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

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July 27, 2021

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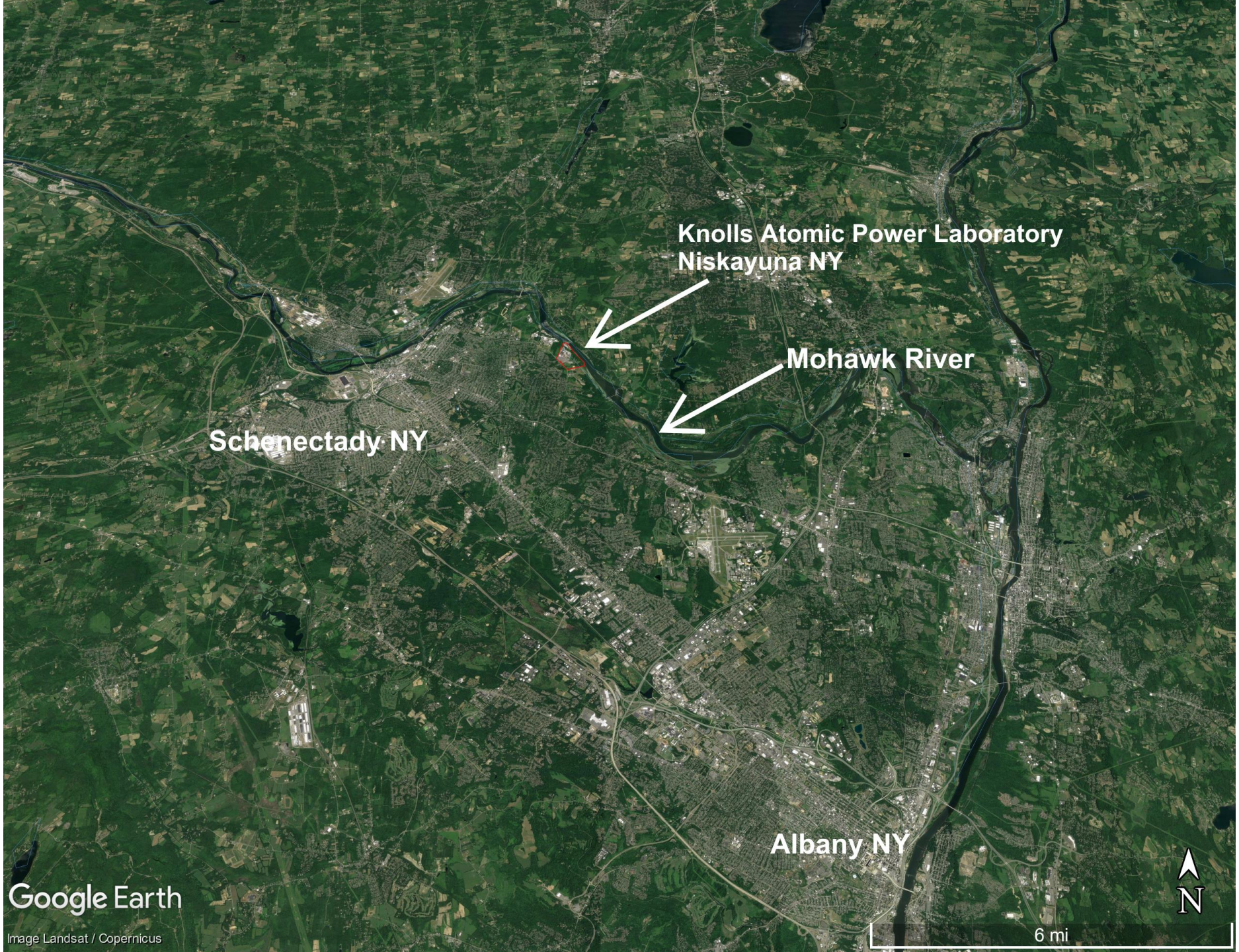
https://wnypeace.org/wp/task-forces/environmental-justice/


Knolls Atomic Power Laboratory
Niskayuna NY
Mohawk River
Schenectady NY
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Google Earth
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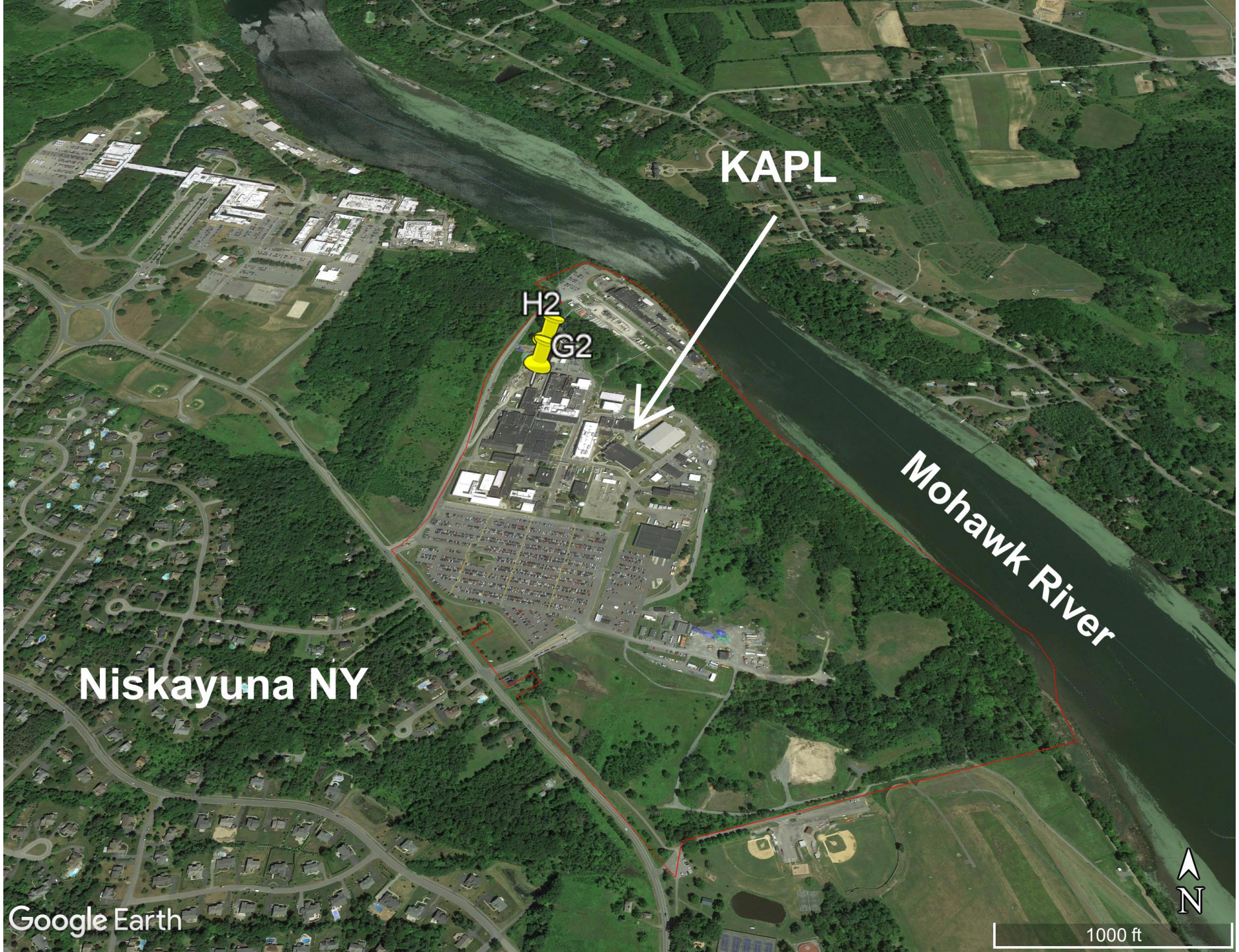
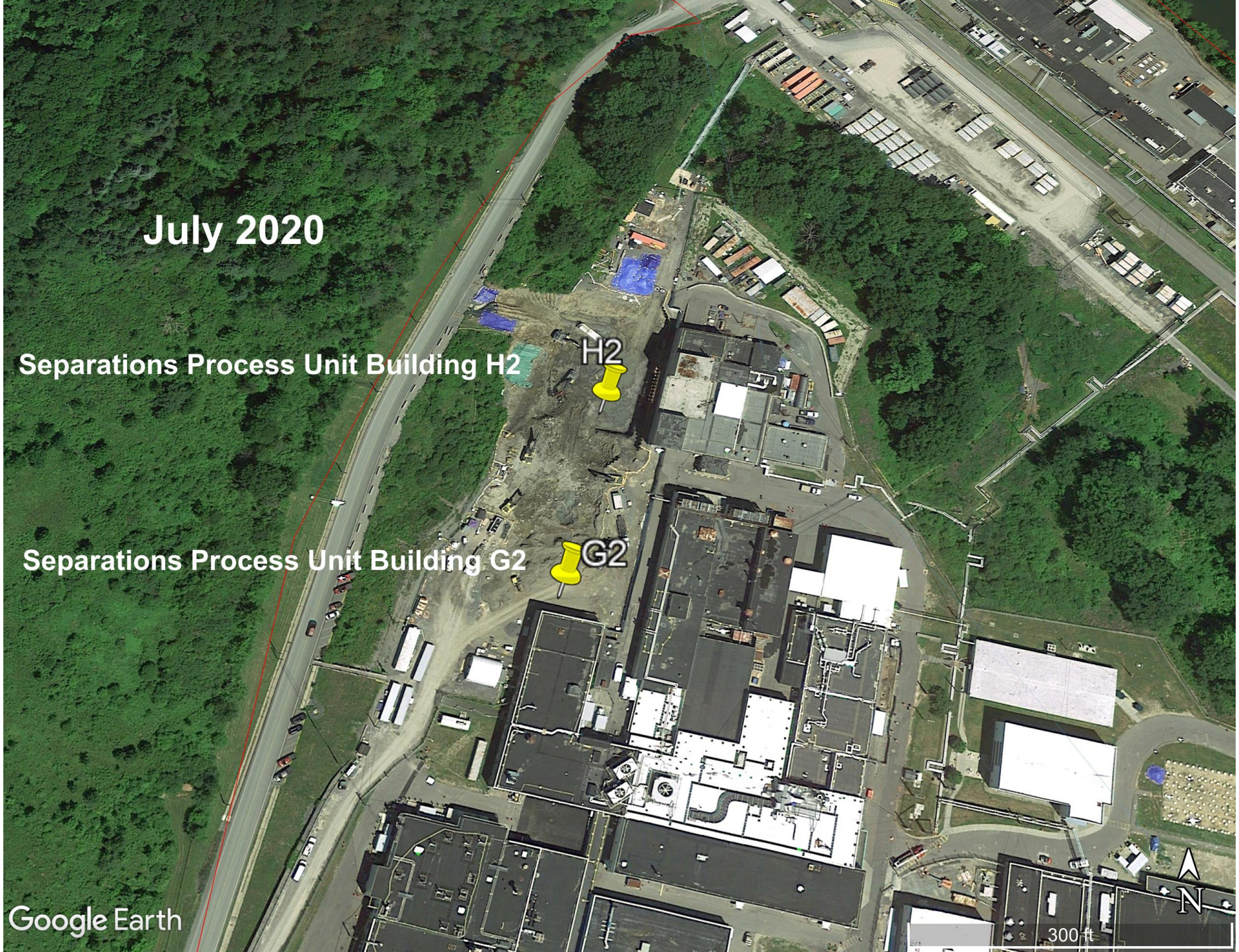

KAPL
H2
G2
Mohawk River
Niskayuna NY
Google Earth
N
1000 ft


September 2009
Separations Process Unit Building H2
H2
Separations Process Unit Building G2
G2
Google Earth
Image USDA Farm Service Agency
N
300 ft


July 2020
Separations Process Unit Building H2
H2
Separations Process Unit Building G2
G2
Google Earth
N
300 ft

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)

DOE Type B Accident Report Radiological Contamination Event During Separations Process Research Unit Building H2 Demolition September 29, 2010…page 6

https://www.energy.gov/sites/prod/files/2014/04/f14/Type_B_AI_Report_SPRU_0.pdf

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

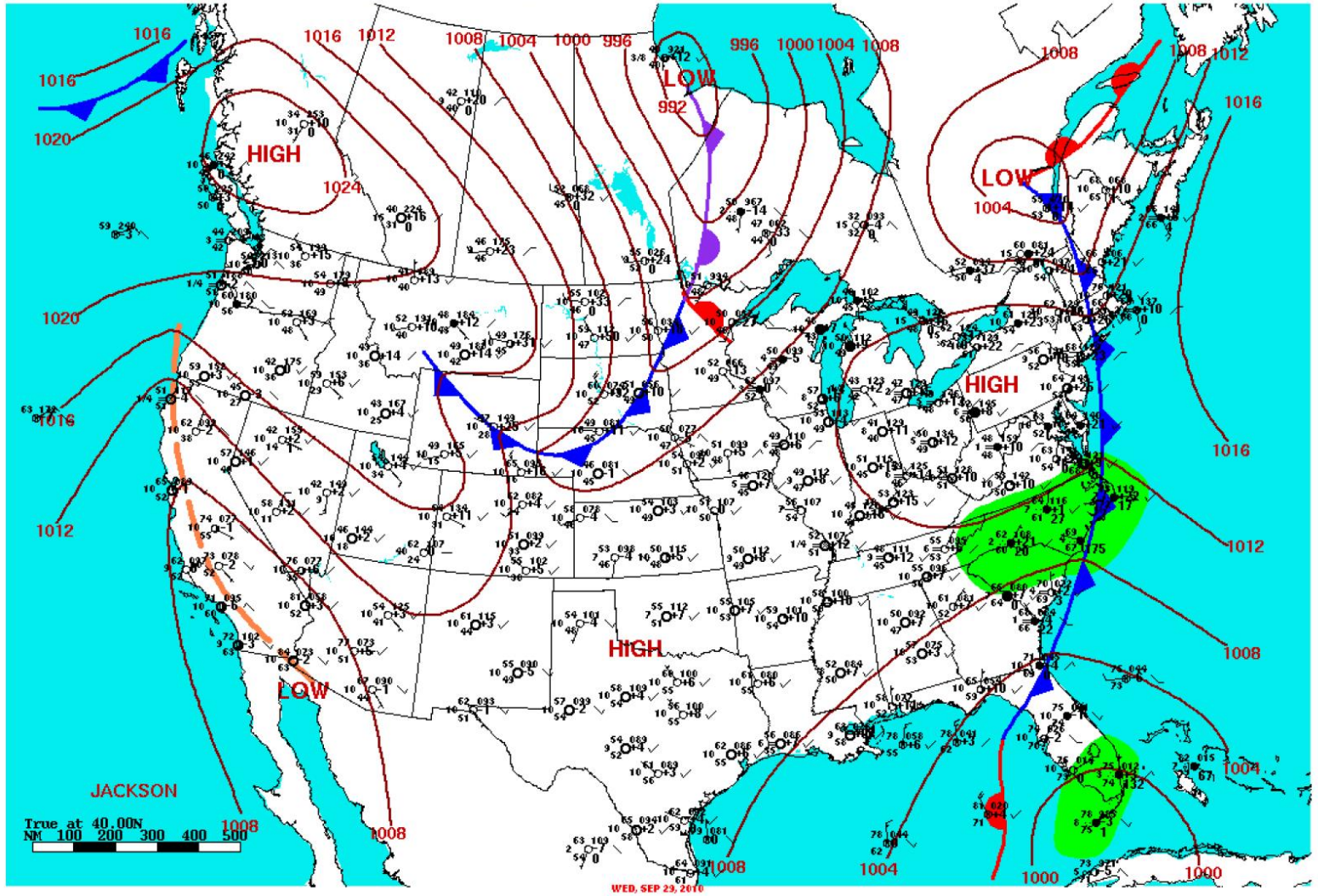
DOE Type B Accident Report Radiological Contamination Event During Separations Process Research Unit Building H2 Demolition September 29, 2010…page 10

https://www.energy.gov/sites/prod/files/2014/04/f14/Type_B_AI_Report_SPRU_0.pdf

September 29, 2010: Tropical Strom Nicole Traveling Northward….

<--Previous Day | Back to Main Page | Next Day -->

https://www.wpc.ncep.noaa.gov/dailywxmap/dwm_stnplot_20100929.html

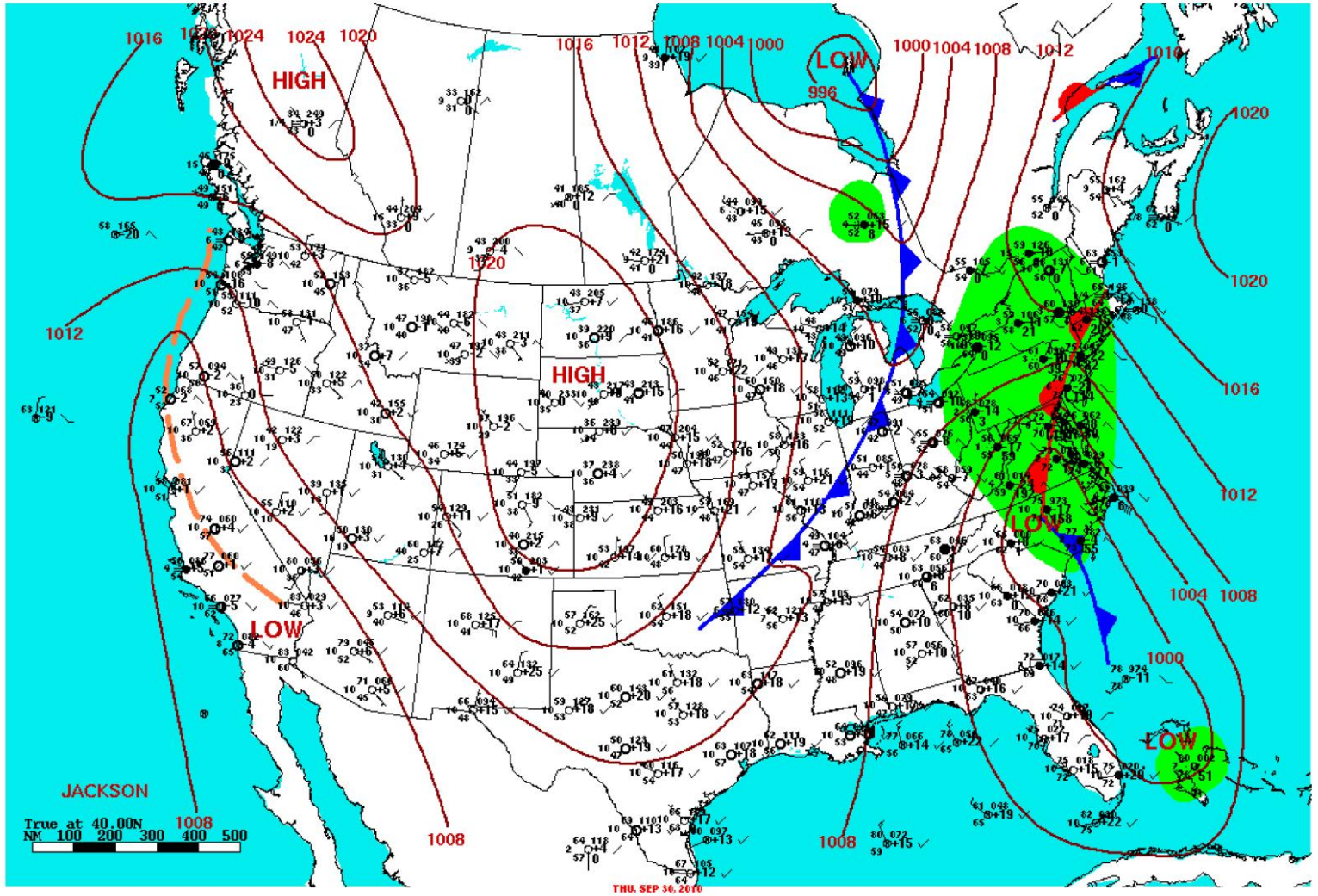


Surface Weather Map and Station Weather at 7:00 A.M. E.S.T.

Go to station plot explanation

September 30 – October 1 2010: Schenectady NY Receives 7 inches Rain

<--Previous Day | Back to Main Page | Next Day --> https://www.wpc.ncep.noaa.gov/dailywxmap/dwm_stnplot_20100930.html



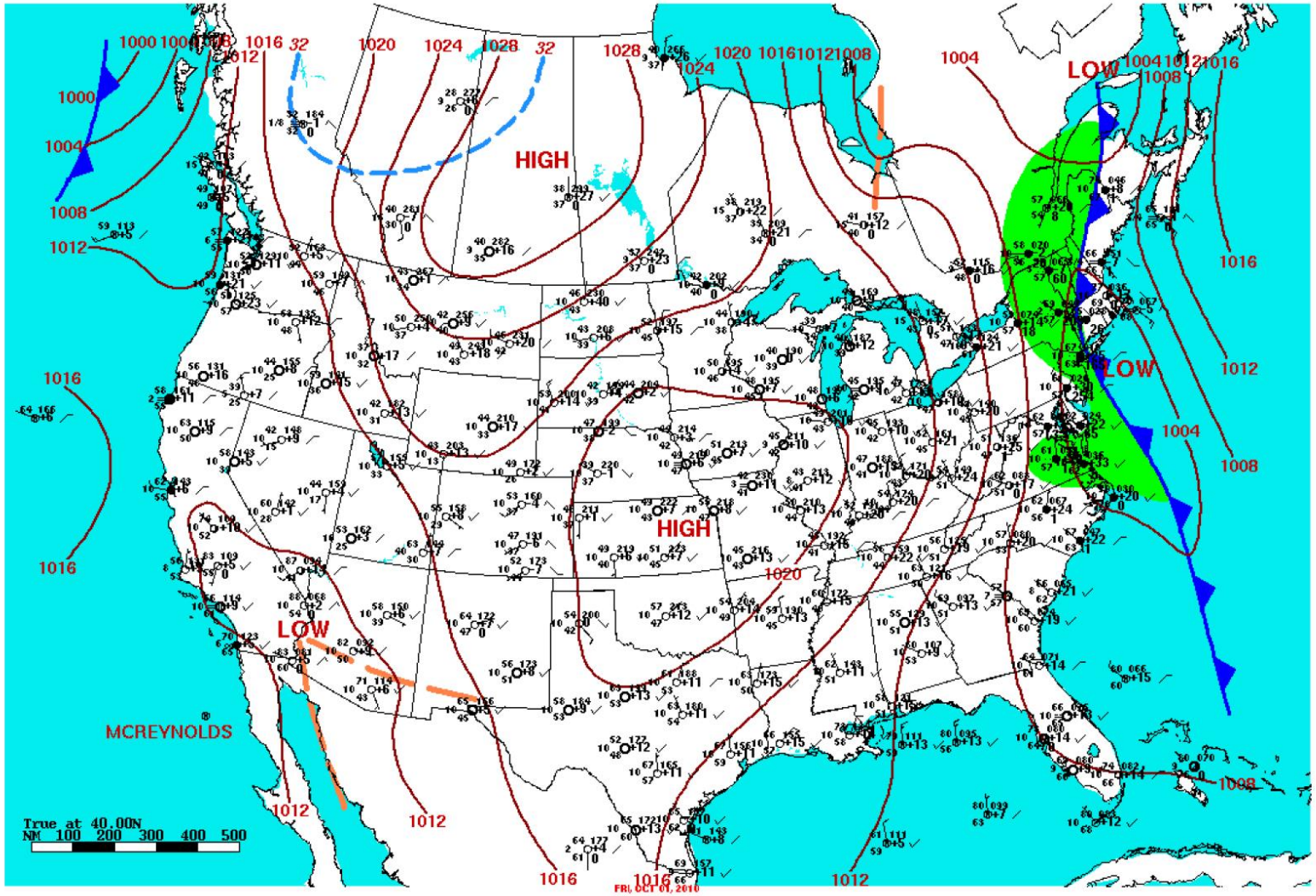
Surface Weather Map and Station Weather at 7:00 A.M. E.S.T.

Go to station plot explanation

"100 Year Rain Event"…

October 1, 2010….Rain Continues…

<--Previous Day | Back to Main Page | Next Day --> https://www.wpc.ncep.noaa.gov/dailywxmap/dwm_stnplot_20101001.html



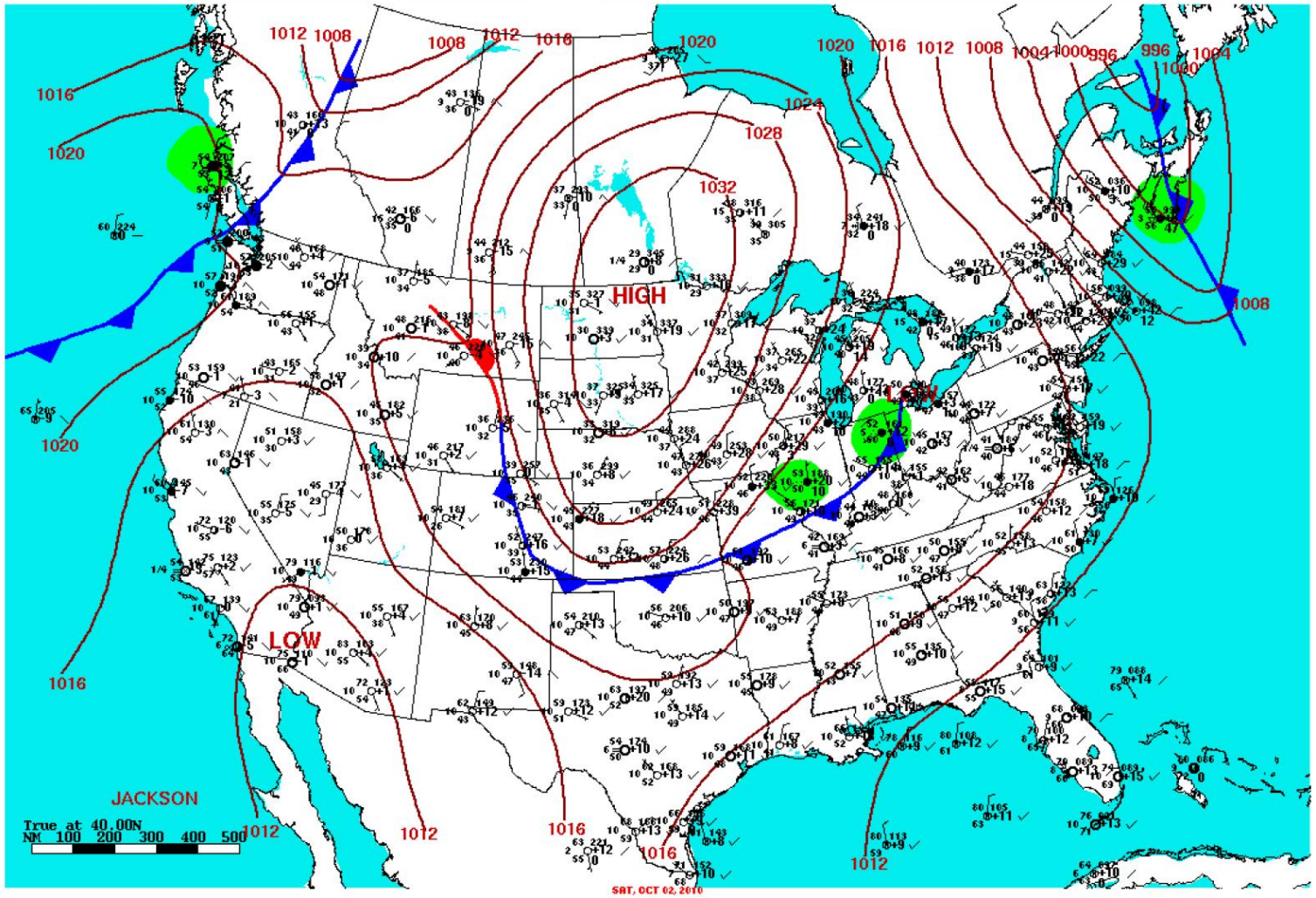
Surface Weather Map and Station Weather at 7:00 A.M. E.S.T.

Go to station plot explanation

October 2, 2010

<--Previous Day | Back to Main Page | Next Day -->

https://www.wpc.ncep.noaa.gov/dailywxmap/dwm_stnplot_20101002.html



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 cm^2 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, 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

2004

Building H2 Prior to Demolition

Building H2
w/o Tent

2016

Building H2 Containment Tent Prior to Demolition

https://www.spru.energy.gov/

Building H2
with Tent

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

EM Marks Milestone At Separations Process Research Unit

Enclosure kept at negative air pressure to prevent spread f radioactivity

https://www.spru.energy.gov/

Building G2 Before Demolition

Building G2 before Demolition

Building G2 Containment Tent - from the south

Building G2 with Polyurethane Tent over steel frame

Building G2 Containment Tent - from the west (H2 Containment Structure in the Background)

https://www.spru.energy.gov/

https://www.spru.energy.gov/

Building H2 and G2 Radiological Inventory

Table 3-2: Comparison of Original and Current SPRU DP Radiological Inventory[1]

https://www.energy.gov/sites/prod/files/2014/04/f14/Type_B_AI_Report_SPRU_0.pdf page 40

Nuclide	Inventory Description/Location			
	Surface Contamination within G2 and H2 Facilities [2010 Facility Estimate] (Ci)[2]	Surface Contamination within Tank Farm Tanks [2010 Facility Estimate] (Ci)	Residual Contamination within Tank Farm Tanks [2010 Facility Estimate] (Ci)	Total SPRU DP Activity [2010 Facility Estimate] (Ci)
Sr-90	1.00/[2.00]	2.81/[2.81]	39.00/[26.51]	42.81/[31.32]
Cs-137	2.40/[13.50]	6.45/[6.45]	24.01/[39.63]	32.86/[59.58]
Pu-239	0.24/[1.58]	0.90/[0.90]	8.91/[8.64]	10.05/[11.12]
Am-241	0.03/[0.22]	0.10/[0.10]	1.16/[1.06]	1.29/[1.38]
Totals	3.67/[17.3]	10.26/[10.26]	73.08/[75.8]	87.01/[103.4]

Total: 34.6 Curies

West Valley MPPB Inventory 2010

Full Name	Nucleide	Est. Curies	Half Life (years)	Decay
Americium	Am-241	260	432	alpha
Curium	Cm-243	0.27	29	alpha
Curium	Cm-244	6.3	18	alpha
Neptunium	Np-237	0.57	2,144,000	alpha
Plutonium	Pu-238	200	88	alpha
Plutonium	Pu-239	63	24,110	alpha
Plutonium	Pu-240	47	6,561	alpha
Uranium	U-232	0.75	69	alpha
Uranium	U-233	0.41	159,000	alpha
Uranium	U-234	0.19	245,000	alpha
Unranium	U-235	0.03	704,000,000	alpha
Uranium	U-238	0.09	4,460,000,000	alpha
Carbon	C-14	13	5,700	beta
Plutonium	Pu-241	1100	14	beta
Strontium	Sr-90	1900	29	beta
Technetium	Tc-99	4.9	211,000	beta,gamma
Iodine	I-129	0.63	15,700,000	beta,gamma
Cesium	Cs-137	2550	30	beta, gamma
	Total:	**6,147**		

Tabel 4-5 in 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 ft^2 (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 ft^2

G2: 103 ft x 116 ft = 11,948 ft^2

Total: 21,188 ft^2

Both Buildings Enclosed prior to demolition

Radiation Dose Limits During Demolition of Main Plant Process Building

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[1]

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!

Asks…..

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 Montoring