Demolition of West Valley Main Plant Process Building: Why the Building Must be Enclosed Prior to Demolition

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https://wnypeace.org/wp/task-forces/environmental-justice/
Separations Process Unit (H2 & G2)  
Knolls Atomic Power Laboratory  
Niskayuna NY

Operational between  
1950 – 1953  
Separate plutonium and uranium from spent fuel  
PUREX Method  
REDOX Method

After 1953, PUREX & REDOX research went to Hanford and Savannah River

Figure 1-1: Aerial Photograph of Upper Level Looking South (Photo #A-1, 1987)
September 2010

Open-Air Demolition of Building H2...
Debris Pile Four Days Prior to Tropical Storm Nicole & The 100 year rain event

Prior to the rain event, the demolition activity spread radioactivity...

Figure 2-1: Facing North of the Building H2 on the Afternoon of September 25, 2010

https://www.energy.gov/sites/prod/files/2014/04/14/Type_B_AI_Report_SPRU_0.pdf
September 29, 2010: Tropical Strom Nicole Traveling Northward....
September 30 – October 1 2010: Schenectady NY Receives 7 inches Rain

“100 Year Rain Event”...
October 1, 2010....Rain Continues...

Surface Weather Map and Station Weather at 7:00 A.M. E.S.T.

Go to station plot explanation
Sequence of Events

9/25/2010  
   H2 Stack Demolished

9/29/2010 AM  
   Several Structures in H2 Taken Down

9/29/2010 Noon  
   Wrecking Crew Break for Lunch

9/29/2010 Noon  
   Radiation Alarms go off for four workers (11,000 DPM/15 cm² on workboots)

9/29/2010 Afternoon  
   Air Radiation monitors record high readings

9/29/2010 Afternoon  
   KAPL deploys 60 people to survey site for radiation

9/29/2010 Evening  
   In preparation of the expected rain, the wrecking crew sprays “glue” on H2 debris pile to stabilize the radioactively contaminated debris.

9/30/2010 – 10/1/2010  
   Significant Rain (~7 inches) from Tropical Storm Nicole. Rainfall overflows “FRAC Tank”. FRAC tank collects ground water underneath building H2.

10/4/2010  
   Air Monitors record increased radiation

10/5 – 10/7/2010  
   Radiation Surveys: 677,000 DPM to 1.5 million DPM in and around the H2 debris pile
Sequence of Events (continued)

10/7 – 10/8/2010  Debris pile covered with tarps
10/12/2010      (FRAC?) Tanks covered with tarps
10/25/2010      Sump pump failed, releasing 640 gallons of radioactively
                 contaminated water into the Mohawk River. EPA and DEC say
                 there is nothing to worry about.
Fall 2012        Polyethylene tents built around H2 and G2
2019             Demolition of H2 and G2 completed.

Open air demolition performed with impending tropical storm.
No meteorologist on staff to help.
H2

Figure 2-4: Building Footprint Taken Afternoon of October 23, 2010
Building H2 w/o Tent

Building H2 with Tent
(polyethylene supported by steel frame
https://dailygazette.com/2010/12/03/1203_kapl/)

Building H2 Prior to Demolition

Building H2 Containment Tent Prior to Demolition
https://www.spru.energy.gov/
Enclosure kept at negative air pressure to prevent spread of radioactivity

https://www.spru.energy.gov/
Building G2 before Demolition

Building G2 with Polyurethane Tent over steel frame

https://www.spru.energy.gov/
# Building H2 and G2 Radiological Inventory

## Table 3-2: Comparison of Original and Current SPRU DP Radiological Inventory

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sr-90</td>
<td>1.00/[2.00]</td>
<td>2.81/[2.81]</td>
<td>39.00/[26.51]</td>
<td>42.81/[31.32]</td>
</tr>
<tr>
<td>Pu-239</td>
<td>0.24/[1.58]</td>
<td>0.90/[0.90]</td>
<td>8.91/[8.64]</td>
<td>10.05/[11.12]</td>
</tr>
<tr>
<td>Am-241</td>
<td>0.03/[0.22]</td>
<td>0.10/[0.10]</td>
<td>1.16/[1.06]</td>
<td>1.29/[1.38]</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>3.67/[17.3]</strong></td>
<td><strong>10.26/[10.26]</strong></td>
<td><strong>73.08/[75.8]</strong></td>
<td><strong>87.01/[103.4]</strong></td>
</tr>
</tbody>
</table>

Total: 34.6 Curies
<table>
<thead>
<tr>
<th>Full Name</th>
<th>Nucleide</th>
<th>Est. Curies</th>
<th>Half Life (years)</th>
<th>Decay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Americium</td>
<td>Am-241</td>
<td>260</td>
<td>432</td>
<td>alpha</td>
</tr>
<tr>
<td>Curium</td>
<td>Cm-243</td>
<td>0.27</td>
<td>29</td>
<td>alpha</td>
</tr>
<tr>
<td>Curium</td>
<td>Cm-244</td>
<td>6.3</td>
<td>18</td>
<td>alpha</td>
</tr>
<tr>
<td>Neptunium</td>
<td>Np-237</td>
<td>0.57</td>
<td>2,144,000</td>
<td>alpha</td>
</tr>
<tr>
<td>Plutonium</td>
<td>Pu-238</td>
<td>200</td>
<td>88</td>
<td>alpha</td>
</tr>
<tr>
<td>Plutonium</td>
<td>Pu-239</td>
<td>63</td>
<td>24,110</td>
<td>alpha</td>
</tr>
<tr>
<td>Plutonium</td>
<td>Pu-240</td>
<td>47</td>
<td>6,561</td>
<td>alpha</td>
</tr>
<tr>
<td>Uranium</td>
<td>U-232</td>
<td>0.75</td>
<td>69</td>
<td>alpha</td>
</tr>
<tr>
<td>Uranium</td>
<td>U-233</td>
<td>0.41</td>
<td>159,000</td>
<td>alpha</td>
</tr>
<tr>
<td>Uranium</td>
<td>U-234</td>
<td>0.19</td>
<td>245,000</td>
<td>alpha</td>
</tr>
<tr>
<td>Uranium</td>
<td>U-235</td>
<td>0.03</td>
<td>704,000,000</td>
<td>alpha</td>
</tr>
<tr>
<td>Uranium</td>
<td>U-238</td>
<td>0.09</td>
<td>4,460,000,000</td>
<td>alpha</td>
</tr>
<tr>
<td>Carbon</td>
<td>C-14</td>
<td>13</td>
<td>5,700</td>
<td>beta</td>
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<tr>
<td>Plutonium</td>
<td>Pu-241</td>
<td>1100</td>
<td>14</td>
<td>beta</td>
</tr>
<tr>
<td>Strontium</td>
<td>Sr-90</td>
<td>1900</td>
<td>29</td>
<td>beta</td>
</tr>
<tr>
<td>Technetium</td>
<td>Tc-99</td>
<td>4.9</td>
<td>211,000</td>
<td>beta, gamma</td>
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<tr>
<td>Iodine</td>
<td>I-129</td>
<td>0.63</td>
<td>15,700,000</td>
<td>beta, gamma</td>
</tr>
<tr>
<td>Cesium</td>
<td>Cs-137</td>
<td>2550</td>
<td>30</td>
<td>beta, gamma</td>
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</tbody>
</table>

Total: 6,147

Tabel 4-5 in [http://www.westvalleyctf.org/DEIS-DP_Docs/DP/WVDP_Phase_1_DP_Rev_0h.pdf](http://www.westvalleyctf.org/DEIS-DP_Docs/DP/WVDP_Phase_1_DP_Rev_0h.pdf)
West Valley Main Plant Process Building
2010: 6,147 Curies
2021: ?? Curies
Approx. Area: 165 ft x 143 ft = 23,595 ft² (Dimensions est. from Google Earth)
Building will not be enclosed prior to demolition

Knolls Atomic Power Laboratory G2 & H2
2010: 34.6 Curies
Approx. Area: H2: 132 ft x 70 ft = 9,240 ft²
G2: 103 ft x 116 ft = 11,948 ft²
Total: 21,188 ft²
Both Buildings Enclosed prior to demolition
By Air:  < 10 mrems/year/per individual    (Daren Boone Feb 28, 2021 QPM)

But:
Many radionuclides at MPPB are alpha emitters, such as plutonium. If a person breaths in a tiny particle containing Pu, the energy deposited by Pu will be localized to a tiny volume inside the lung.
Potential Dangers of Tiny Amounts of Radioactively Contaminated Dust Escaping During Demolition of the Main Plant Process Building

Overdose: Excessive risk of cancer over a lifetime

If 0.1% of the mass of plutonium (2010 inventory) at West Valley escapes during demolition. How many individuals could this place at risk of overdose? 10 million people

Minuscule volumes of radioactively contaminated dust particles are toxic to humans (and other biota).

1. After Dr. Gordon Edwards [http://www.ccnr.org/max_plute_aecb.html]
Example Calculation

2010 Inventory: 63 Curies of Plutonium
Specific activity Pu-239: 0.063 Curies/gram
Grams in MPPB: 63 Curies/0.062 Curies/gram = 1,016 grams Pu-239
Rounding to 1000 gram:
0.1% of 1,000 grams = 1 gram Pu-239
1 gram Pu-239 is enough to overdose 10 million people
(see http://www.ccnr.org/max_plute_aecb.html )

Plutonium is highly toxic!
Assume DOE removes 99.9% of the Pu-239 Prior to Demolition

Remaining Plutonium-239 Prior to Demolition: 1 gram

If 0.1% of that mass escapes during demolition of MPPB:
1 milligram escapes: 10,000 people potentially at risk of overdose

Pu-239 half-life is 24,110 years. Decays into U-235 with additional half life of 704 million years.
10 half-lives must pass for biological safety.

Plutonium escaping from West Valley will be in the environment and remain toxic for at least 7 billion years. Note: Age of Earth is only 4.5 billion years.

Plutonium is “Forever Toxic” to Humans and other organisms!
1. Ask our elected officials to force DOE to build an enclosure surrounding the Main Plant Process Building at West Valley Demonstration Project – prior to demolition.

2. DOE should have a meteorologist on site during the demolition.

3. Offsite Monitoring