Nuclear Power Task Force
Sept 24, 2014

Rep. Gerry Pollet, JD

Executive Director,

Heart of America Northwest

"*The Public's Voice for Hanford Clean-Up*"

www.hanfordcleanup.org

1st Question: Is Nuclear Power Cost Effective for WA Ratepayers Today?

- Market Test adopted for CGS (formerly WPPSS 2) operated by Energy NW
- McCullough Report December, 2013 makes clear that CGS has been failing market test for years
- Last year, NW ratepayers unnecessarily spent $200 million buying electricity from CGS instead of market
- **Closure would save ratepayers $1.7 billion**
- McCullough: expert witness Snohomish PUD (discovered and analyzed so-called Enron trader tapes…), testimony US Senate credited with start of investigation into manipulation Western electricity crisis, advisory WA AG, CA PUC, OR PUC… expert witness for City of Tacoma and Seattle City Light for refunds due to Western Market Crisis…

“Our conclusion:

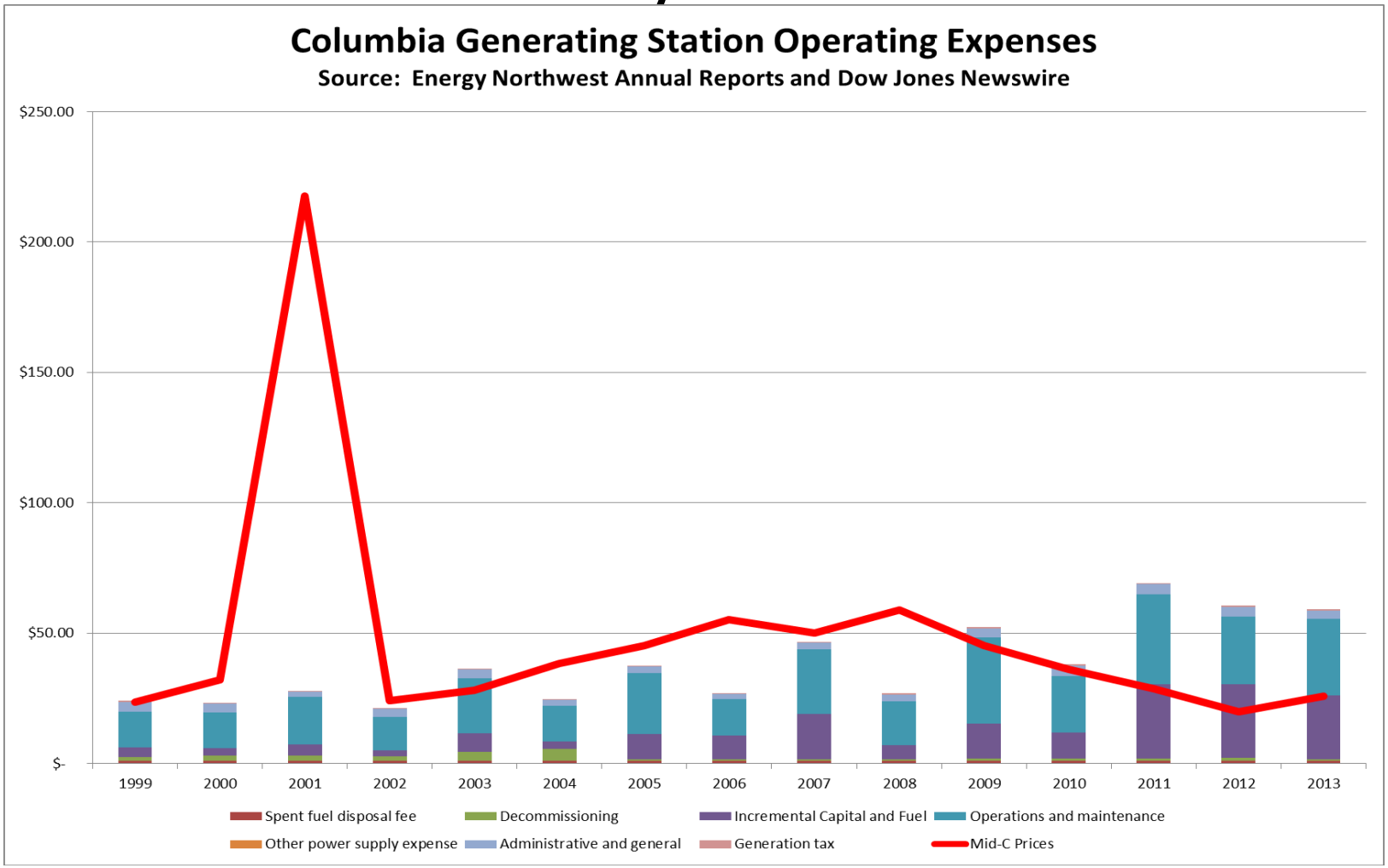
bolstered by many interviews with the project’s owners and operators, as well as industry representatives throughout the region, is that CGS can be replaced at a significant cost savings to the region’s ratepayers and utilities – approximately a $1.7 billion dollar saving.

- Our recommendation is that BPA issue a Request For Proposals (RFP) for alternatives and displace the unit within the current institutional framework.”

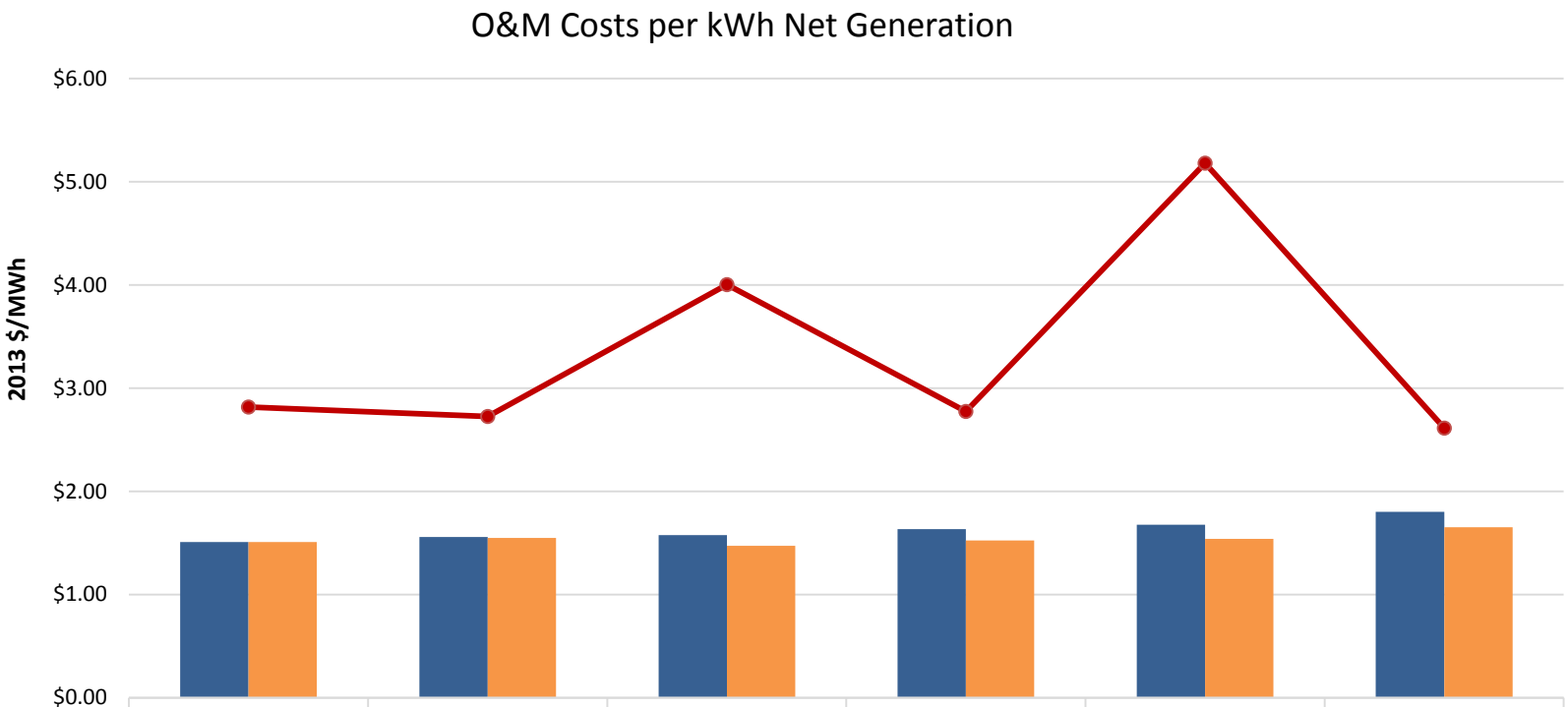
CGS Reactor Fails Market Test

- Market Test adopted by BPA and agreed to by ENW in late 1990s for Columbia Generating Station (CGS) nuclear power plant that recommended closure if the plant cost more than market prices.
- "our study of the present day economics of CGS finds that it has failed the Market Test since 2009."
- "We project that CGS will continue to cost more than market rates in years to come.
- "It also poses physical and financial risks, has an antiquated ownership structure, and is ill-suited to Mid-Columbia area generation operations."

CGS Reactor Operating Expenses Have Significantly Exceeded Mid Columbia Market Electricity Costs Since 2009:



CGS Operational Costs Far Above Industry Averages (McCollough at 9)



	2007	2008	2009	2010	2011	2012
FERC Form 1	$1.51	$1.56	$1.58	$1.63	$1.68	$1.80
NEI	$1.51	$1.55	$1.47	$1.52	$1.54	$1.65
CGS	$2.82	$2.72	$4.00	$2.78	$5.18	$2.61

Source: FERC Form 1 Large Plant Steam-Electric Generating Plant Statistics, NEI, and Platts CGS report

Energy NW Response

- "The study has been unnecessarily complicated by a lack of transparency at Energy Northwest. Even the simplest requests have been delayed by months. In a number of cases, our request for materials already provided to the press has experienced a lengthy delay before response."
- ENW Unwilling to be subject to the market test
- Counter study does not dispute basic economics, rather points to theoretical benefit of diversity and erroneous hypothetical replacement with new natural gas, rather than actual market availability of power as shown by McCullough.
  - ENW counter ignores much lower cost of meeting demand with efficiency / conservation investment, particularly if we have new incentives for utilities to count conservation

Recommendation: let market decide

- "recommending the issuance of a Request For Proposals (RFP) to see if the unit can be replaced with long-term options that are less costly, less risky, and better fitted to regional needs. If the RFP provides cost savings for BPA and its customers, CGS would commence decommissioning at the end of its current refueling cycle in 2015."
- Also avoids major costs of upgrades to meet Fukushima requirements, fuel, etc…
- *Market Test with long-term contract replacing is consistent with concerns about impact on consumers of purchasing power that is not needed*.

Recommendation: let market decide

- It will cost ratepayers hundreds of millions more to upgrade safety of the CGS Plant to meet Fukushima related requirements. ***On top of paying these costs BPA ratepayers paid $200 million more for electricity from CGS last year than if BPA had closed the plant and bought the power on the wholesale market.***

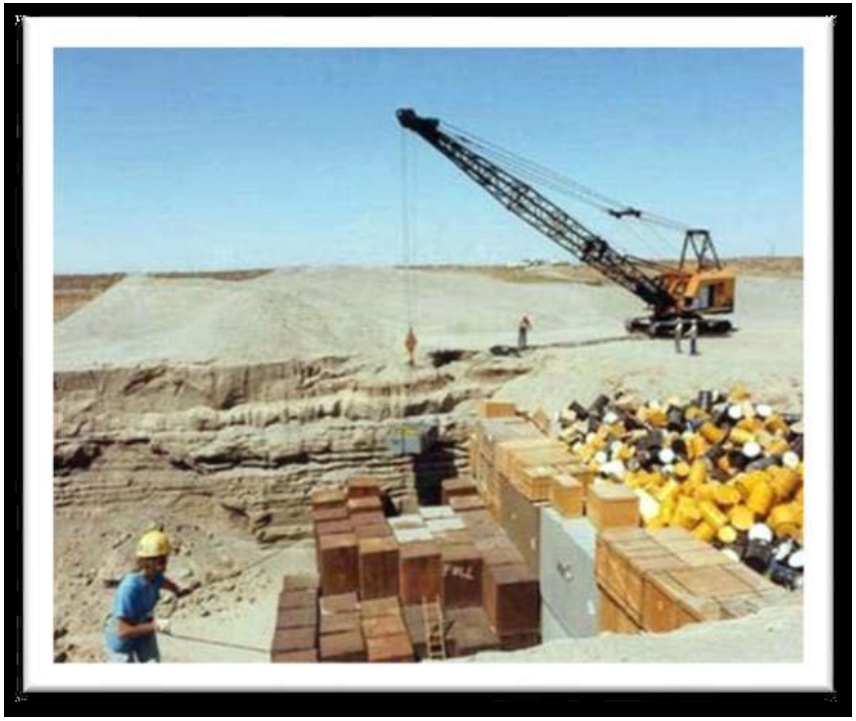
Recommendation: let market decide

- *"Aside from the inherent dangers embedded in nuclear power, the economics of CGS no longer makes sense. The plant should be displaced." - Recommendation 1*
- As reported in ***The Wall St. Journal***, ***Seattle Times***, ***The New York Times*** and more, the full report is at www.mresearch.com/reports.html

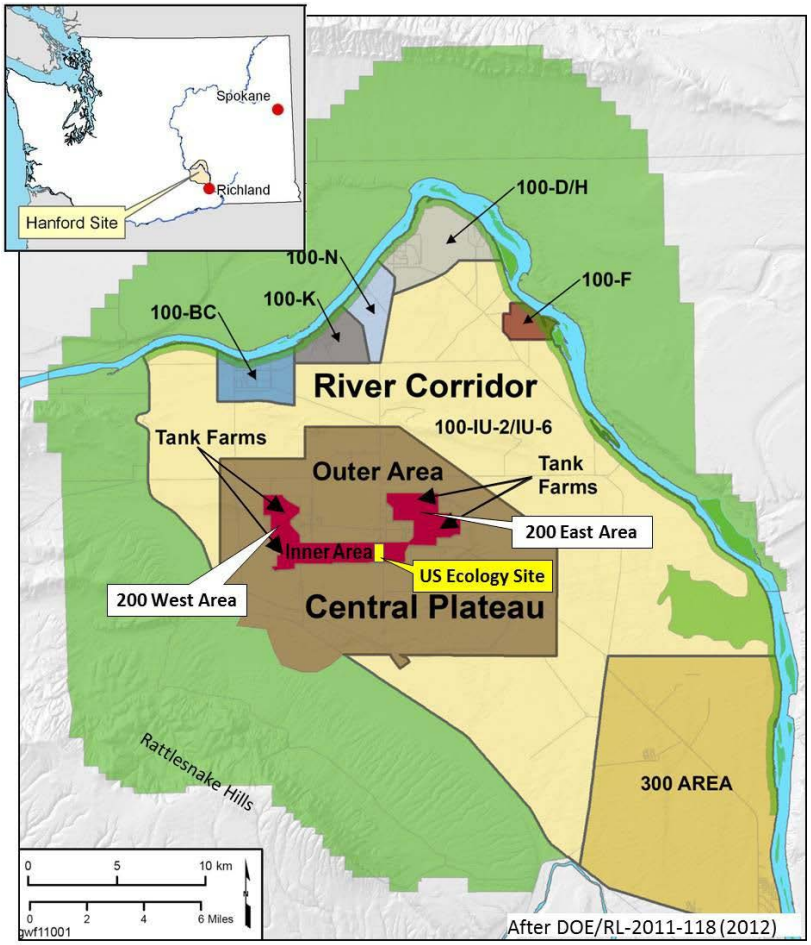
2nd Question, Consider **Waste** – Part of Committee Mandate

- Radioactive wastes from CGS which are not spent fuel are buried in **unlined, leaking landfill** operated by Washington State (under lease to US Ecology Corp) at Hanford
- ***Washington residents are subsidizing and bearing the risks PLUS paying the costs for cleaning up*** the contamination which should be paid for by the operator and generators.

Commercial radioactive LLW Dump operated by US Ecology Corp for WA State – trench disposal shown in years after RCRA barred municipal waste in unlined landfills



Location of leaking, unlined commercial radioactive waste dump operated by WA State, where CGS waste (other than spent Fuel) goes

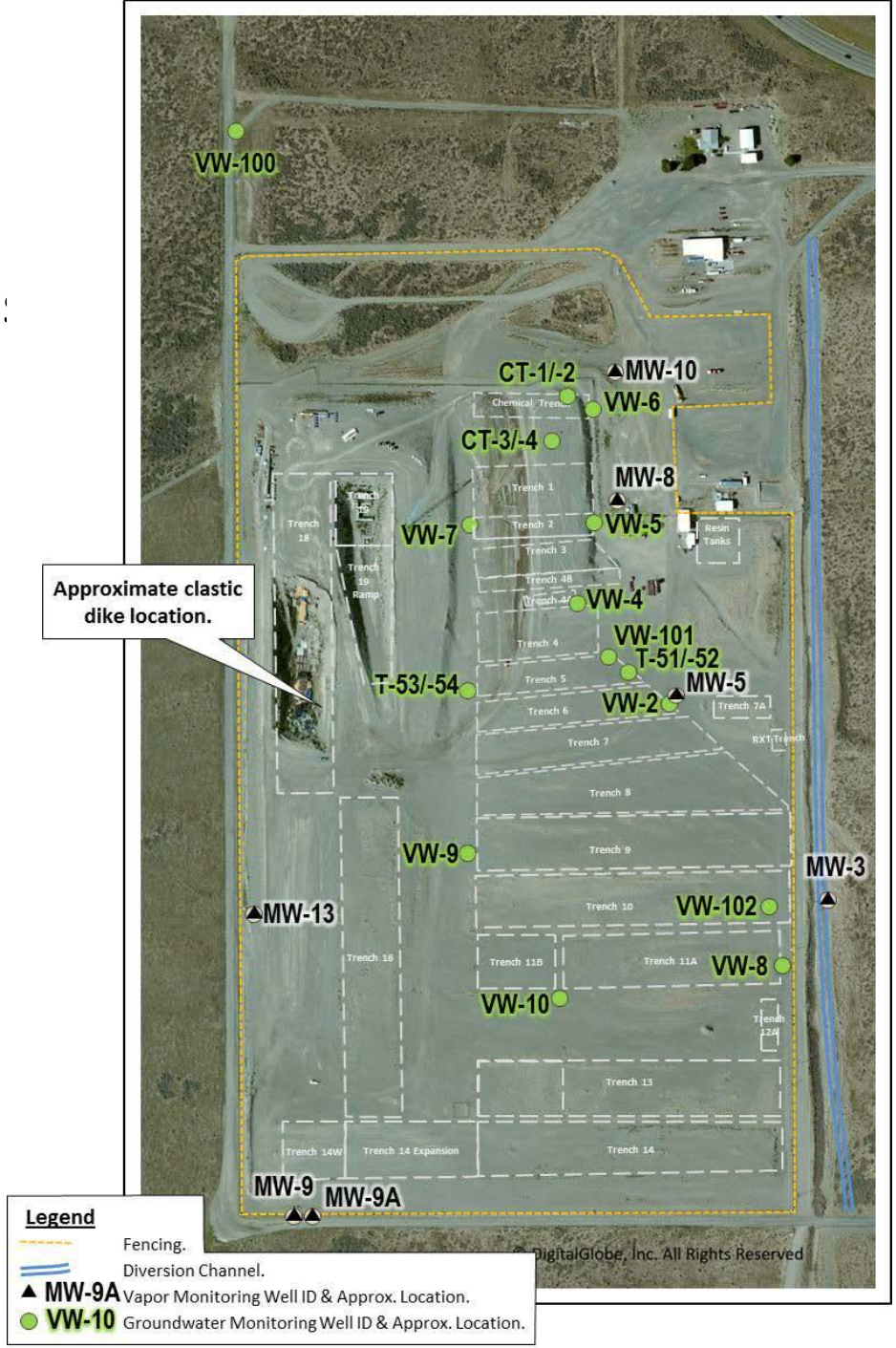


Contaminating Ground Water, Public Health Risk & Violating Treaty Rights

- WA State / US Ecology Co. unlined, leaking radioactive waste landfill contamination of groundwater projected to cause fatal cancer risk in 2.5 - 5% of Native Americans using groundwater pursuant to rights downgradient
  - WA State MTCA standard is 1 additional cancer for every 100,000 people exposed
  - Even DoH says Native American adults using groundwater will have risk 40x higher than MTCA
  - This is a significant justice issue treating Native American health risk differently than everyone else's
- State's taxpayers shouldn't be paying millions in capital budget to cleanup from private operation

"Trenches 1 through 11A contain wastes that were packaged in metal drums, fiberboard drums, and cardboard boxes."

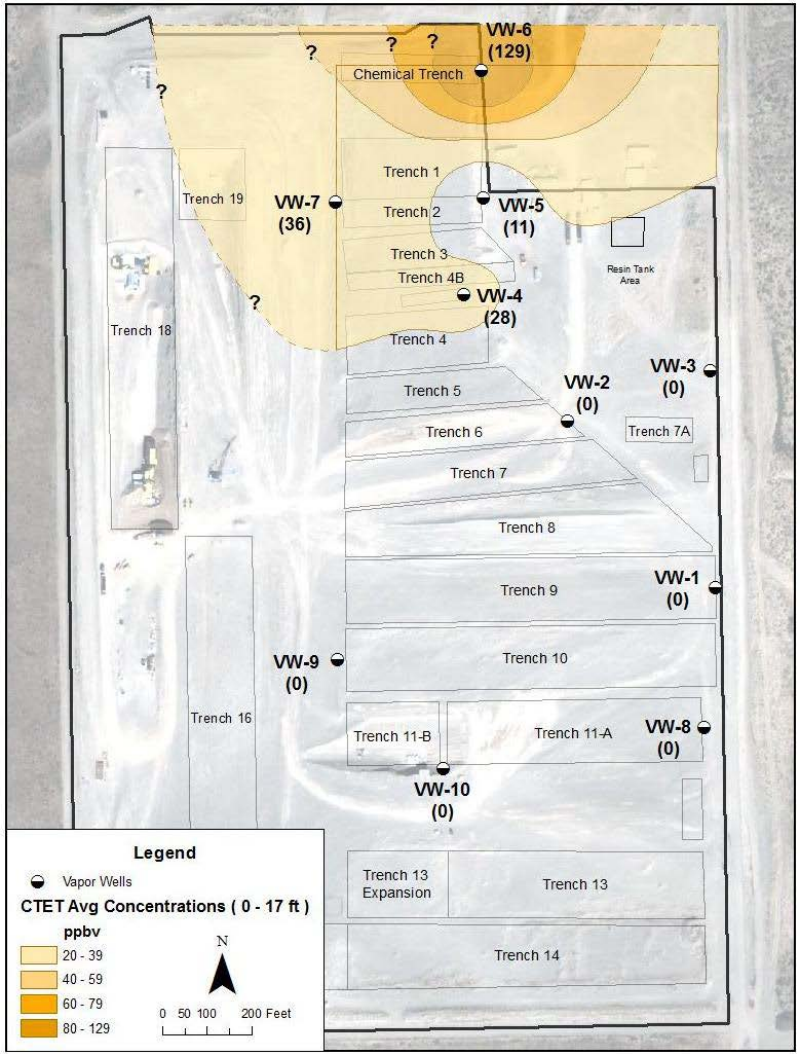
Conceptual Site Study Table 3-4
VET 8-2013



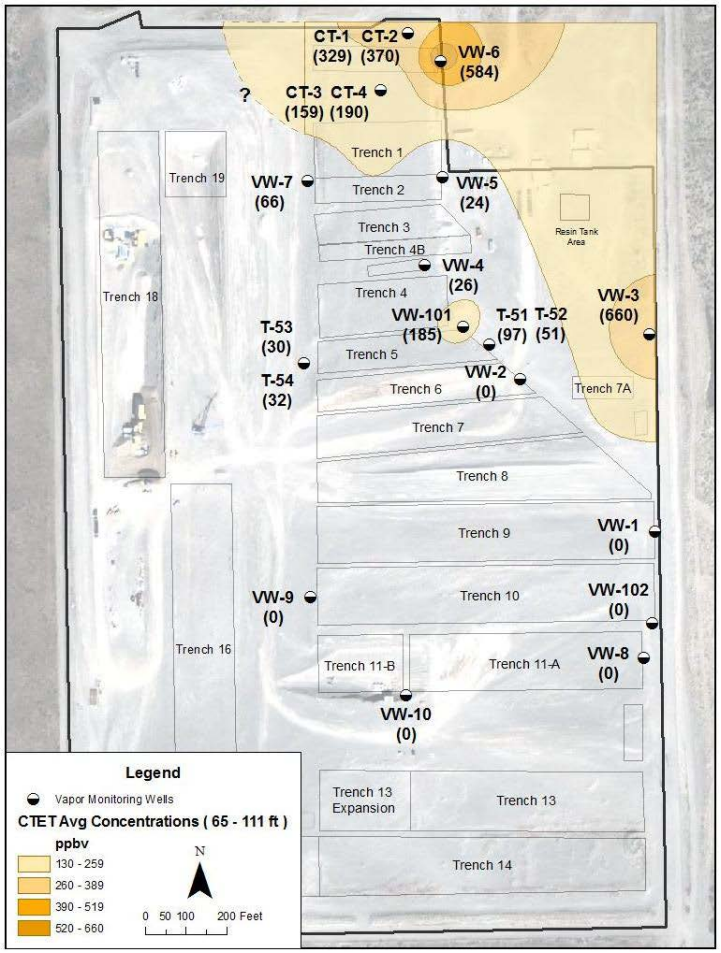
Unlined Trench in current use bisected by clastic dike, which is likely preferential pathway for infiltration and migration of contamination to groundwater

Conceptual Site Model Figure 2-5

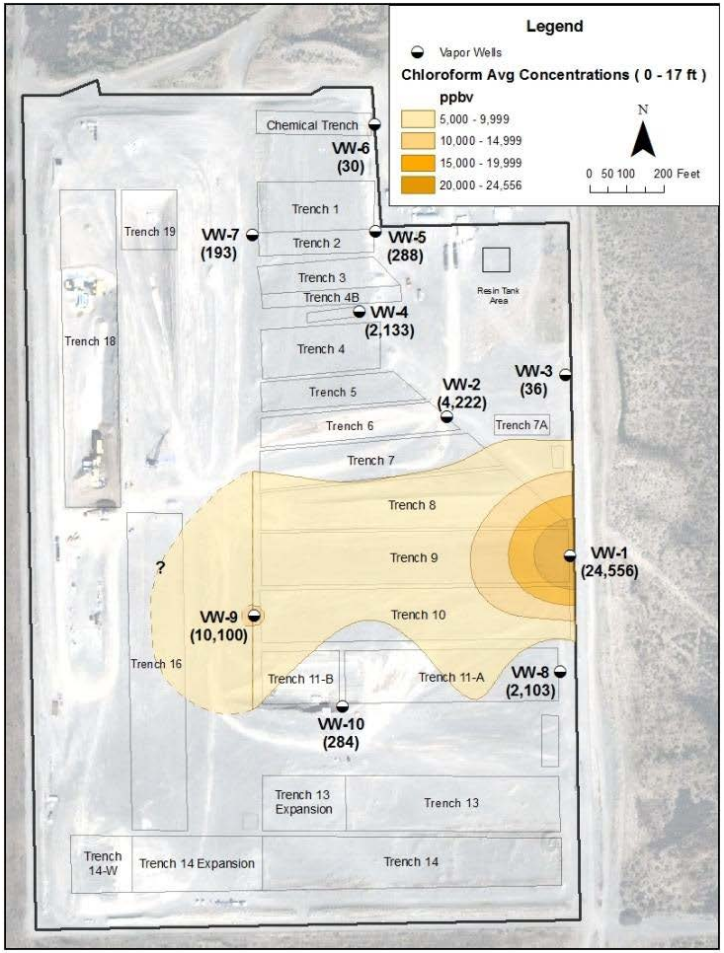
Carbon Tetrachloride spreading in soil vapor from unlined trenches just below surface



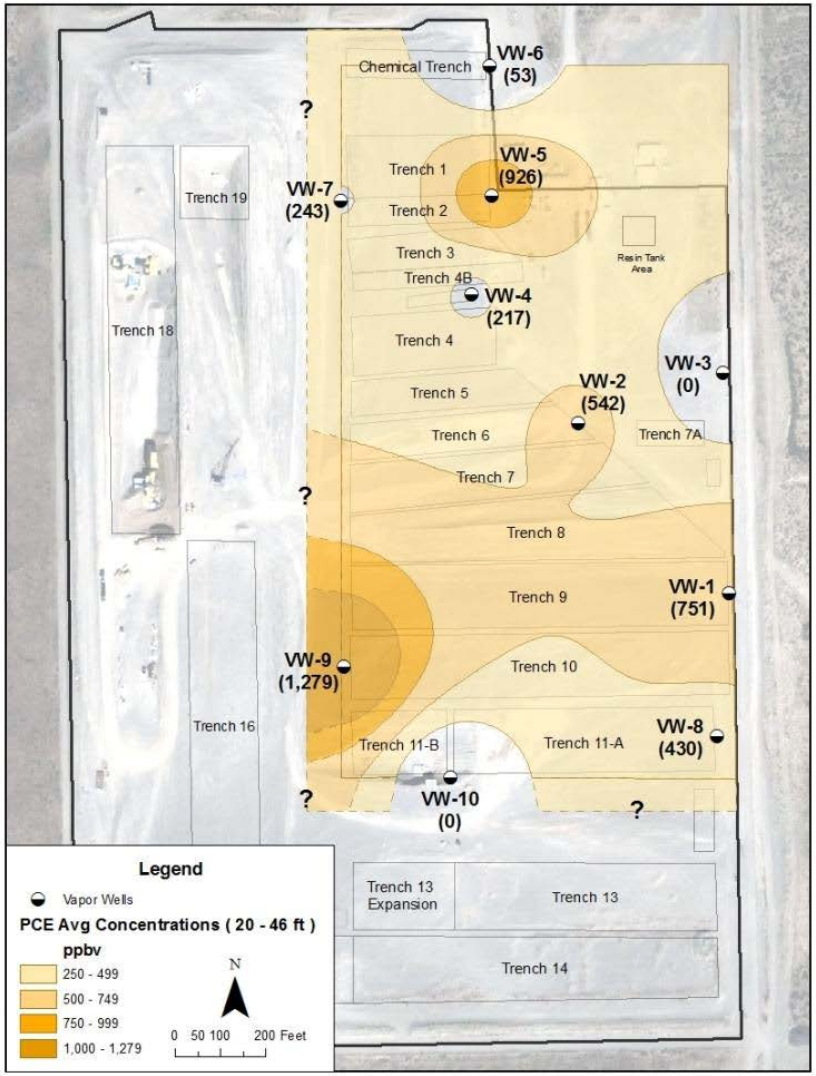
Carbon Tetrachloride spreading 65-111 feet below surface (figures VET 8-22-13 Conceptual Site Model)



Chloroform spreading (this map shows plume spreading from surface to 17 feet below surface from leaking unlined trenches)



PCE (tetrachloroethene) contamination spreading– evidence shows source likely in, or impacting, current and recent unlined trenches



Cost of Remediation Should Not be Borne by WA Taxpayers

- WA Dept of Ecology paying: asking for capital budget $16 million + just to put cover over unlined trenches… should be rejected. Instead require real cleanup, paid by polluters.
- This is “cover-up”, not clean-up
- Stop treating the commercial radioactive waste dump differently than other MTCA sites
- Company operating, and generators of waste, should be paying for full cleanup to meet MTCA standards, including for Uranium. Taxpayers should not be paying.
- Cover is like a bandaid. It doesn’t cleanup or stop contamination. Contamination of groundwater from Uranium alone will cause fatal cancer risk to Yakama Nation members using groundwater at 40 x to 400+x what we call “acceptable risk” for all other sites.

Question 3: What's Solved if "Reprocessing" Waste and Plutonium Fuel (MOX) Creates More Waste and Risks?

- Reprocessing is what created Hanford's intractable liquid High-Level Nuclear Waste problems
- Creates more liquid High-Level Nuclear Wastes with no treatment, and ultimately requiring treatment and solidification and disposal in a geologic repository… which we don't have.
- Extracts Plutonium – a tiny portion of the spent fuel, while creating massive wastes requiring disposal.

Energy NW embarked on importing Plutonium fuel without regard for costs or risks

Energy Northwest continues to endorse a phased approach to MOX fuel introduction into a US boiling water reactor (BWR) beginning with the irradiation of MOX fuel rods. Energy Northwest will
rec
inc **REDACTED** **REDACTED**

In addition, Energy Northwest believes that valuable information can be obtained from an effort to identify the optimum fraction of MOX fuel in a representative BWR core. This fraction will be determined in part by limitations inherent in the reactor structures, systems and components, which cannot be modified in a cost effective manner to permit higher core fractions of MOX fuel. In addition to those analyses performed by the fuel vendor and the nuclear steam supply system (NSSS) vendor, Energy Northwest will [redacted]

Budgetary estimate for EN:
Travel: $[redacted]
Analysis: $[redacted]

Prepared by Lisa Ferek 12/14/09

Seattle Times Page 1 Saturday March 19, 2011

Plutonium fuel could be used at Hanford power plant

Washington's only nuclear-power plant is considering use of the plutonium fuel that has raised special concerns about one of Japan's damaged nuclear reactors. By Sandi Doughton Seattle Times science reporter

The operator of Washington's only nuclear-power plant is considering use of the plutonium fuel that has raised special concerns about one of Japan's damaged nuclear reactors.

Officials at the Columbia Generating Station, on the Hanford nuclear reservation, have been quietly discussing the use of so-called mox fuel for at least two years — but had hoped to keep the fact out of the news.

Seattle Times, p 1 3-19-11 cont'd"

- In the case of an accident, some experts say fuel made from highly toxic plutonium can produce more dangerous fallout than standard uranium fuel. Plutonium fuel is also harder to control,

MINUTES OF THE
ENERGY NORTHWEST
REGULAR BOARD OF DIRECTORS' MEETING
MULTIPURPOSE FACILITY – GLENN C. WALKLEY ROOM
3000 GEORGE WASHINGTON WAY
RICHLAND, WASHINGTON
APRIL 21, 2010 – 9:00 A.M.

One of the initiatives that was started a number of years ago at Energy Northwest was

researching the option to burn mixed oxide fuel (MOX) at Columbia because in the future

there will be opportunities to use plutonium as fuel in commercial reactors to generate energy….

MINUTES OF THE
ENERGY NORTHWEST
REGULAR BOARD OF DIRECTORS' MEETING
cont'd:

Small nuclear reactor study group

- The study group has been working with Public Affairs on a communication strategy to address public perception and acceptance.
- The study group will be meeting with the Department of Energy (DOE) at the end of the month to discuss the potential for partnering with DOE on a demonstration plant for the small nuclear units.
- Discussion ensued regarding public perception on the west side of the state, risk management, the price of natural gas, the President's mixed message about nuclear with the shut-down of the Yucca Mountain repository, meeting the Governor's environmental goals, and Energy Northwest's leadership responsibility to educate the public on energy options.

Carbonless Energy Park

- E/BS is still looking for approximately 20 square miles of land through a lease or land transfer that is on the Hanford site in close proximity to Columbia to build energy resources on that are very low carbon neutral or carbonless.
- Staff has met with DOE regarding a potential land transfer. DOE has done a good portion of the environmental assessment and is contemplating a potential lease/transfer of approximately 300 acres for development.

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February 4, 2011

Ms. Monica Chavez
Pacific Northwest National Laboratory
902 Battelle Boulevard
P.O. Box 999, MSIN K8-18
Richland, WA 99352

Dear Monica,

Subject: **RFP 156466 EVALUATING THE USE OF MOX FUEL IN ENERGY NORTHWEST'S COLUMBIA GERERATING STATION**

In response to PNNL's subject RFP, Energy Northwest submits the attached Pricing Proposal for the subject scoping studies contained in the Statement of Work for RFP 156466.

This Price Proposal is subject to the following changes:

Statement of Work

- Deliverables and Schedule (Task One)
  2. Licensing Study (Early Introduction), due 7 months after contract award
  3. Physical Study Impact Report, due 7 months after contract award

- Deliverables and Schedules (Task 2)
  MOX usage in Columbia Generating Station Risk Assessment Report, due 9 months after contract award.

- Deliverables and Schedules (Task 3)
  Energy Northwest MOX Fuel Reload Licensing Plan, due 11 months after contract award.

This increase in schedule is required due to the large outage the Energy Northwest will undertake in the first part of 2011.

ENW Openness? 3 months after agreement shown above… for public briefing and answering legislators', press Qs, ENW denies:

- **From:** Paoli, Michael J. **|** Public Affairs Energy Northwest

Sent: Tuesday, May 10, 2011 1:09 PM

To: Olson, Rochelle G.

Subject: Talking points for Boise trip

For review

Dale, good afternoon.

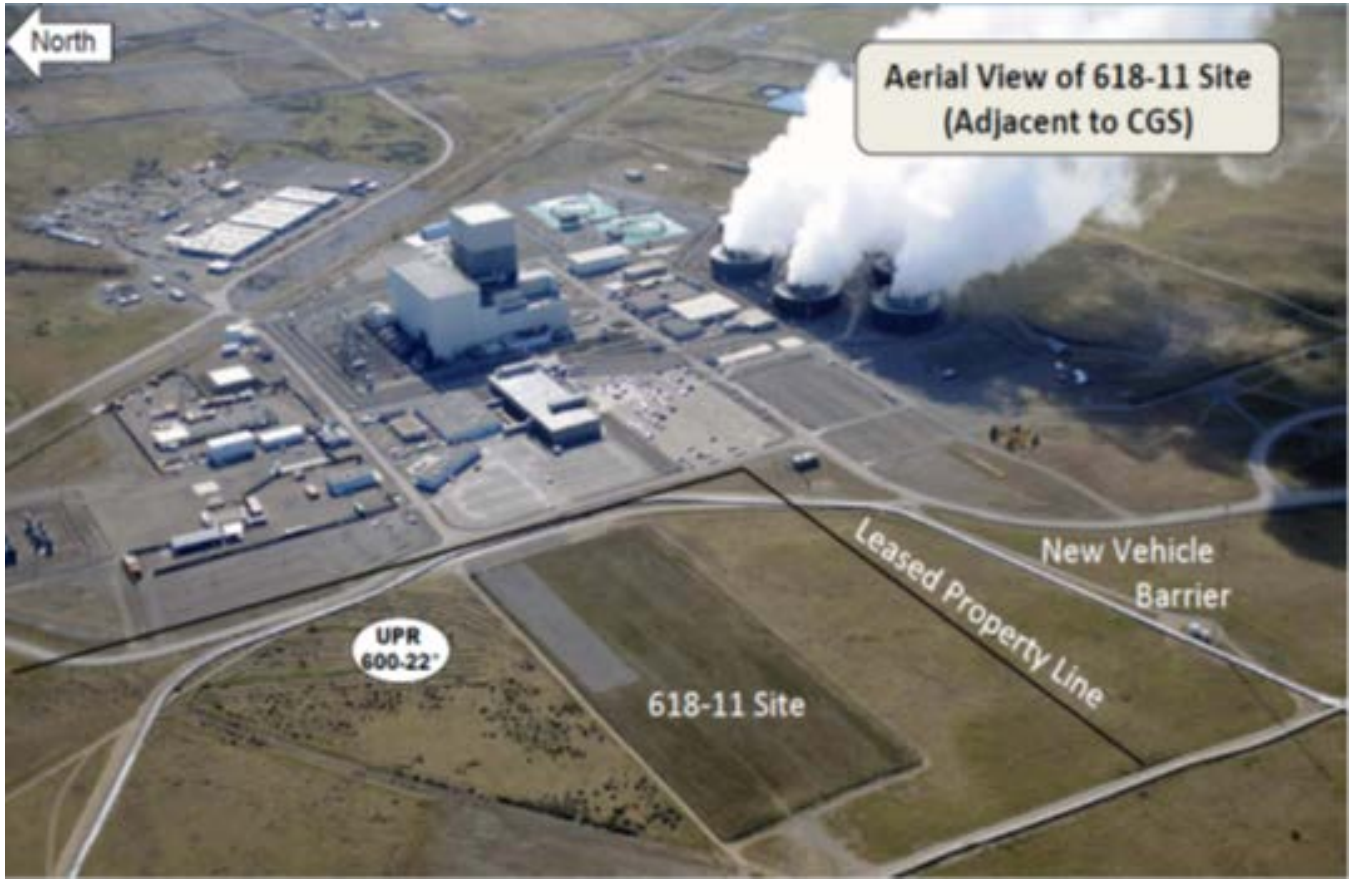
Attached are the documents John Dobken created (opening presentation remarks and answers to proposed questions), along with Mark's recent presentation to the State Energy Strategy Advisory Committee and our MOX fuel talking points.

(The latest tone I've struck with regard to MOX fuel has begun with, "To be honest, The study of MOX fuel potential isn't even on our scope right now,

Land Proposal Ignores:

- Extremely dangerous waste area just outside Energy NW CGS Reactor parking lot – requires exclusion, robotic removal of extremely radioactive Transuranic wastes…
- Potential use for large scale solar in partnership with USDOE, e.g., to meet demand for vitrification plant – much more realistic; private capital available…
- Native American Tribes have both Treaty Rights and federal statutory right to obtain land, plus federal law on adding to Hanford Reach National Monument. Repeatedly ignored in discussion. Ignores cultural and religious resources.
- SMRs are decades away from commercialization, Hanford not chosen as demonstration site by USDOE

Extremely radioactive waste burial ground with high airborne risk during remote retrieval next to CGS Reactor Parking lot:



How much ratepayer funding was wasted on Energy NW's Plutonium Fuel initiative???

- High risks of importing Plutonium back to Hanford never considered
- Massive waste stream from reprocessing, including more liquid High-Level Waste, never considered. Waste from processing Plutonium fuel at Hanford, and where / how disposed never considered.
- Internal staff documents' as well as external experts' warnings of much higher catastrophic risks and radiation releases ignored.

Question 4: What is the Safety of Spent Fuel at CGS, and How or When, Will the US Dispose of High-Level Radioactive Wastes?

A Reminder:

- Hanford was 1 of 2 finalists in 1986 for nation's first High-Level Nuclear Waste Dump (repository)
- Voters (84%) passed Referendum 40 in opposition and creating state process to review.
- Numerous proposals to send nation's Spent Fuel & highly radioactive GTCC waste from reactors to Hanford for storage in recent years including …

Risks of Trucking Spent Fuel

The Risk of >17,000 Trucks of Waste

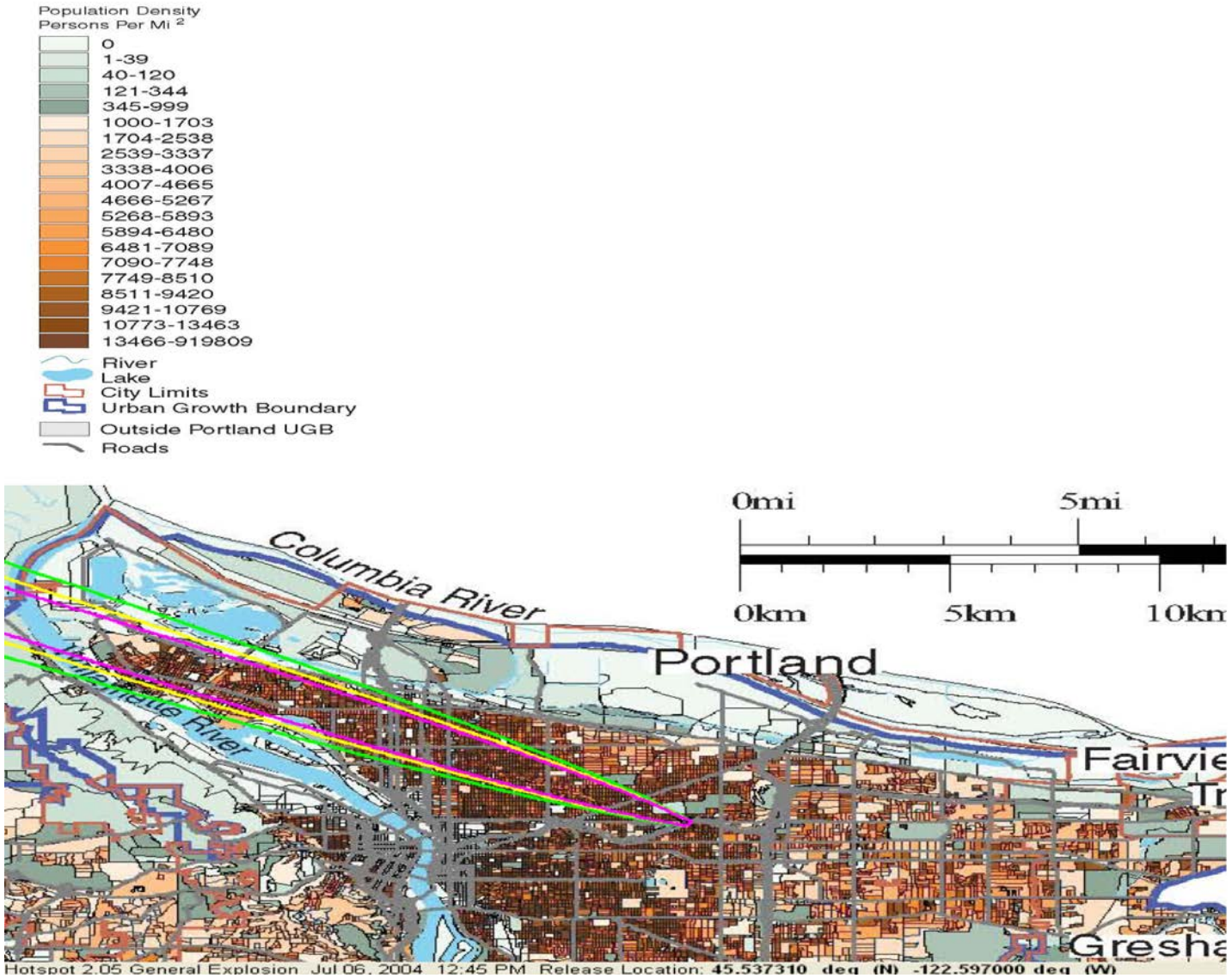
Cancer Risk from Trucks Even Without an Accident or Terrorist Attack:

- 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.

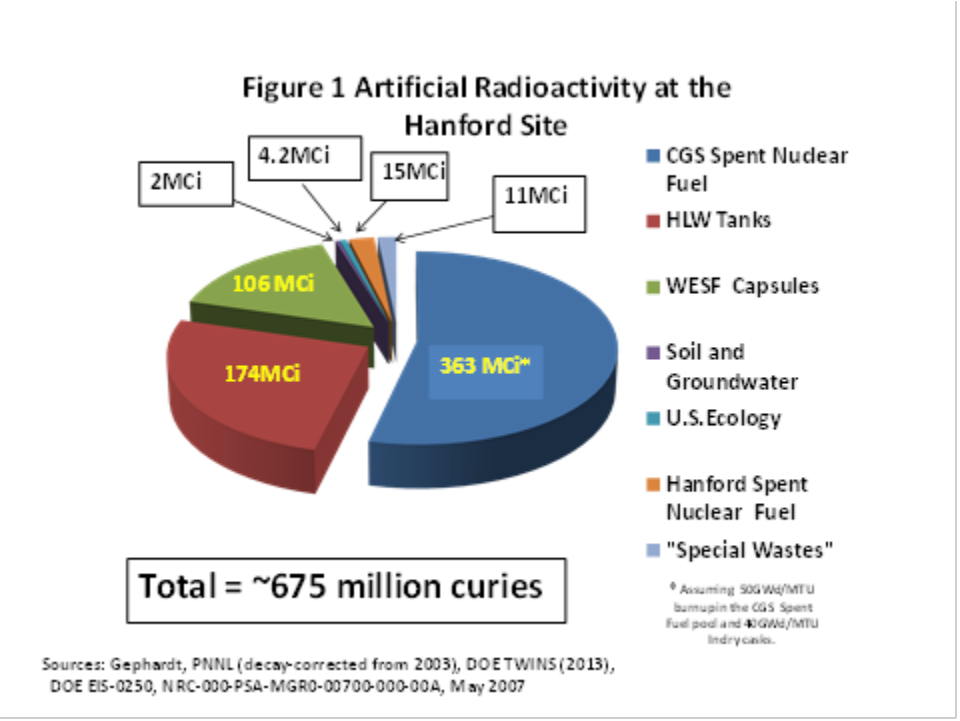
Accident or Terrorist Figure 6. Approximately 350 Square Miles Could Be Exposed to Dangerous Radiation in The Event of an Attack



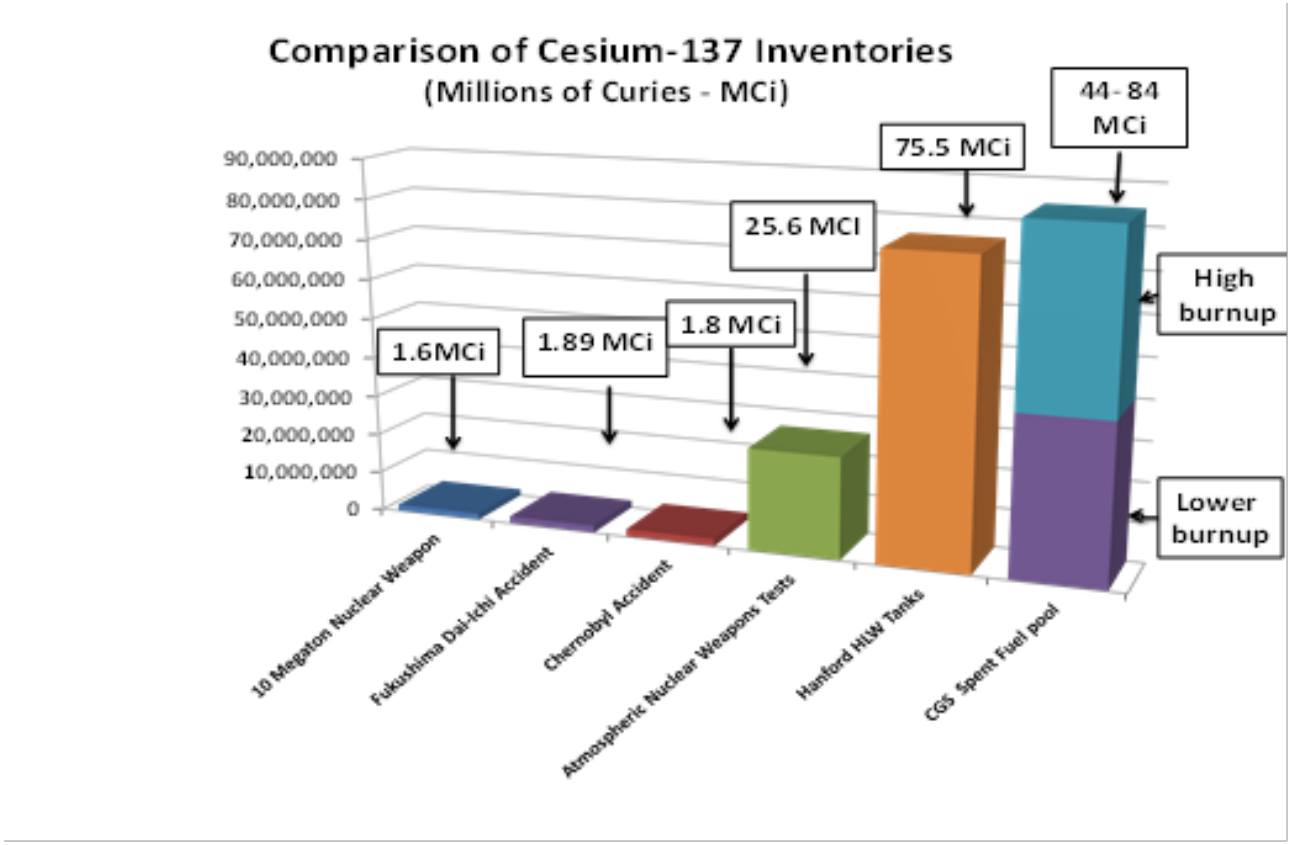
What Are Risks From Storing Spent Fuel at CGS Reactor Pool?

- GE Mark 2 Reactor design with fuel pool several stories up, same as at Fukushima Mark 1 Reactors.
- Spent Fuel and Disposal not considered in NRC's licensing renewal EISes
- New Seismic Risk Studies …
- CGS was not designed to withstand quake risks now known to exist. Recent geologic studies found quake threats could exceed the design standards by more than three times.
- Data Presented on following slides from new report by Robert Alvarez, Fellow at Institute for Policy Studies & former Sr. Policy Adviser to Secretary of Energy, for PSR and HoA

CGS Spent Fuel is already majority of radioactivity at Hanford - over the next 30 years, CGS is projected to generate 300 to 400 percent more long-lived radioactivity than currently in Hanford's HLW tanks



The amount of Cs-137 in the CGS pool is about 2 to 3 times more than released by all atmospheric nuclear weapons tests (See Figure 2) and about 24 to 45 times more than released by the Chernobyl accident.



Spent Fuel Pool Fire Disastrous:

- Dr. Allison Macfarlane, Chairman of the U.S. Nuclear Regulatory Commission (NRC) noted in April, 2014 that "land interdiction [from a spent nuclear fuel pool fire at the Peach Bottom Reactor in Pennsylvania] is estimated to be 9,400 square miles with a long term displacement of 4,000,000 persons [See Attachment 1]." By comparison, the Fukushima nuclear disaster resulted in eviction of approximately 160,000 people from their homes, food restrictions, and the costly and uncertain remediation of large areas.
-
- Like the reactors at the Fukushima accident site, the CGS pool is elevated several stories above ground and currently holds the equivalent of roughly two spent reactor cores – more than the Fukushima Unit No. 4, which held the largest inventory among the damaged reactors and still poses an accident risk.

The CGS Reactor Spent Fuel Pool Risks:

- The CGS pool was originally designed to hold about three times less than its current capacity and was intended for a 5-year storage period.
  - Prior to startup in 1984, the original spent fuel pool racks were designed to hold 1,020 fuel assemblies, but were substituted with high density racks that accommodate 2,652 assemblies. U.S. Nuclear Regulatory Commission, Spent Fuel Project Office, WNP-2 Spent Fuel Storage, September 1999. http://pbadupws.nrc.gov/docs/ML1312/ML13126A169.pdf
- As a result, the pool lacks the same "defense in depth" protection as the reactor core.
- For instance, the CGS spent fuel pool is not under thick and heavy secondary containment that covers the reactor vessel, and does not have its own independent power or water supply.

High Risks - CGS Reactor Spent Fuel Pool

- The fuel pool cooling system was originally designed to maintain the pool at a temperature of less than or equal to 125°F during refueling activities with both trains of fuel pool cooling in operation and reactor cooling water (RCC) at 95°F.
- However, the Final Safety Analysis Report (FSAR) for the Columbia Generating Station, … does not address the temperature limits for an unanticipated full core offload, in which one of the two heat removal systems is disabled. The NRC exempts Energy Northwest from having back-up for a single failure of one its two heat exchangers, "based on the expected infrequent performance of a full core offload."
- However, in January 2014, when pressed about this matter by the NRC, Energy Northwest revealed that the heat in the SFP will be "on the order of three times greater than that of a normal refueling," after discharge of a full irradiated core.
- NRC also noted that **Energy Northwest had not performed the necessary calculations of the time when boiling in the pool would occur from emplacement of a full irradiated core in the pool**. Op. Cit. Ref. 1 p. 9.1-27.
    - U.S. Nuclear Regulatory Commission, Interim Staff Evaluation and Audit Report by the Office of Nuclear reactor Regulation Related to Order EA-12-049 Modifying Licenses With Regard to Requirements For strategies for Beyond-Design-Basis External Events, Energy Northwest, Columbia Generating Station, Docket No. 50-397. http://pbadupws.nrc.gov/docs/ML1333/ML13337A266.pdf

The CGS Reactor Spent Fuel Pool Poses Unique Risks from being at Hanford:

- According to the Nuclear Regulatory Commission, the Columbia Generating Station is one of ten BWR,'s in the U.S. which "are more reliant on infrequently operated backup cooling systems than other similar plants because of the absence of an onsite power supply for the primary SFP[spent fuel pool] cooling system or low relative capacity of the primary cooling system."
  - No consideration of risks and unavailability of water and power due to CGS' unique co-location at Hanford with numerous other nuclear facilities which would also need power and water restored to avert catastrophe in earthquake below maximum possible; or, that the Hanford facilities' releases of radiation will make it impossible to bring equipment and water to CGS.

Occupational Radiation Doses High at CGS

- The NRC reports that radiation exposures to workers at BWR's in the United States in 2011 was more than two and a half times higher than at pressurized water reactors (PWR). This is because of the single loop coolant design which allows BWR's to contaminate larger amounts of plant equipment than Pressurized Water Reactors.

Occupational Radiation Doses High at CGS

- CGS had the third largest collective exposure among the 28 currently operating single unit reactors in the U.S. between 1997 and 2011 (See figure 15).
- Moreover, from 1999 to 2011, the Columbia Generating station was responsible for nearly half of the collective worker dose of all facilities located on the Hanford site, including Energy Department facilities (See figure 5).
- As noted in a December 2011 NRC inspection report, "the willingness to work around substandard procedures was a long-standing operator behavior."

Doesn't NRC address consequences of severe accident in EIS for relicensing?

"Assessing Consequences of a Severe Accident

Let us now examine what Chapter 5 of a typical DLR EIS states about the impacts of a severe accident. Chapter 5 typically

repeats a "canned" statement such as:

> The probability weighted consequences of atmospheric releases, fallout onto open bodies of water, releases to ground water, and societal and economic impacts from severe accidents are small for all plants. However, alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives.

Thus, out of a typical DLR EIS that may contain perhaps 140,000 words or so, the stakeholders and public are provided with a terse 48 word statement assessing the impacts of a potentially catastrophic accident that could threaten millions.

This terse statement about the consequences of a catastrophic accident is all that DLR supplies to stakeholders and the public. An appendix generally provides some supporting information on the methodology used to reach this conclusion."

Charles Eccleston, NAEP National E-News, June 2012 (Eccleston is "*a leading international expert on NEPA, environmental impact assessment, and environmental policy issues. He frequently consults on complex NEPA, and environmental and energy issues. Eccleston is the author of nine books and 70+ articles and professional publications. His books cover subjects as diverse as NEPA, Environmental Policy, and energy." He has worked for both the NRC on relicensing and for USDOE.)*

Why are NW Ratepayers' funds involved in an SMR reactor project in Idaho?

Energy Northwest joins SMR initiative

Posted on July 1, 2013 by ansnuclearcafe| Leave a comment

Press release from Energy Northwest

NuScale's containment vessel showing the reactor pressure vessel (Graphic: NuScale Power)

RICHLAND, Wash. – Energy Northwest is teaming with NuScale Power and Utah Associated Municipal Power Systems as part of the Western Initiative for Nuclear collaboration to study the demonstration of a commercial, small modular reactor project, potentially in southeastern Idaho, by 2024. If NuScale receives federal development funding, Energy Northwest will have first right of offer to operate such a project and, by doing so, become one of the industry experts for small modular reactor operation.

Recommendations:

- Issue RFP for replacement power from CGS – let the market decide (last year, ratepayers paid $200 million form for electricity from CGS than if just bought the power on market)
- End use of taxpayer funds, instead of polluters', to pay for cleanup of leaking unlined commercial radioactive waste dump; and, require it to be actually cleaned up;
- Stop Making More Nuclear Waste – nowhere to go!
- Move CGS Spent Fuel to Dry Cask Storage (CGS ahead of curve of others already)
- Respect Treaty rights and land transfer laws, consider large scale solar and ensure "conservation counts"
- Do not import Plutonium or add other wastes to Hanford's problems. As long as we make more, we are target to be sent more.
- Stop spending NW ratepayer funds on SMR decades away from commercial application