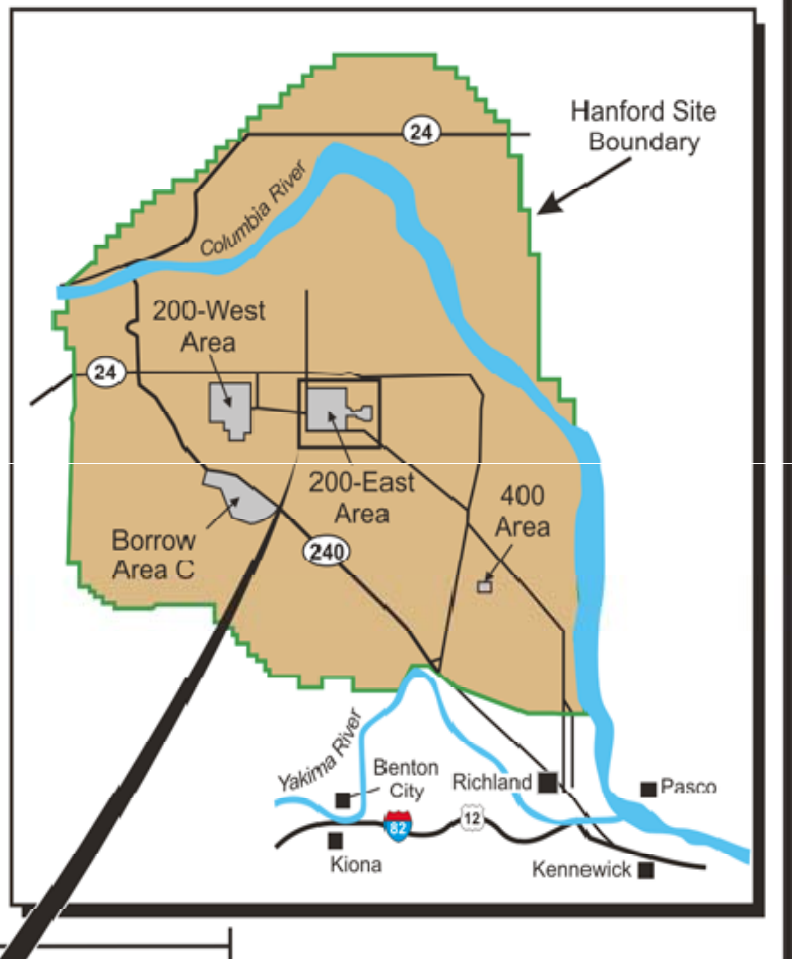
Image © 2007 NASA
Image © 2007 TerraMetrics

Image © 2007 DigitalGlobe

Columbia River at Risk

- Hanford Reach of the Columbia flows through Hanford for over 50 miles, past nine full scale nuclear reactors, hundreds of liquid waste and burial sites.
- Hanford Reach National Monument
- Contaminants entering River along shore at levels >1,500 times Drinking Water Standard



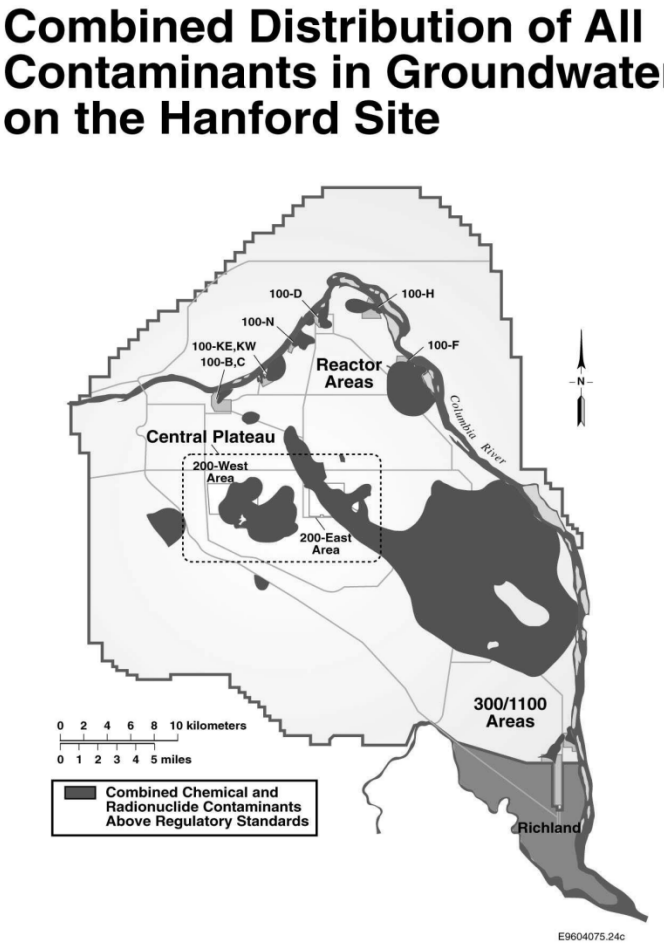


200-East Area

12th Street

Hanford's Unknown Dangers

- 53 million gallons of waste in Hanford's High-Level Nuclear Waste Tanks; 35 million gallons remain in Single Shell Tanks.
- USDOE admits that over one million gallons of waste has leaked from tanks... How fast and where is it spreading? Will anything be done?
- Over 200 square miles of contaminated groundwater (80+ sq. miles above Drinking Water Standards)... Contamination already entering River at levels >1,500 times DWS for Strontium...



Use of Unlined Burial Grounds

Why was I-297 Necessary?

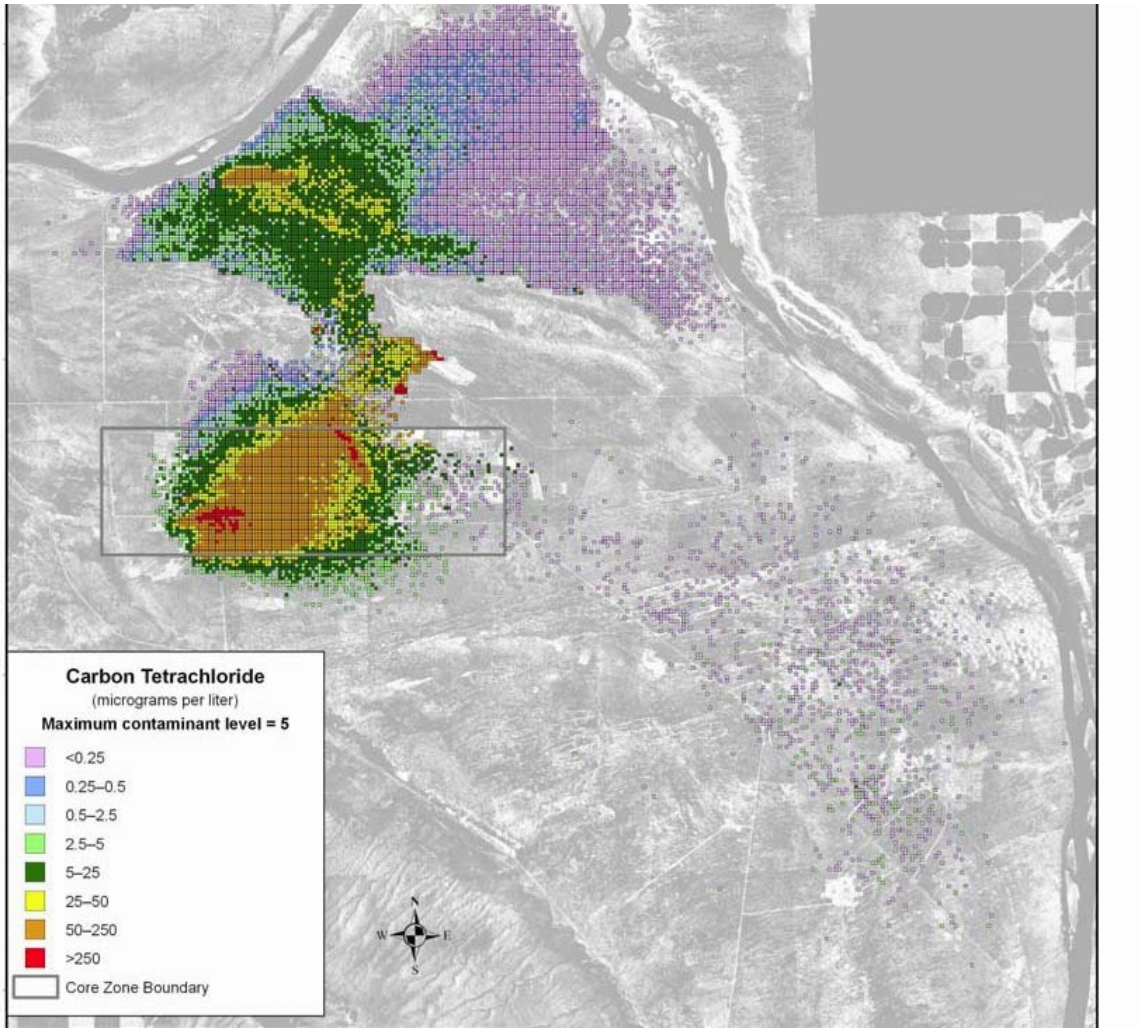
- I-297 says “Clean up contamination before adding more”
- End Dumping in Unlined Trenches

Cumulative Impacts Without Adding More Waste or Considering Tank Wastes

Maximum Peak Year Concentrations of the COPCs from Non–*TC & WM EIS* Sources at the Core Zone Boundary and the Columbia River Nearshore

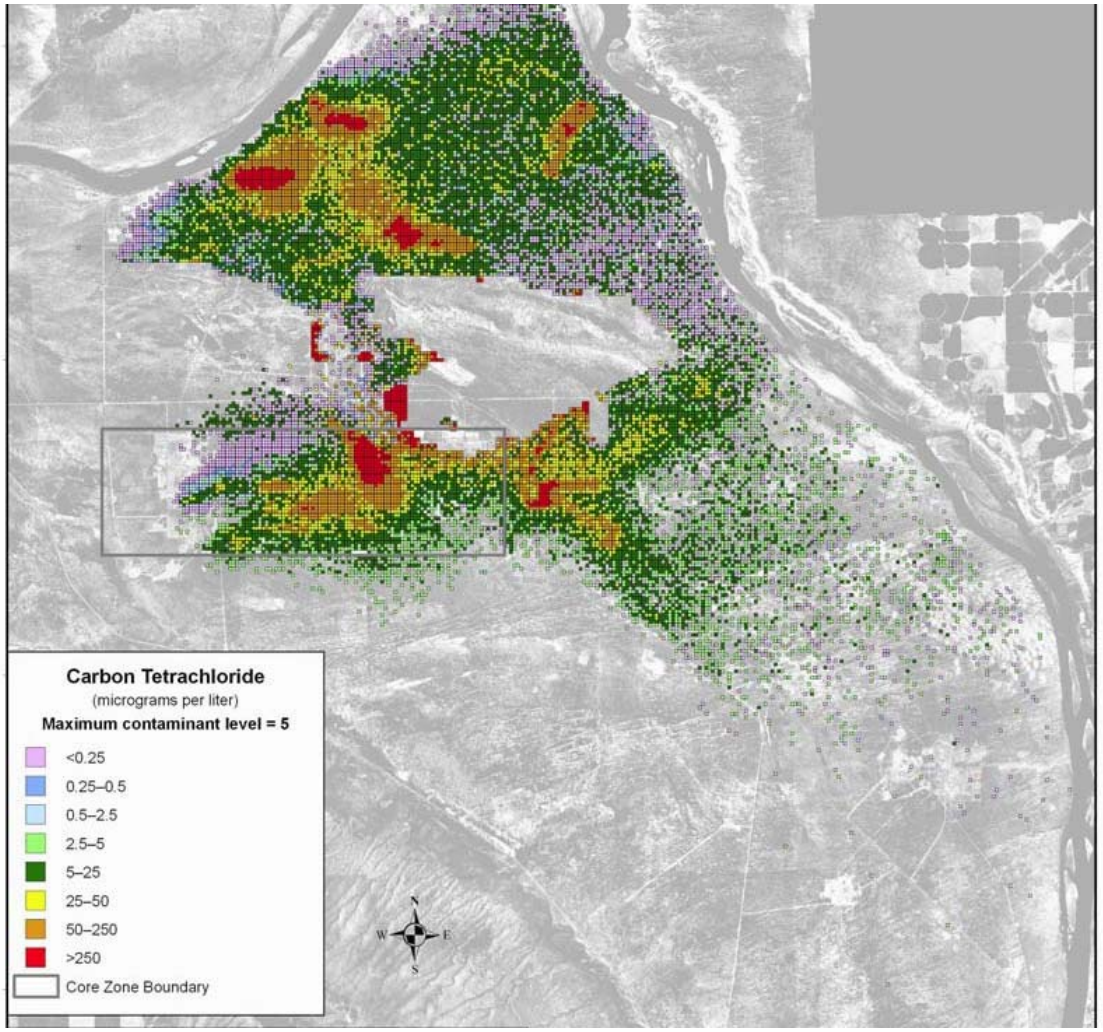
- Table U-2

Contaminant	Max concentration Central Plateau Inner (year)	Max concentration River shore (year)	DW Standard or benchmark
Pu (inc 239, 240)	2,660 (11,848)	4,250 (2983)	15 pCi/L
I-129	50.9 (4043)	9.1 (4540)	1. pCi/L
Chromium	2540 (2216)	16,100 (1978)	100



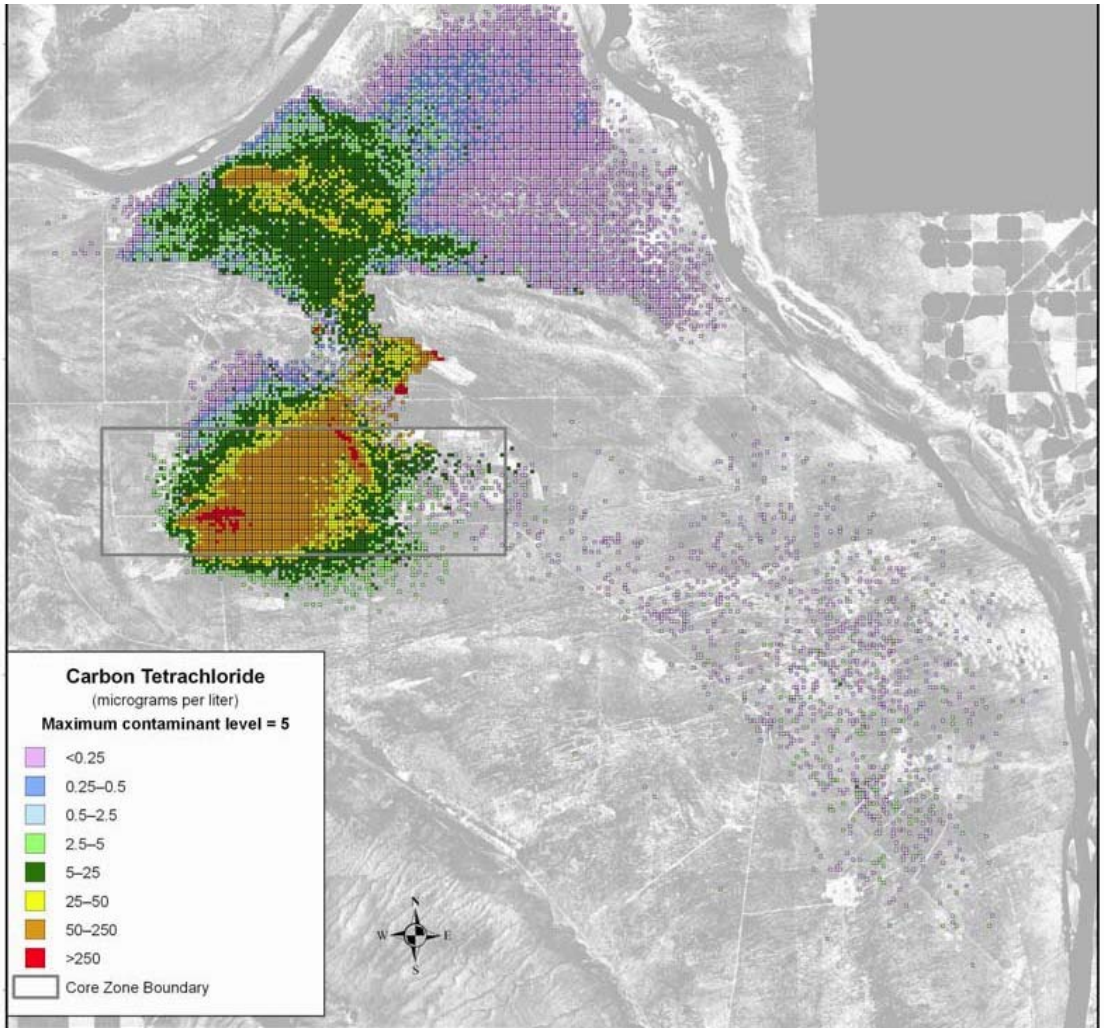
Carbon Tetrachloride level in groundwater now, darkest red area =>50x Drinking Water Standard. Carbon tetrachloride is a poison and carcinogen. River shown in blue runs through Hanford 50 miles.

Figure 6–99. Alternative Combination 3 Spatial Distribution of Cumulative Groundwater Concentration for Carbon Tetrachloride During Calendar Year 2005



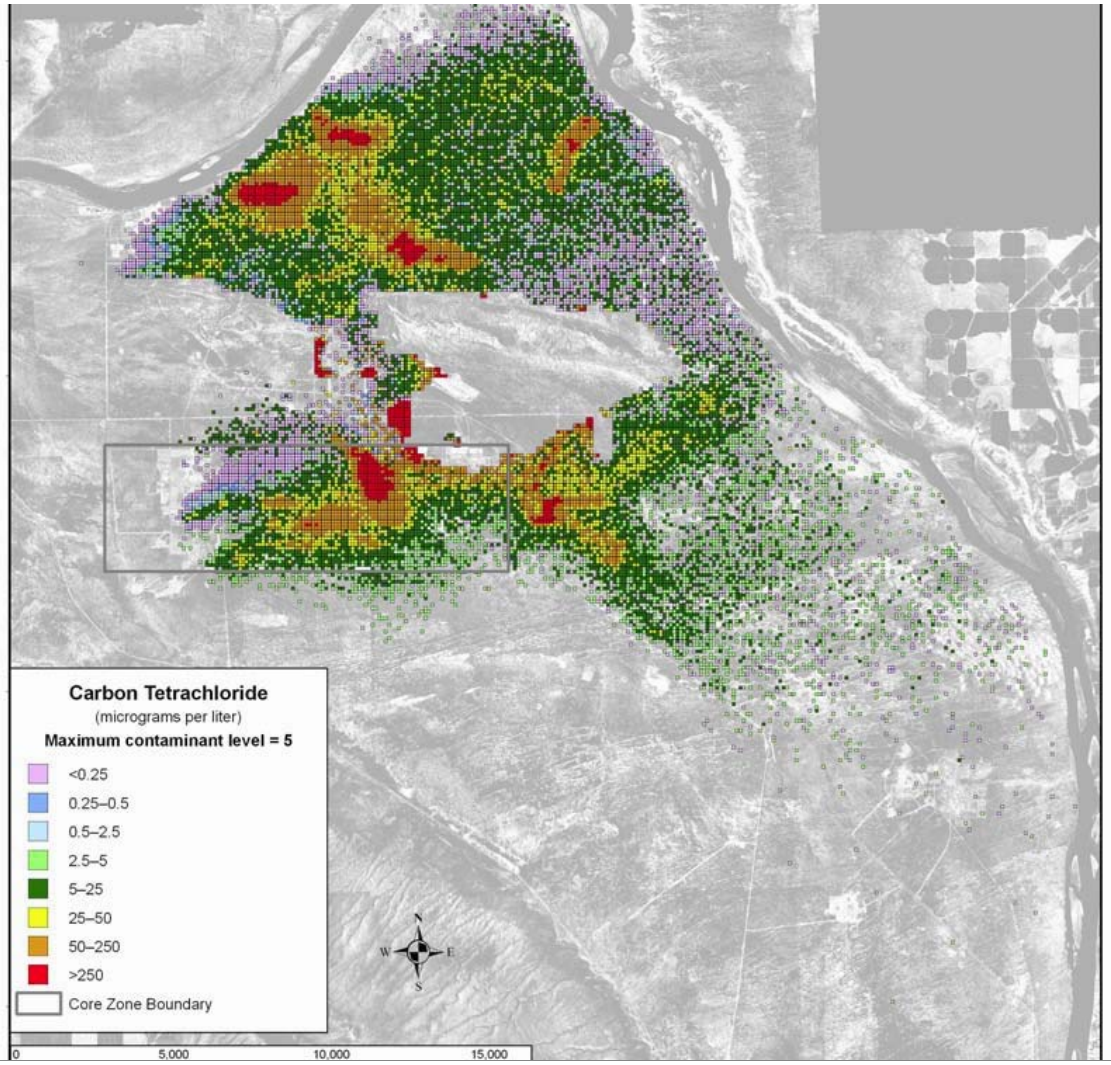
Carbon Tet levels projected in year 2135. Carbon Tet is a poison and carcinogen. Dark red areas near Rivershore are >50x DWS. DWS set at level at which 1 adult male in 10,000 dies of cancer.

Figure 6–63. Alternative Combination 2 Spatial Distribution of Cumulative Groundwater Concentration for Carbon Tetrachloride During Calendar Year 2135 (USDOE's Preferred Alt)



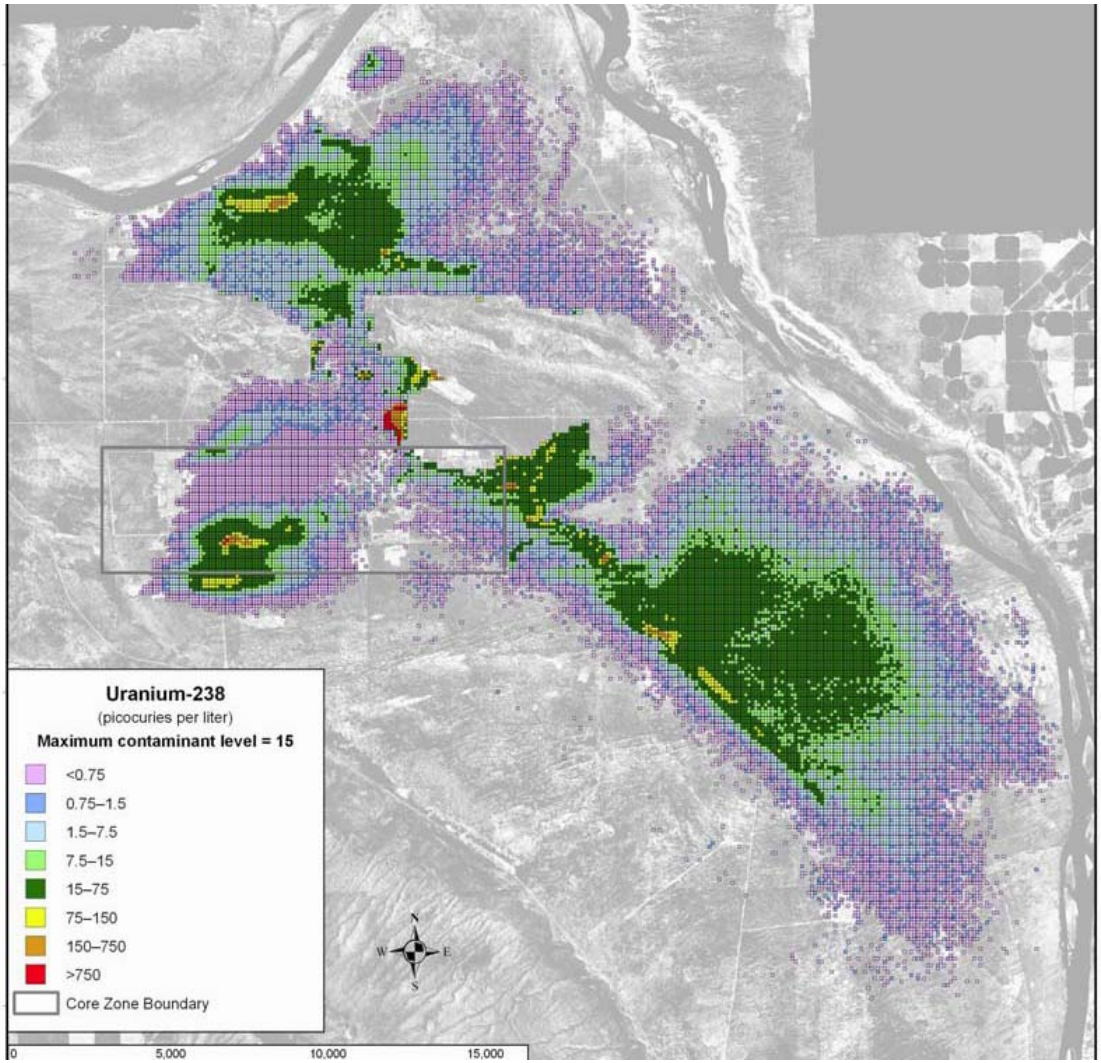
USDOE presents measurements of contamination in groundwater at rectangular "Core Zone Boundary". This does not meet regulatory standards to measure and protect at edge of each contaminated unit. Allows for miles of dilution in groundwater, and will cause exposure to people using area.

Figure 6–99. Alternative Combination 3 Spatial Distribution of Cumulative Groundwater Concentration for Carbon Tetrachloride During Calendar Year 2005



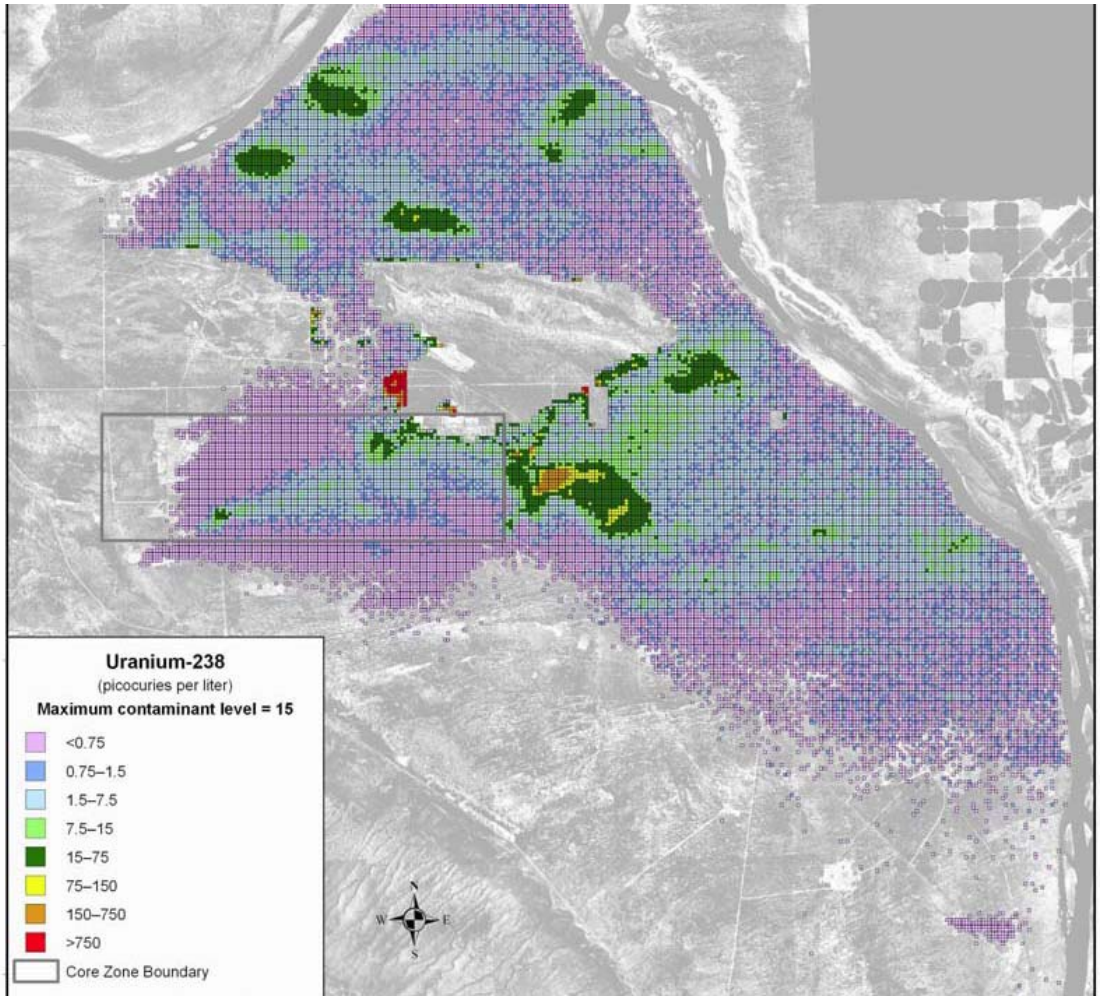
Carbon Tetrachloride in 2135 under Alt 3, landfills with offsite waste in 200 West as well as 200 East. No real difference in first one hundred years between alternatives

Figure 6–100. Alternative Combination 3 Spatial Distribution of Cumulative Groundwater Concentration for Carbon Tetrachloride During Calendar Year 2135



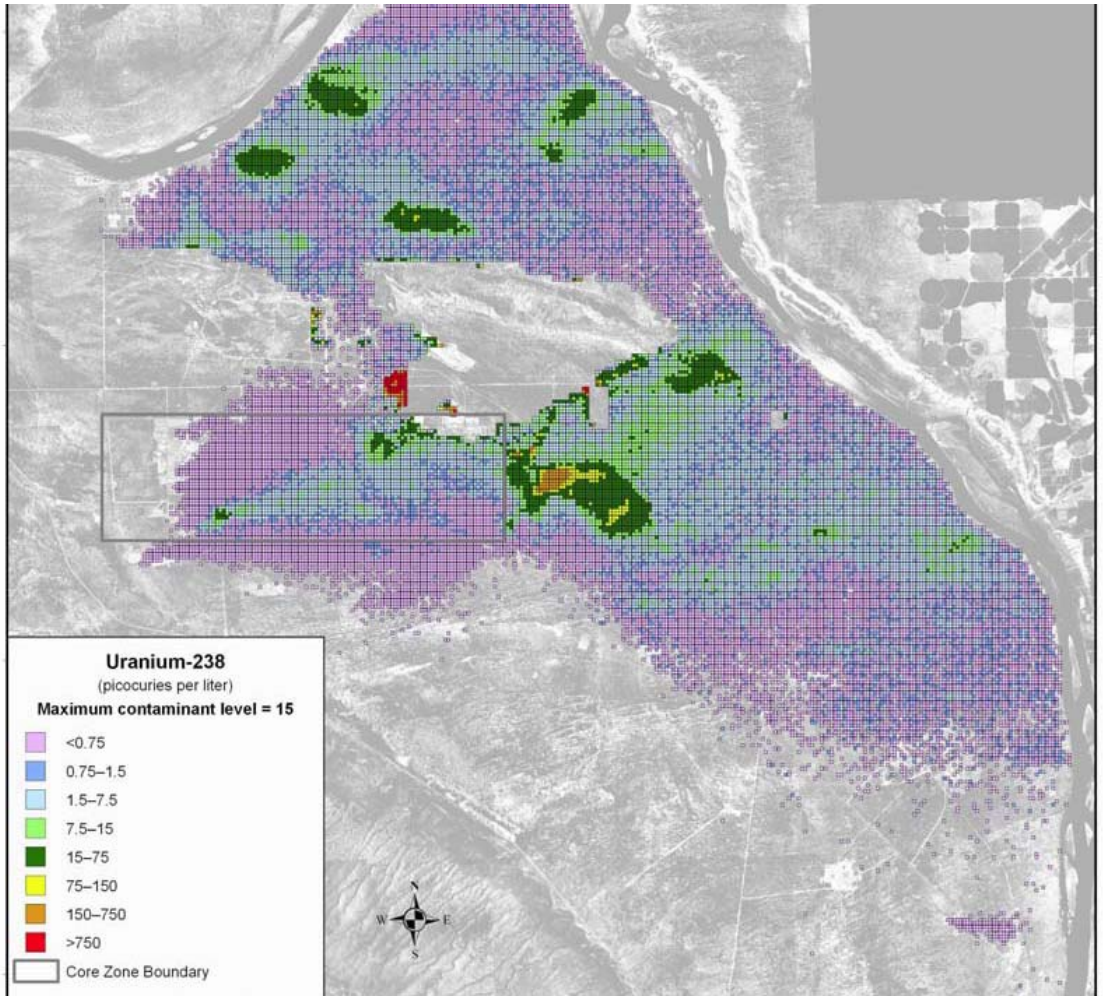
Uranium 238 in Groundwater in Year 2135
Dark red >50x Drinking Water Standard

Figure 6–65. Alternative Combination 2 Spatial Distribution of Cumulative Groundwater Concentration for Uranium-238 During Calendar Year 2135



U 238 projected for year 3890… Uranium has spread into the River

Figure 6–66. Alternative Combination 2 Spatial Distribution of Cumulative Groundwater Concentration for Uranium-238 During Calendar Year 3890



Uranium 238 in Year 3890 under Alt 2;
Uranium into River. New plumes from tank leaks, residues and discharges will grow for thousands of years under USDOE's plans to NOT cleanup tank leaks, waste discharge trenches and cribs, and to leave 1% in tanks.

Figure 6–66. Alternative Combination 2 Spatial Distribution of Cumulative Groundwater Concentration for Uranium-238 During Calendar Year 3890 . Discussion page 6-70.

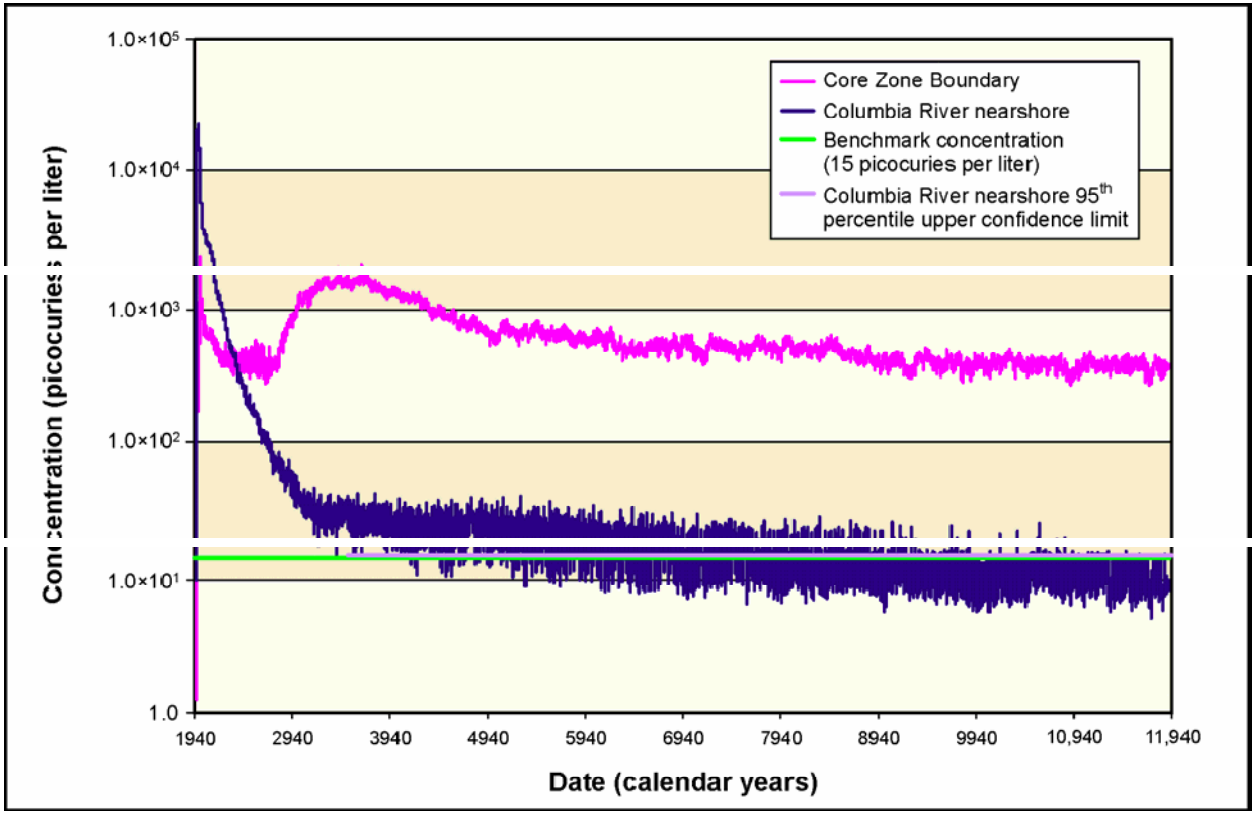


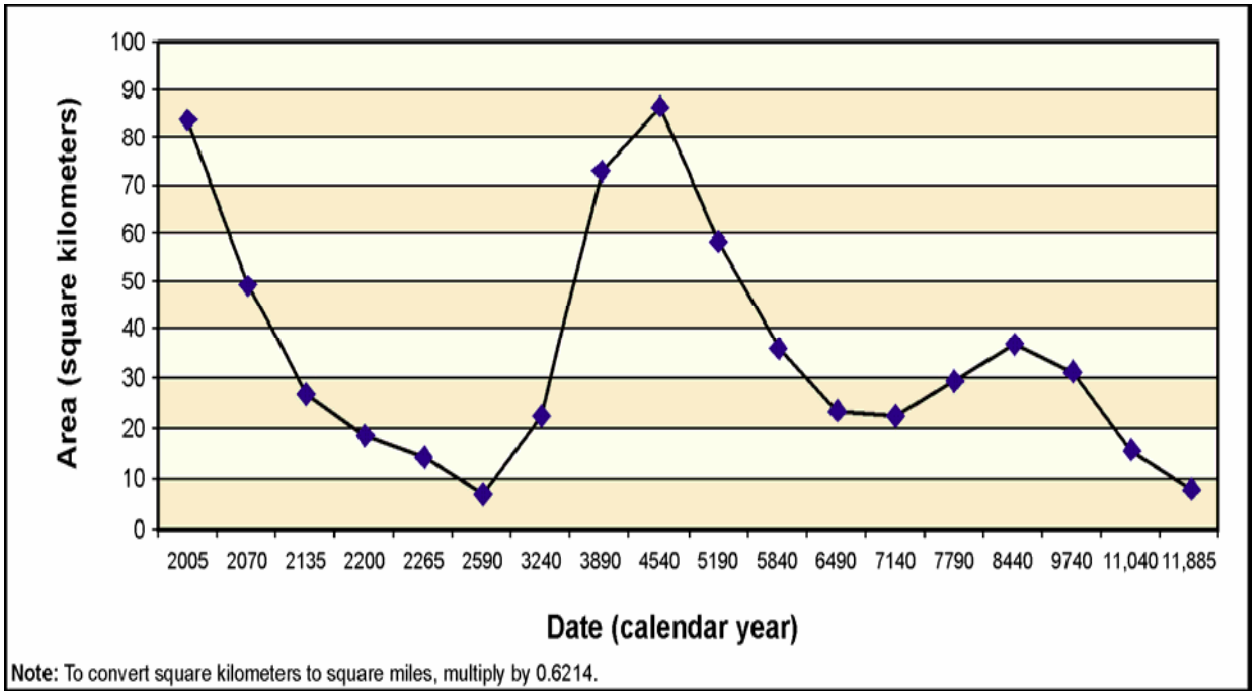
Figure 6–78. Alternative Combination 3 Cumulative Concentration Versus Time for Uranium-238

Uranium 238 over time in groundwater: increases on Central Plateau to 100 x DWS in 1,000 years. Sources include tank residues, leaks, and billions of gallons discharged to cribs.

Green: Drinking Water Standard

Pink: Central Plateau at edge of area expected for unrestricted public / Tribal use

Purple: Rivershore

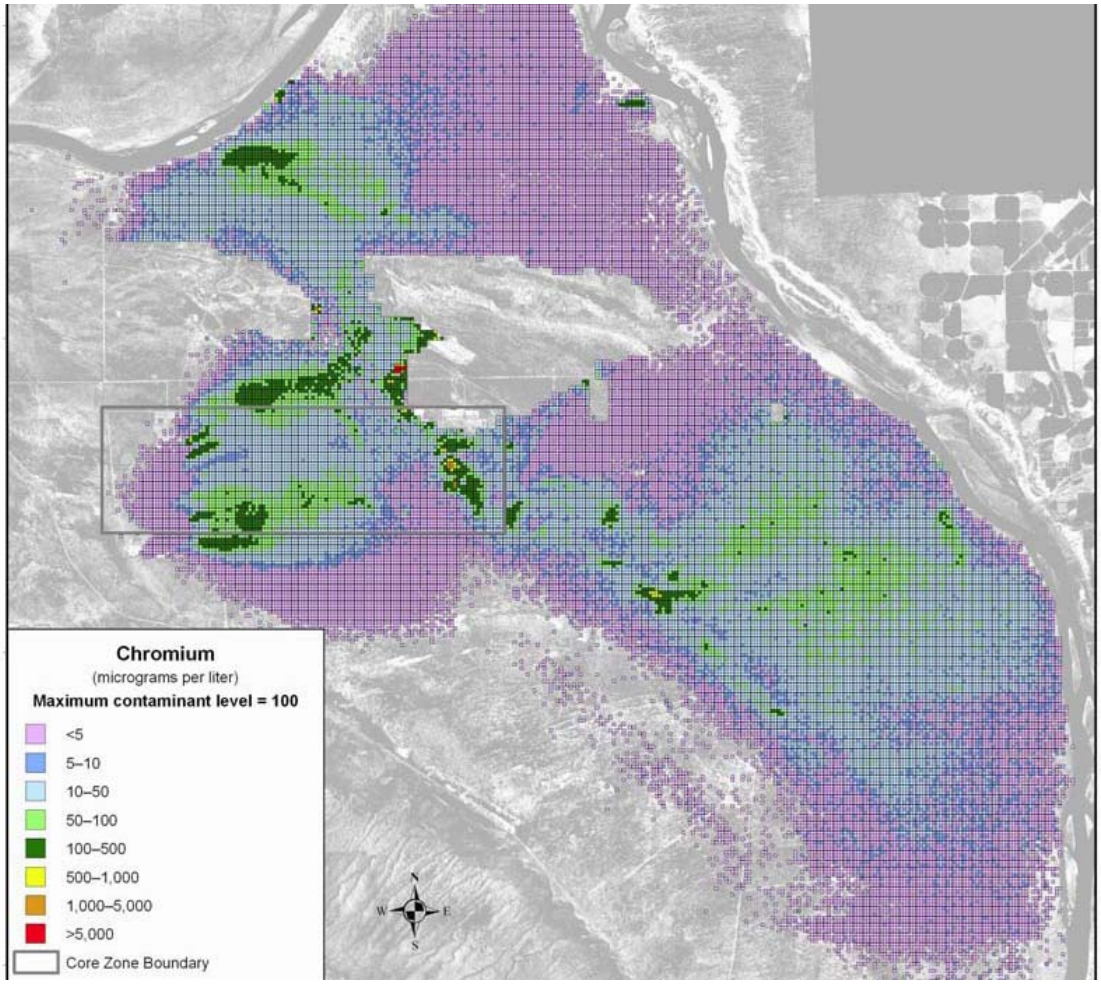


•**Figure 6–85. Alternative Combination 3 Total Area for Which Cumulative Groundwater Concentrations of Iodine-129 Exceed the Benchmark Concentration as a Function of Time**

Square kilometers of Hanford where Iodine 129 contamination will exceed Drinking Water Standard

85 square km today

In 600 years, begins climbing back to 85 sq Km under Alt 3, with landfill in 200 West and offsite waste - not including all other contaminated sites



Chromium in Groundwater today
Dark red >50x Drinking Water Standard
Standard to protect endangered species is 10x lower

Figure 6–91. Alternative Combination 3 Spatial Distribution of Cumulative Groundwater Concentration for Chromium During Calendar Year 2005

Key Decisions USDOE Proposes to Issue Using TCWMEIS:

- Where to bury offsite waste at Hanford:
  - Fails to include an alternative of not using Hanford as a national radioactive and mixed radioactive hazardous waste dump!
  - Whether to use landfills in both 200 East and 200 West areas, or just 200 East
  - USDOE proposes to add approximately 3 million cubic feet of waste to Hanford's contamination and compliance problems… approximately 17,500 truckloads of waste
  - USDOE improperly left out of EIS a disclosure that it is also considering sending highly radioactive GTCC waste to be buried in Hanford landfill(s). Includes Plutonium.

Waste Management Alternatives
Both use Hanford landfill(s) as national radioactive and mixed radioactive hazardous waste dump

Alternative 2:

Landfills in 200 East and 200 West used

Alternative 3, just an IDF landfill in 200 East

The Risk of 70,000 Trucks of Waste

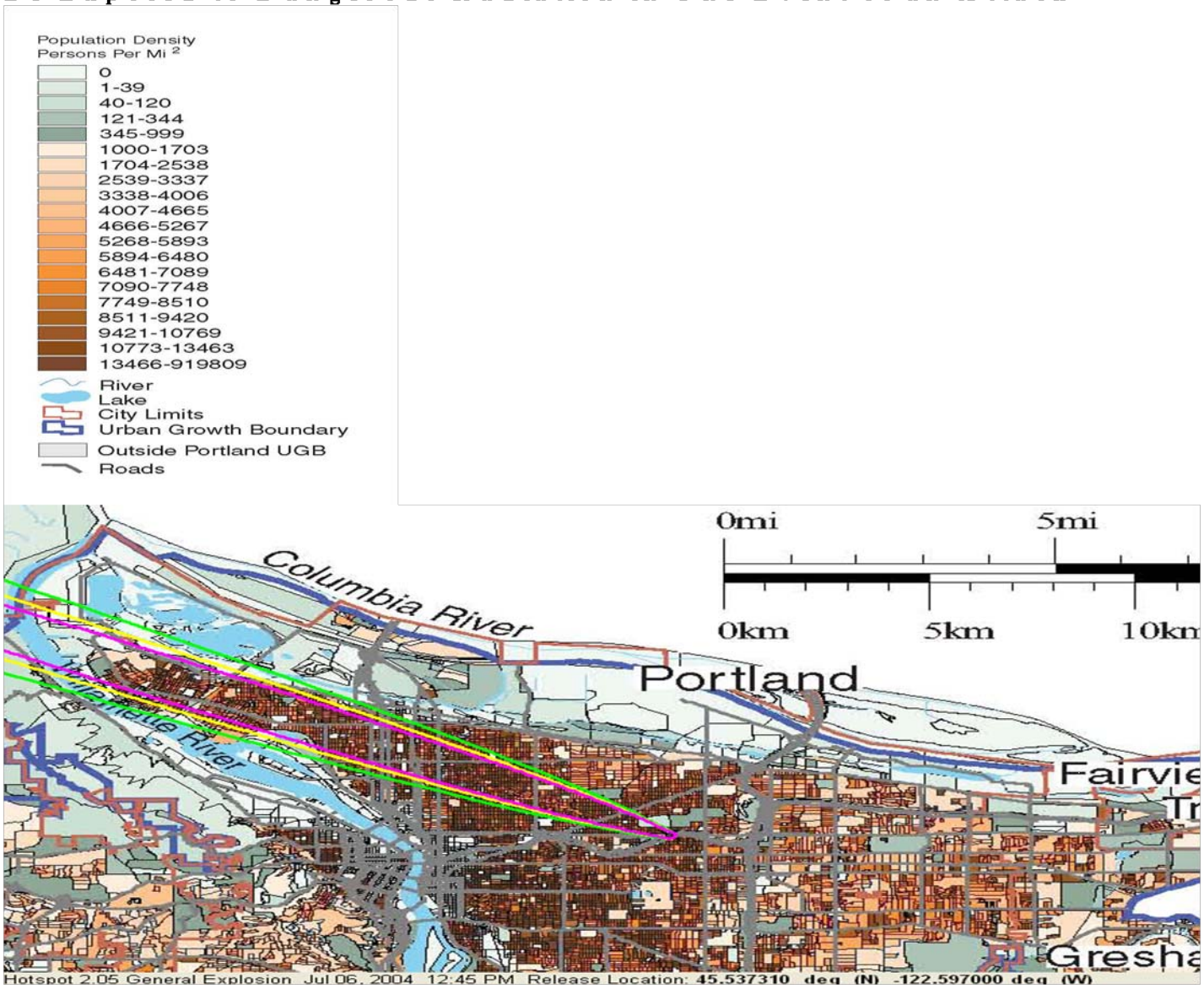
Cancer Risk from Trucks Even Without an Accident or Terrorist Attack:

- USDOE estimated 816 fatal cancers in ADULTS along truck route due to routine exposure if Spent Fuel shipped to Hanford for storage and reprocessing under GNEP
  - USDOE ignored children and NAS data
- GTCC wastes as radioactive as Spent Fuel, but USDOE failed to disclose that it is considering shipping GTCC and hily radioactive Plutonium to Hanford in the TCWMEIS.
- For 3 million cubic feet of offsite LLW and MW, TCWMEIS fails to disclose sources from new production to be disposed at Hanford, claims treatment for offsite waste that is not planned.

What if there is an accident or terrorist attack?

- HoA commissioned physicists to model impact of reasonably foreseeable accident with fire or terrorist attack on a truck at I-5 and I-205 in Portland, and on I-90 in Spokane
- Uses NRC model
- Over a thousand cancer deaths, hundreds of square miles contaminated and require evacuation. Decontamination on this scale never attempted.

Accident or Terrorist Figure 6. Approximately 350 Square Miles Could Be Exposed to Dangerous Radiation in The Event of an Attack



Key Decisions USDOE Proposes to Issue Using TCWMEIS:

- Whether or How to Clean-Up the High-Level Nuclear Waste Tank Leaks and the Billions of Gallons of Tank Wastes Deliberately Discharged into Soil Ditches (Cribs, Trenches)?
- Whether to remove the tanks and piping or add cement and leave behind under a “cap”?
- “Tank Closure” decisions
- USDOE wants to use “landfill” closure: Not investigate contamination; add cement; Not cleanup leaks and discharges – put big soil caps over tank farms
- Hazardous waste law says use “clean closure”: must take all practical steps to remove residues; and, investigate and cleanup contamination before capping.

Tank Closure Alternatives

-linked in USDOE's alternatives to treatment alternatives, but no reason for linking

- "closure" is a legal term for what state tanks are left in and whether contamination and residues are cleaned up

Landfill closure:

Leave residues

Leave contamination in soil and cap tank farms

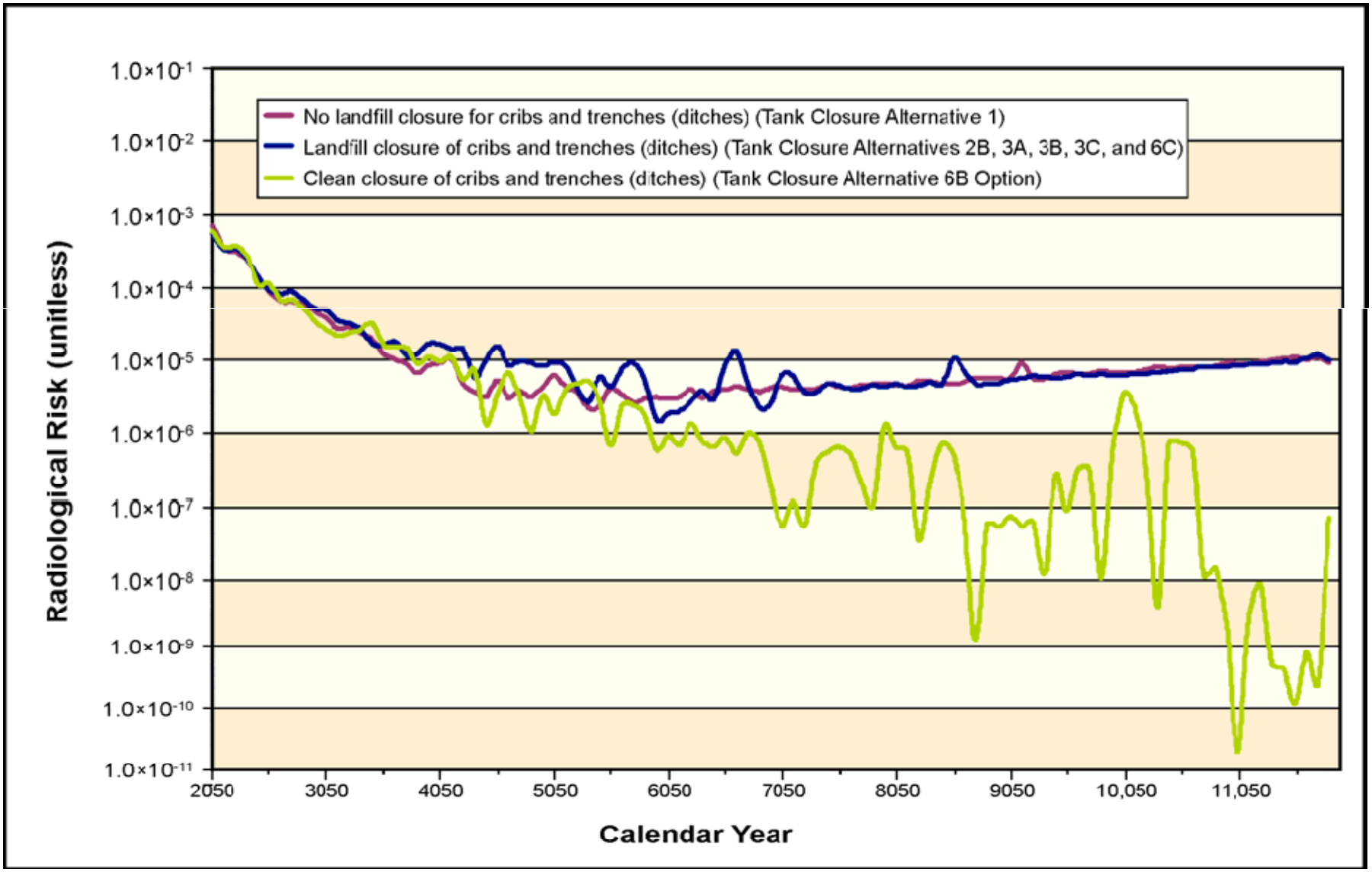
Clean Closure:

Remove residues

Remove tanks or pipes to extent practicable and based on risk

Clean up tank leaks and massive contamination from billions of gallons of deliberate tank waste discharges to cribs to extent practicable

Using Caps (landfill closure) instead of cleaning up just 2 sets of cribs and trenches causes magnitudes higher risk (S-16):



Key Decisions USDOE Proposes to Issue Using TCWMEIS:

- How much Waste to retrieve from the leaky Single Shell High-Level Nuclear Waste Tanks (SSTs):
  - 90%
  - 99%: USDOE's choice
  - 99.9%
- Over a million gallons of waste has leaked from SSTs, and the contamination has moved deeper and into groundwater – heading towards the Columbia River - despite USDOE claiming it would not move for thousands of years.

Example of rapid contamination TY Tank Farm

- Fifty fold increase, from 1996 to 2002, in contamination found in one borehole tested between Tanks TY-103 and TY-105.
  - Rise in ^{137}Cs concentration
  - One of the tanks had a substantial release; no reporting, a significant violation.
  - Depth of contamination shows source is likely a pipe or tank leak, … not borehole contamination.
- USDOE also failed to report a release from TY-102.
- Claimed TY farm to be “Controlled, Clean and Stable”.

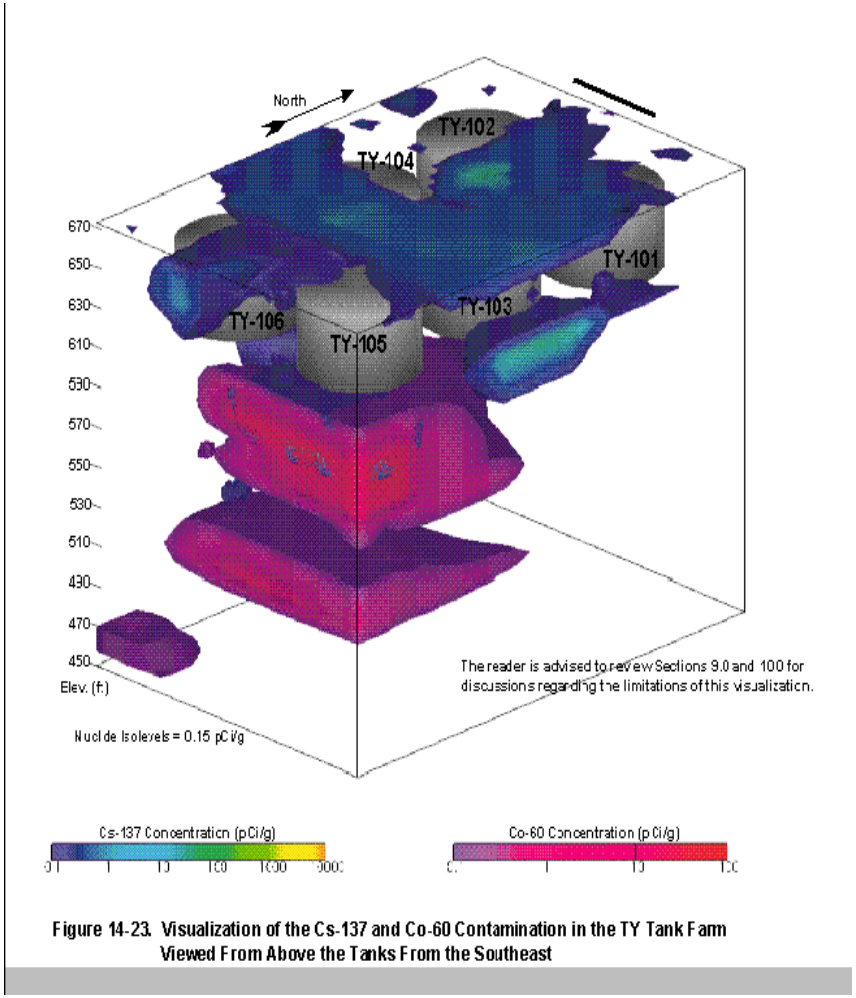
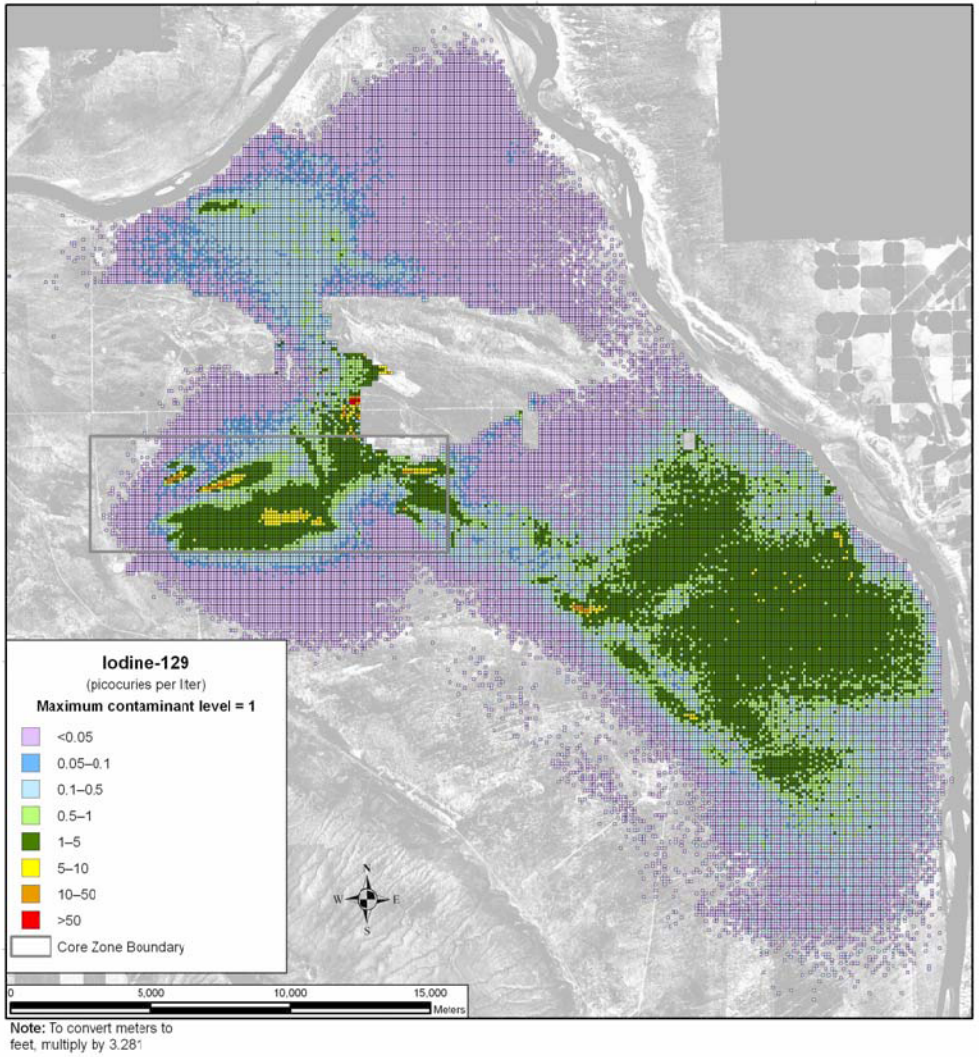


Figure 14-23. Visualization of the Cs-137 and Co-60 Contamination in the TY Tank Farm Viewed From Above the Tanks From the Southeast

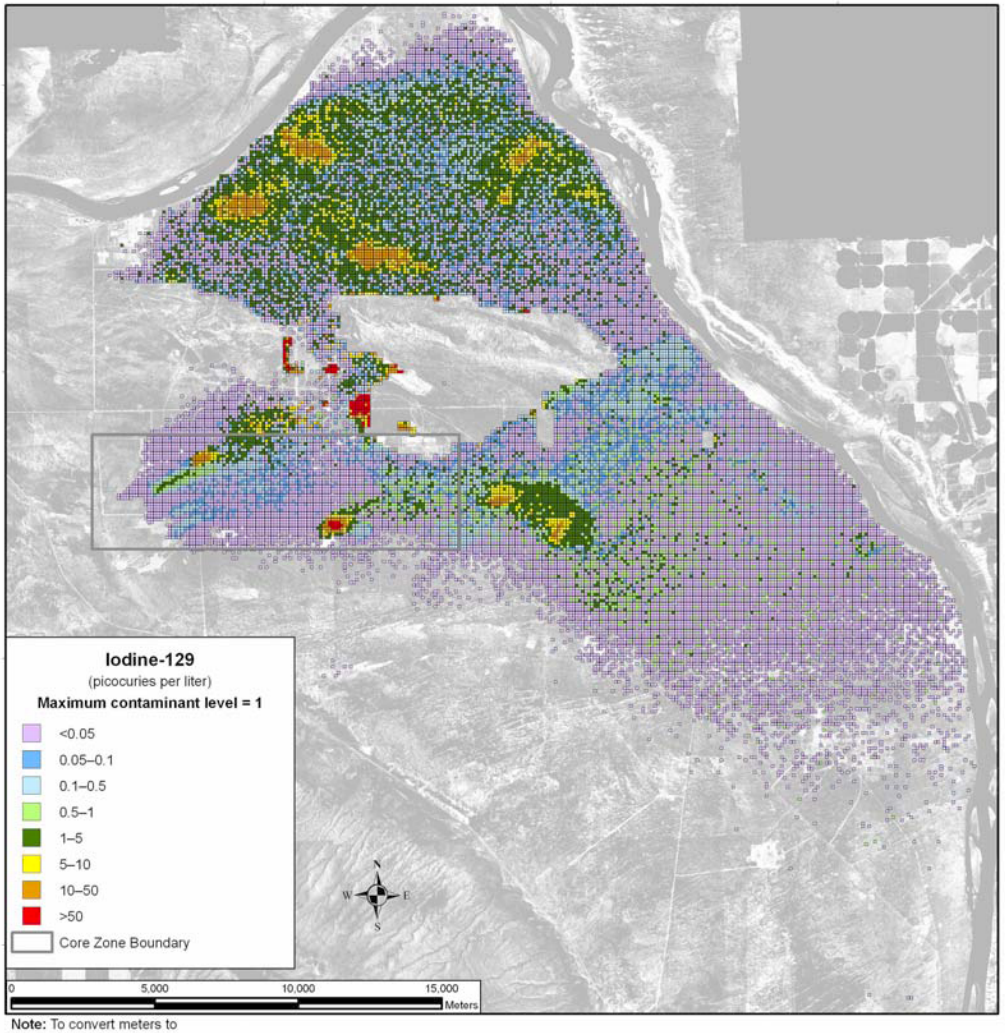
Impacts of USDOE's Plans (Combo Alt 2) – Radioactive Iodine 129

- Iodine in Groundwater today
- Darkest red is >50x DWS
- Table 6-44



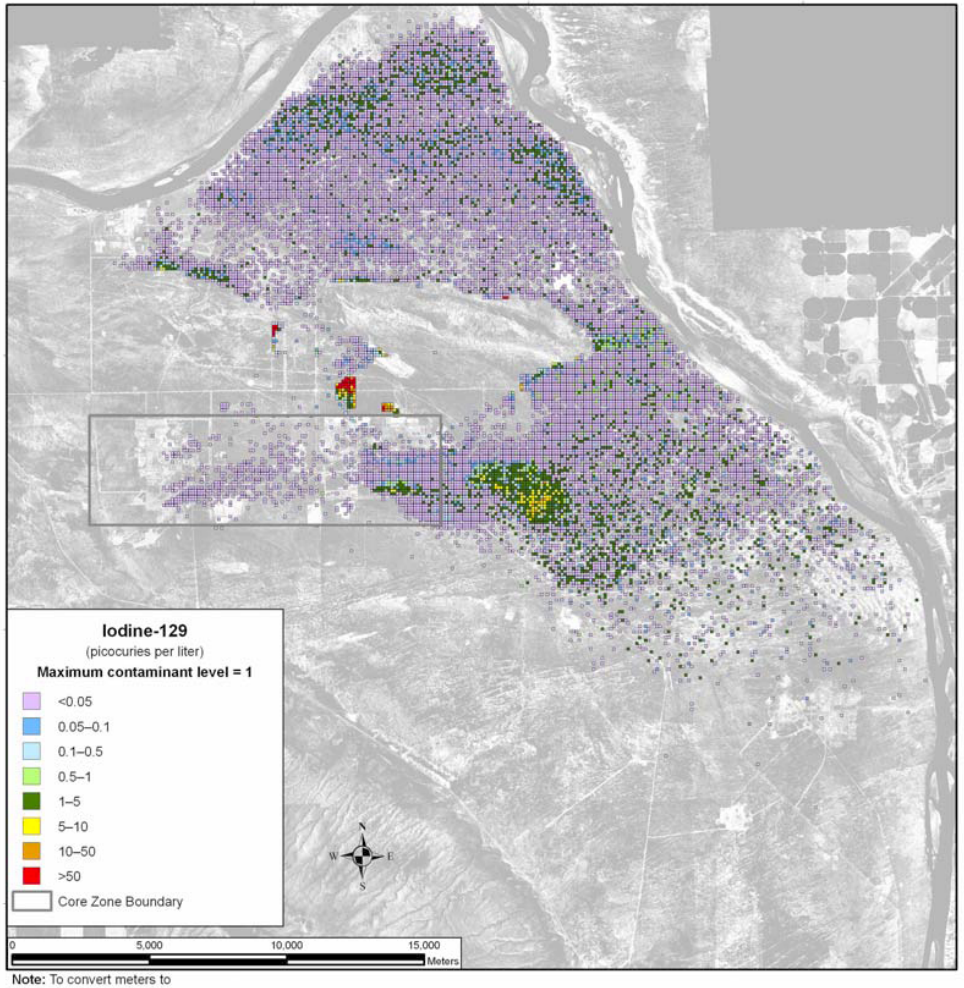
Impacts of USDOE's Plans (Combo Alt 2) – Radioactive Iodine 129

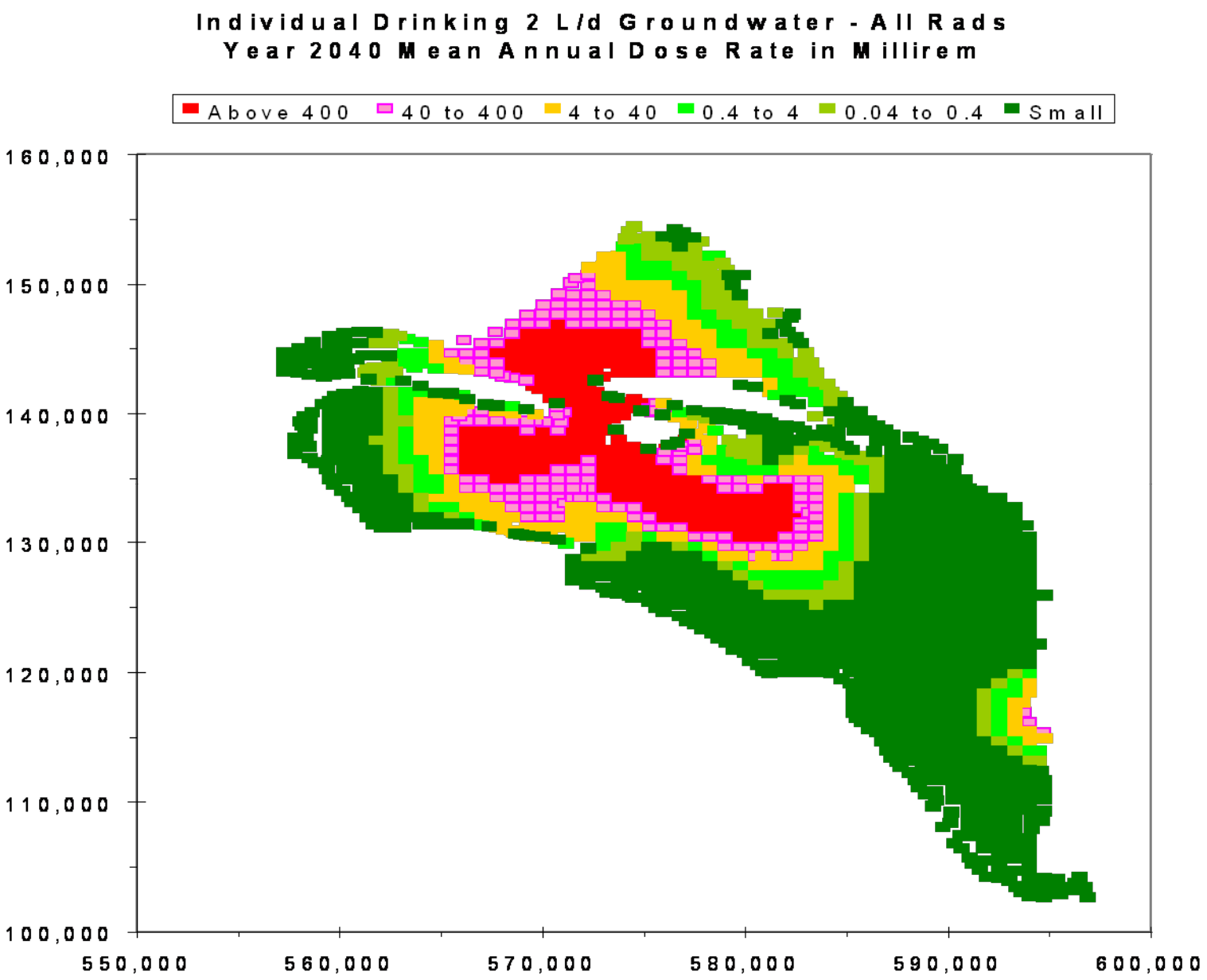
- Iodine in Groundwater in Year 3890
- **Tank residues and leaks are not cleaned up (landfill closure);** 200 East IDF landfill only
- Darkest red is >50x DWS
- Table 6-45

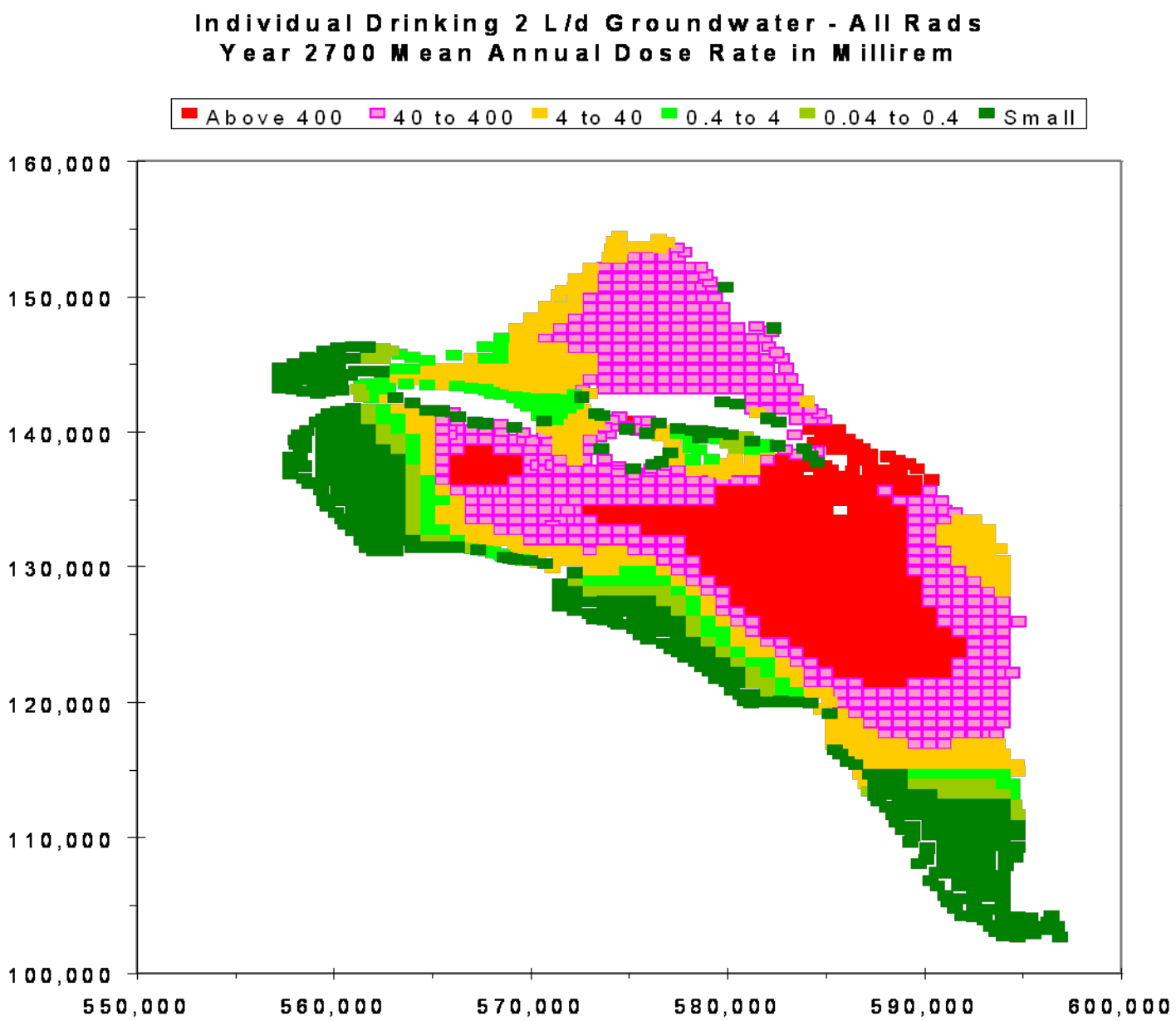


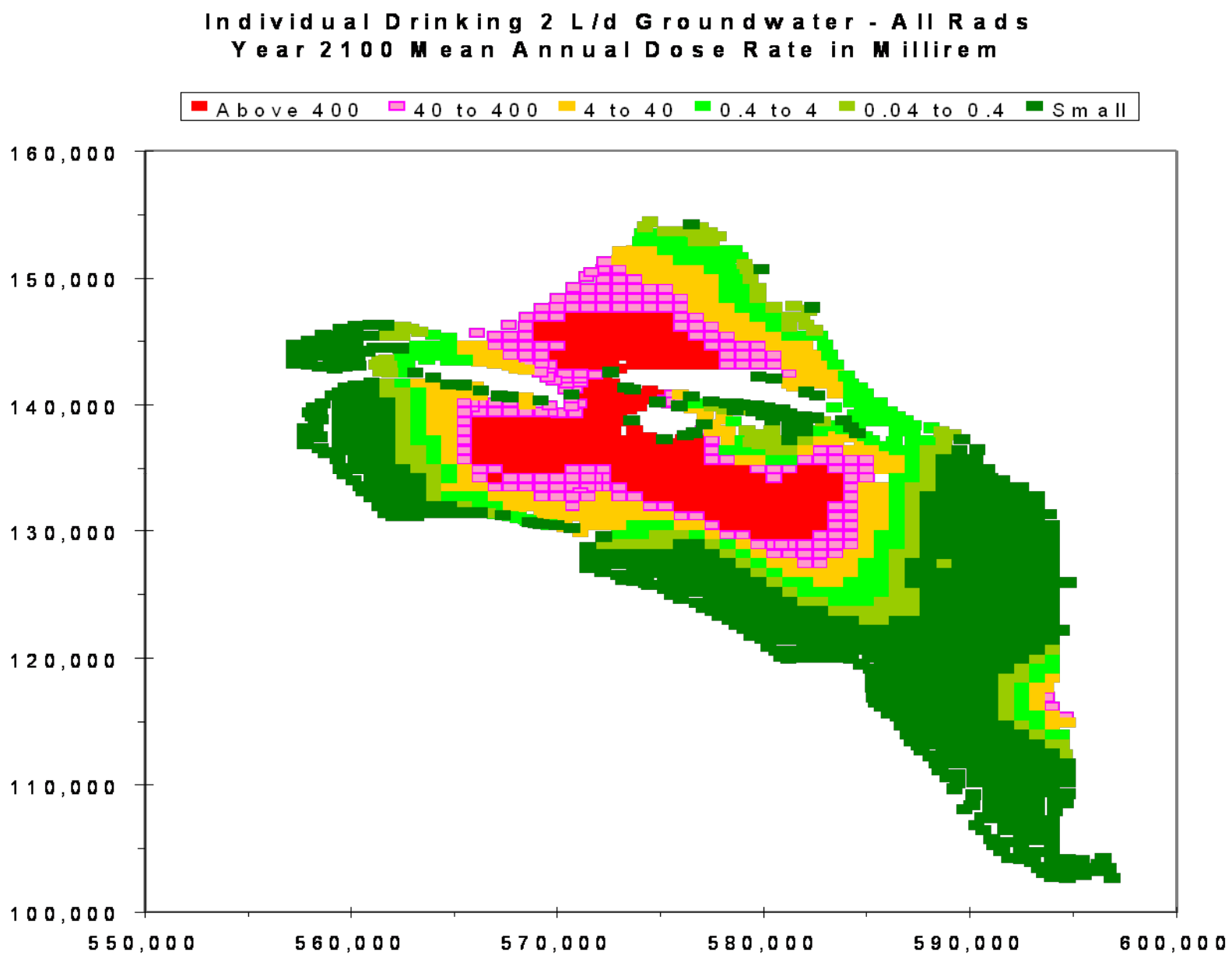
Impacts of USDOE's Plans (Combo Alt 2) – Radioactive Iodine 129

- Iodine in Groundwater in Year 7140
- Tank residues and leaks are **not cleaned up (landfill closure);** 200 East IDF landfill only
- Darkest red is >50x DWS
- Table 6-46




Individual Drinking 2 L/d Groundwater - All Rads
Year 2040 Mean Annual Dose Rate in Millirem
Above 400
40 to 400
4 to 40
0.4 to 4
0.04 to 0.4
Small
160,000
150,000
140,000
130,000
120,000
110,000
100,000
550,000
560,000
570,000
580,000
590,000
600,000


Individual Drinking 2 L/d Groundwater - All Rads
Year 2700 Mean Annual Dose Rate in Millirem
Above 400
40 to 400
4 to 40
0.4 to 4
0.04 to 0.4
Small
160,000
150,000
140,000
130,000
120,000
110,000
100,000
550,000
560,000
570,000
580,000
590,000
600,000


Individual Drinking 2 L/d Groundwater - All Rads
Year 2100 Mean Annual Dose Rate in Millirem
Above 400
40 to 400
4 to 40
0.4 to 4
0.04 to 0.4
Small
160,000
150,000
140,000
130,000
120,000
110,000
100,000
550,000
560,000
570,000
580,000
590,000
600,000

6 sets of High-Level Nuclear Waste Treatment Alternatives Presented

- Vitrification Plant (WTP) is $8 billion over budget and delayed 8 years to start up in 2019. It is only designed with capacity to treat half of the volume of "Low Activity Waste" from the tanks.
- "Supplemental" treatment refers to how to treat the other half of the waste.
- Only one alternative proposes to treat all waste with current roadmap of separating High Activity Waste (10% volume with 90% of radioactivity) from Low Activity Waste (LAW) (90% volume with 10% radioactivity), followed by a second LAW vitrification plant

Key Decisions USDOE Proposes to Issue Using TCWMEIS:

- How to treat the 50% of tank waste volume that the Vitrification Plant is not designed with capacity to treat in 50 years?
  - Vitrification Plant (WTP) is $8 billion over budget and delayed opening from 2011 to 2019. The High Activity Waste vitrification portion is designed to glassify the 10% of volume with highest radioactivity, but the Low Activity Waste (LAW) portion is only designed to glassify half of the remaining 90%.
  - The LAW glass is planned to be buried at Hanford, only the HAW glass is stored for disposal in a geologic repository.
- Options:
  - Build second LAW plant (WA State preference)
  - Use less effective thermal treatments (steam reforming or bulk vitrification) or, grouting; or, delay making a decision until after the year 2015
    - WA State agreed to delaying choice in settlement proposal

Key Decisions USDOE Proposes to Issue Using TCWMEIS:

- How to Dismantle the FFTF Nuclear Reactor?
- Decision to shut it down permanently was made 2001 after long battle. Sodium drained.
  - Nuclear proponents want USDOE to reopen
- Choices are to entomb or to remove structure above grade
  - USDOE prefers entomb; state reactor siting law says remove (removal chosen for reactors along River)
- Whether to truck radioactive sodium and highly radioactive components to Idaho National Lab or to treat at Hanford?

How to comment and organize!

- We need to send message to USDOE (and WA) with large turnout and strong comments
- Without public outcry, Hanford will be a national radioactive waste dump and the contamination of the Columbia River will grow as you have seen
- It is UP TO YOU to protect our environment and future generations
- Come to at least one hearing, plan to speak up for 2-3 minutes, send in more detailed comments (addresses on handouts). Great if you can attend two.
- Phone bank to urge others to come to hearings around region. Start tomorrow! Email all your friends.
  - Host a cell phone bank party!
  - Ask your City officials, State reps and Members of Congress to have statements opposing Hanford as national waste dump and opposing abandonment of wastes at the hearings, and to send letter to Secretary of Energy.

Hearings and Workshops
Comments Must Be Sent by 3-19

- Feb 9 Hood River
- Feb 10 Portland (Feb 1 workshop)
- Feb 22 LaGrande
- Feb 23 Spokane
  - Feb 17 prehearing workshop by Heart of America Northwest at Spokane Community College
- March 1 Eugene (Feb 27 workshop at U of O PIELC)
- March 8 Seattle
  - March 6 (Sat) 10:30-12 workshop at Hugo House, Capitol Hill