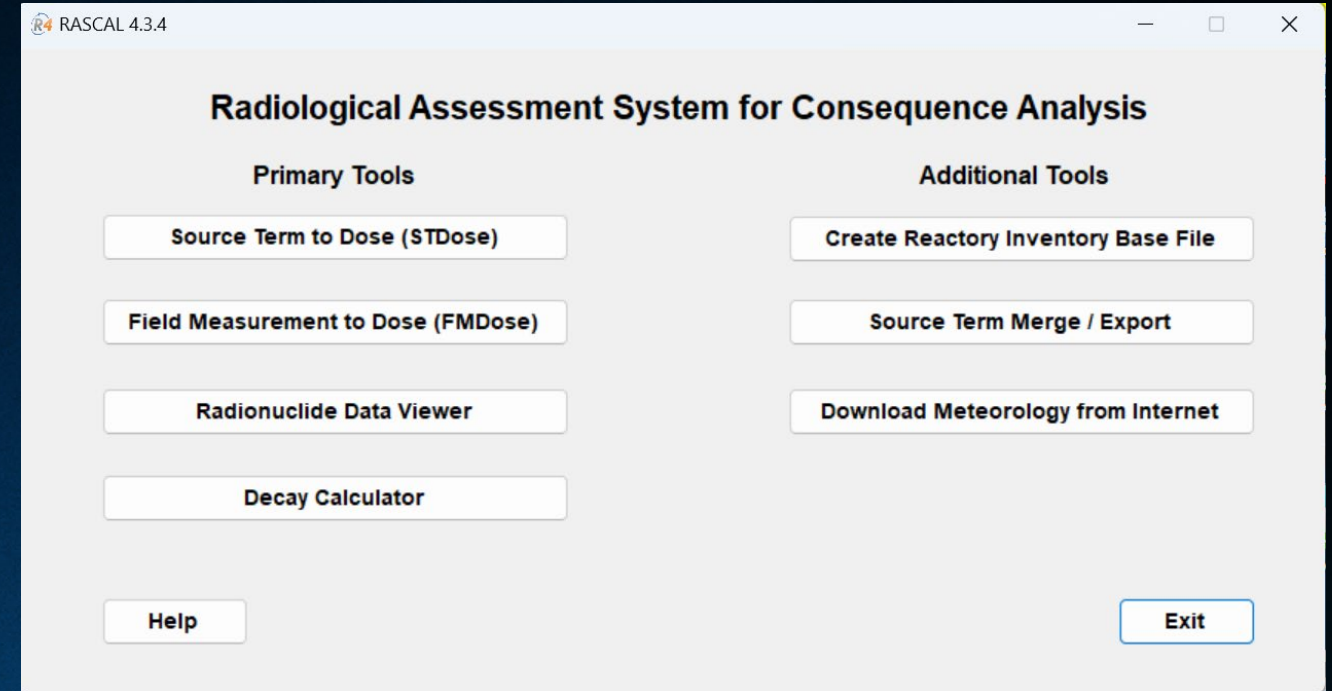


# RASCAL Tabletop Exercises

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## Ground Rules

- **In person**, raise your hand if you want or feel free to speak up to ask questions or raise comments during exercises.
- For those **online**, post questions, comments, we encourage you to engage with each other.
- Our teams will monitor chat and bring it up for in person discussion as they see fit.
- Individual troubleshooting for everyone **may not** be addressable during the exercise, but we encourage you to email issues to [RAMP@NRC.gov](mailto:RAMP@NRC.gov) to eventually get them addressed.
- This is a new type of meeting session, so we will all be learning it together!



## Purposes of This Exercise

- RASCAL fits into the **pre-release** and **early plume phases** of a radiological emergency.
- It also is critical to pair it with site/nearby **real time meteorology**.
- It is utilized in pursuit of **protective action recommendation and decision making**.
- Missing information: conservative assumptions, run multiple assessments, and/or pursue clarification?
- There is no “right answer” here. All models are wrong, some are useful.
- If things get messy, consider this a successful session!

## Let's get the new MetFetch



**Download Meteorology from Internet**

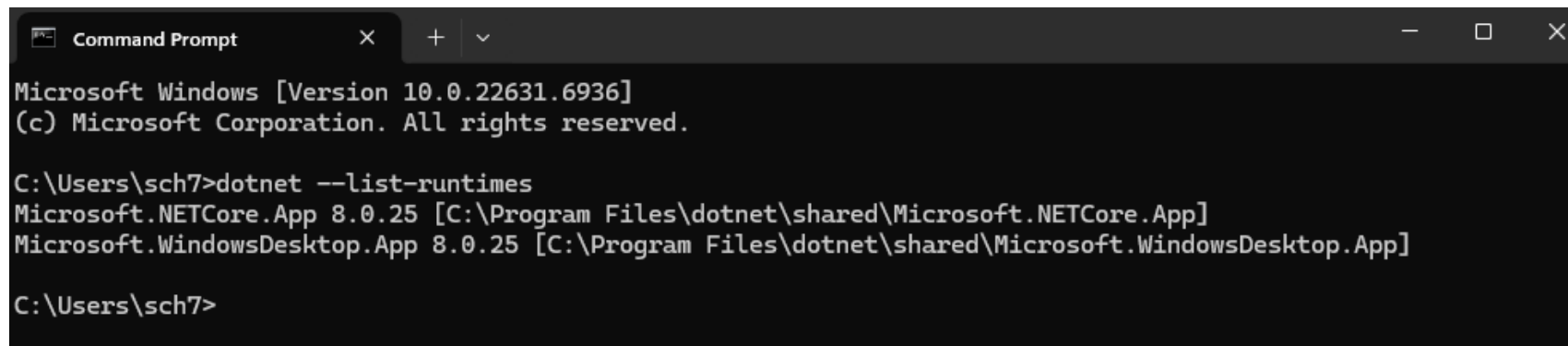
- Go to [ramp.nrc-gateway.gov](http://ramp.nrc-gateway.gov) and login.
- Codes -> RASCAL -> Download page.
- Scroll down and click Met-Fetch-2025.zip.
- Make sure RASCAL is closed.
- On your Desktop, right click your RASCAL Shortcut icon and select 'Open File Location' or look inside C:\NRC\RASCAL43.
- Inside your RASCAL43 folder, create a new folder called MetFetch\_Archive.
- Move your current MetFetch.exe file into the MetFetch\_Archive folder.
- Open your Downloads folder, move your just downloaded MetFetch.exe file into your RASCAL43 folder.
- Try to run MetFetch. NRC users may require an extra step.

- Open your command prompt and type in:  
dotnet --list-runtimes (then hit enter)

- Open your RASCAL install folder:
  - Probably at C:\NRC\RASCAL43\

## Updating DotNet or Runtime Configuration

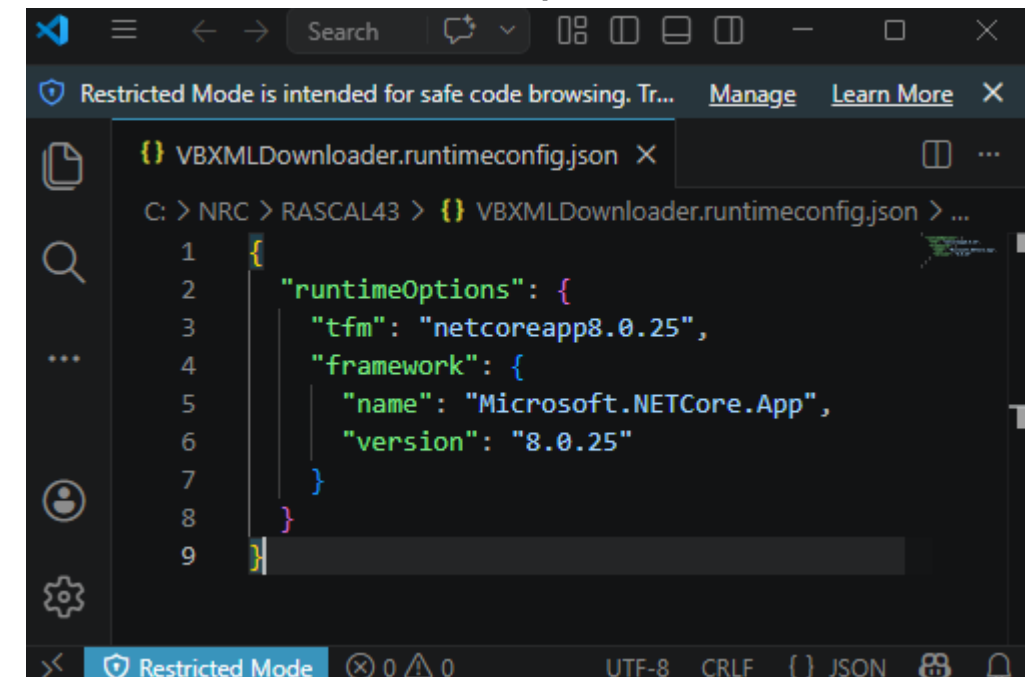
- Open VBXMLDownloader.runtimeconfig JSON Source File (VSCode, Notepad, etc.)
- Update DotNet to match what your system already has (in command prompt)



```
Microsoft Windows [Version 10.0.22631.6936]
(c) Microsoft Corporation. All rights reserved.

C:\Users\sch7>dotnet --list-runtimes
Microsoft.NETCore.App 8.0.25 [C:\Program Files\dotnet\shared\Microsoft.NETCore.App]
Microsoft.WindowsDesktop.App 8.0.25 [C:\Program Files\dotnet\shared\Microsoft.WindowsDesktop.App]

C:\Users\sch7>
```

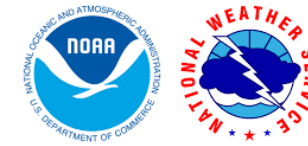


```
VBXMLDownloader.runtimeconfig.json
C: > NRC > RASCAL43 > {} VBXMLDownloader.runtimeconfig.json > ...

1  {
2    "runtimeOptions": {
3      "tfm": "netcoreapp8.0.25",
4      "framework": {
5        "name": "Microsoft.NETCore.App",
6        "version": "8.0.25"
7      }
8    }
9  }
```

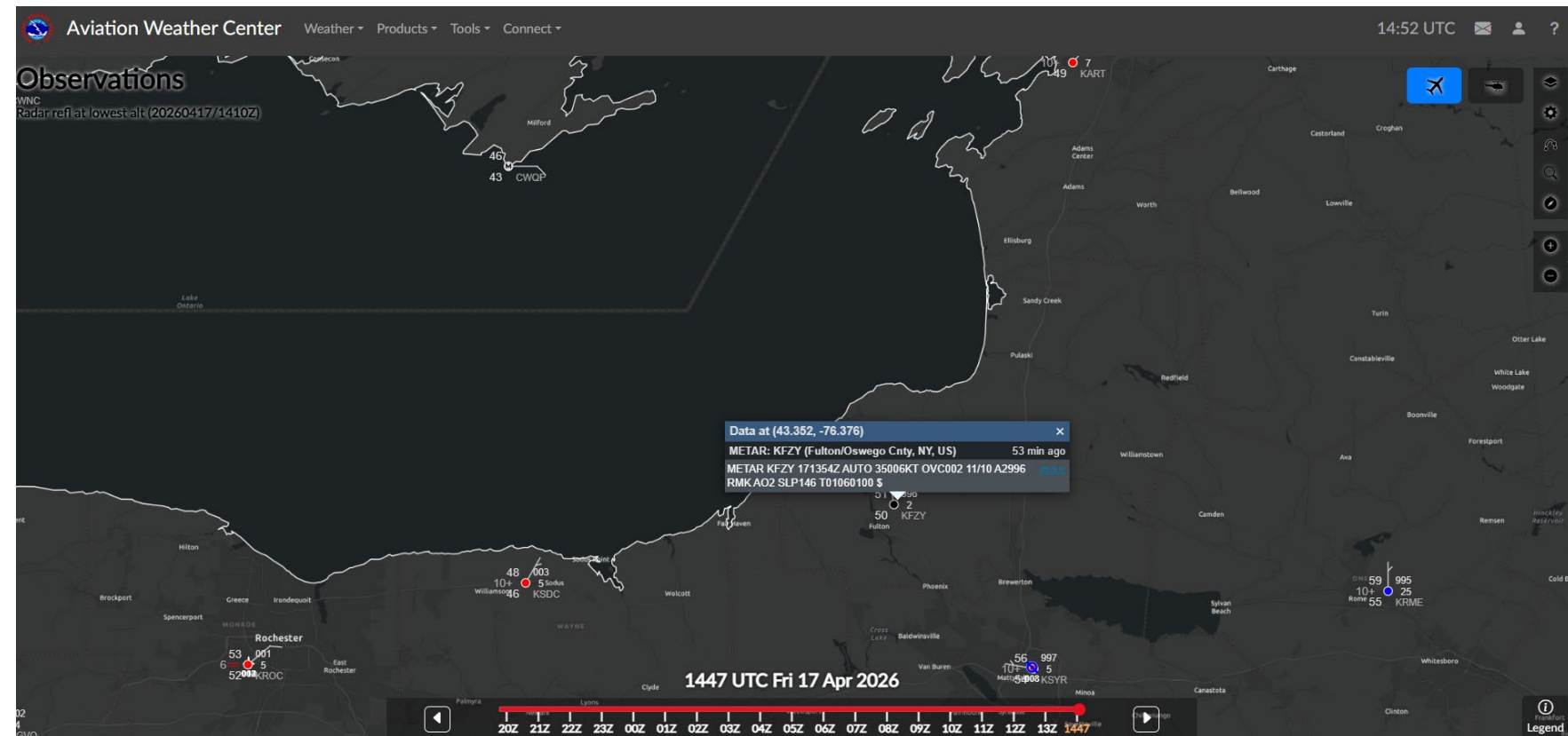
# Live Meteorology Data

- Aviationweather.gov (courtesy of NOAA)
- Meteorological Aerodrome Report (METAR)
  - Usually automatically generated weather observation data, hourly or more frequently
- Terminal Aerodrome Forecast (TAF)
  - Human-produced forecasts (of varying quality and frequency)



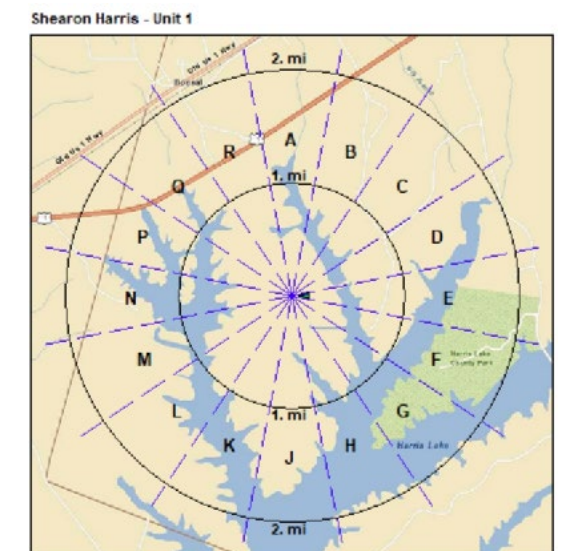
Station ID
QUAD
KAAA
KAWG
KBMI
KBUU
KC75
<b>KCWI</b>
KDBQ
<b>KDVN</b>
KEFT
KEOK
KFEP
KGBG
KGGI
KIOW
KJVL
KLOT
<b>KMLI</b>
KMP7

<b>METAR for:</b>	KNHK (Patuxent River NAS, MD, US)
<b>Text:</b>	METAR KNHK 171852Z 32011KT 10SM BKN070 BKN250 27/11 A2990 RMK AO2 SLP125 T02670111
<b>Conditions at:</b>	1852 UTC 17 Fri Apr 2026
<b>Temperature:</b>	26.7°C (80°F)
<b>Dewpoint:</b>	11.1°C (52°F) (RH = 38%)
<b>Pressure (altimeter):</b>	29.9 inHg (1012.6 hPa) (sea level pressure 1012.5 hPa)
<b>Winds:</b>	from the NW (320°) at 11 kt (5.7 m/s, 12.7 mph)
<b>Visibility:</b>	10+ mi (16+ km)
<b>Clouds:</b>	broken clouds at 7,000 ft, broken clouds at 25,000 ft
<b>Ceiling:</b>	7,000 ft
<b>METAR for:</b>	KNHK (Patuxent River NAS, MD, US)



# Protective Actions in the Early Plume Phase

- According to EPA PAG (2017): During an incident with an uncontrolled source of radiation, protection of the public from unnecessary exposure to radiation may require some form of intervention that will disrupt normal living. Such intervention is termed a protective action. Examples of protective actions include:
  - Evacuating an area;
  - Sheltering-in-place within a building or protective structure;
  - Administering potassium iodide (KI) as a supplemental action; and others
- These exercises will feature generic simplified ER plans:
  - Lettered RASCAL Sectors: up to 2 miles, (puff) directions to 10 mi.
  - Evacuate sector at TEDE > 5 rem, shelter in place sector at 1-5 rem.
  - Please be aware of your specific site/institution's ER policies





# Pre Exercise Met Fetch Run

- Walk thru a Met Fetch data collection and meteorology upload.



# Exercise 1: Nine Mile Point Nuclear Station

- A LOCA has occurred at Nine Mile Point Unit 2 (GE BWR-5). Nine Mile Point is a two-unit station that shares a site with FitzPatrick Nuclear Power Plant.
- Download the last 24 hours of meteorological observations and all forecasts for every available airport within 100 miles of Nine Mile Point.
- The reactor was shut down at 1140, core uncovered at 1205, emergency responders cannot currently report a core recovery timeline. The licensee is concerned about a dry well leak into gas treatment system and is modeling for 5x design basis release.
- Local authorities have ordered evacuations within the 2-mile exclusion area boundary, and shelter-in-place for downwind EPZ, but do not see the need for a general evacuation beyond 2 miles based on a 48-hour projection, what is your recommendation and does this align?



## Exercise 2: Browns Ferry

- Browns Ferry Unit 1 (GE-BWR-4, TVA) has declared a general emergency (no hostile activity reported), with the reactor successfully scrammed today at 0729 local time, it was operating at 100% power with last maintenance outage 10 months ago.
- Download the last 24 hours of meteorological observations and all forecasts for every available airport within 100 miles of Browns Ferry.
- A release was estimated to have begun at 0915 local time. First air sample readings at 0921 reported release rates of 1900 Ci/s Nobles, 165 Ci/s Iodines (total), and 7.5 Ci/s particulates.
- Assuming an eight-hour release, and modeling for 48 hours beyond that, what is your protective action recommendation?



## Exercise 3: Almaraz Unidad 1 and Manual Meteorology Entry

- Unit 1 at Almaraz is experiencing a LOCA, with shutdown at 1735 local time today, and core uncover at 1811. Containment bypass with 100 gal/min flow rate for 24 hours. 0% release rate after 24 hours. Sprays off and 10 meter release.
- Meteorological fetching data will be more limited here, and thorough manual entry may be required.
  - Utilize MetFetch as much as you can to collect live weather.
  - Pursue live weather manual entry utilizing the internet. (AEMET.ES)
- Modeling for 48 hours out, what is your protective action recommendation at this time?



## Exercise 4: Columbia Degrading Accident Sequence

- Columbia Nuclear Generating Station, a single BWR operating at 1,216 MWe, is facing emergency responder judgement of ongoing degrading conditions.
- At 1124 local time today, an automatic scram occurred due to plant response to a switchyard electrical transient. All control rods inserted successfully, and main steam isolation valves closed. Switchyard conditions are unknown.
- If you were activated, you'd probably start by collecting nearby meteorology data.
- EDG-1 is unavailable due to planned maintenance outage. EDG-2 started at 1126 local, began to lose oil pressure at 1130 and is estimated to fail within 15 minutes. FLEX contingencies have been activated.
- This is **early**, but what would your RASCAL model look like?



## Exercise 4: Continued (Columbia, 1124 shutdown local time)

- EDG-2 FTR but was recovered at 1311.
- Reactor Core Isolation Cooling (RCIC) declared inoperable.
- Primary pressure boundary failure likely in recirculation ~1313.
- A site area emergency was declared at 1314. Core uncover is anticipated within one hour, with core damage expected an hour later.
- The licensee is modeling an 8-hour design basis accident release thru the dry well wall, up the stack, and without sprays.
- Develop a dose assessment and determine protective action recommendations.



## Wrapping Up

- These exercises were meant to spark questions that would need an answer in an emergency.
- Defense in Depth.
- We're in this together.
  
- Thank you! Please email any further comments to **[RAMP@NRC.gov](mailto:RAMP@NRC.gov)**



**Thank you**