

# Navigating the RadNet CDX Website

## User Manual



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## Selecting Customized View Options in Query View

Query view allows the user to select from a list of options that allow the creation of a customized report. The list of options includes\*:

- Monitor type (fixed or deployable)
- Monitor location
- Beta gross count rate (count rate of beta particles detected by the detector)
- Gamma ROI (counts of gamma radiation within nine ranges of energies numbered 2-10)\*\*
- Measurement start date/time
- Measurement end date/time
- Monitor ID (each monitor numbered uniquely)

*\* Some options are not available for deployable monitors due to the differences in their capabilities.*

*\*\* Since gamma ROI 1 is only used by scientists to stabilize detector operations, this range is not available through this online tool.*

Start by selecting either of the two radio buttons marked “Deployable Monitor List” or “Fixed Monitor List.” See Figure 1, below.

**RadNet Query Builder**  
Monitor Type:  Deployable Monitor List  Fixed Monitor List

**Figure 1**

## Selecting Available Columns

The RadNet database stores the data that the monitors gather as part of each measurement. When you query the system, you can limit the types of data that will be presented to you. All of the selected data types will appear in a series of columns that you will be able to individually sort.

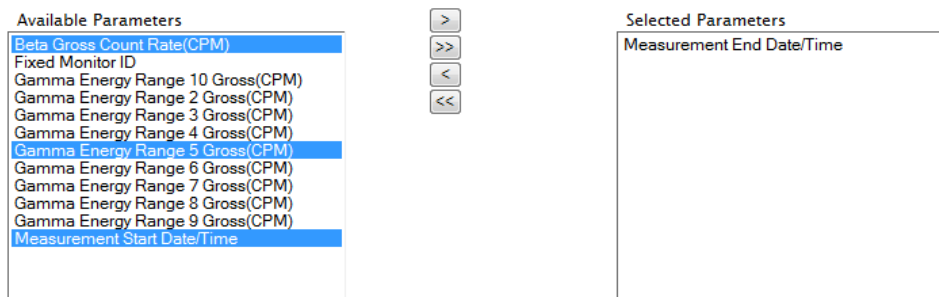
Choose from the list of “*Available Columns*.” There are differences in the parameters between the *Fixed Monitors* and *Deployable Monitors* lists.

To make your selection(s), move your cursor to the desired line and left click. The item becomes highlighted in blue. Now click on the single arrow button pointing to the right located in-between the *Available Columns* and *Selected Columns* tables. See *Figure 2* below. Whatever is inserted into the *Selected Columns* table will become sortable criteria in the *Query Results* page. Hint: Most queries for data will be enhanced if evaluated against time, so it is recommended that “*Measurement End Date/Time*” remain in the *Selected Columns*.



**Figure 2**

To select more than one item, either add them one-by-one by repeating the process above, or hold down the CONTROL key (or the Apple key on a Macintosh® computer) and click on the next desired item. Once you have made your selection(s), release the CONTROL key and click on the single arrow button pointing to the right located in-between the *Available Columns* and *Selected Columns* tables. *Figure 3* shows three selections.



**Figure 3**

If you want to choose all the options listed, there are two ways to do so:

- Press the “double arrow” button

- Select the first item, scroll to the last item and hold down the SHIFT key and click. Now press the single arrow button to move the selection to the *Selected Columns* table.

To remove an item from the *Selected Columns* back to the *Available Columns* table, simply use the same procedure but use the buttons pointing back to the left.

To de-select an item after it has been highlighted, simply click on it again and the blue highlight will disappear. Or, press the "ESCAPE" key to clear all your items.

The system will store your query selections that appear in the *Selected Columns* table. During the same session, the next time you return to the RadNet Query Builder, the same criteria will be displayed in the *Selected Columns* table. However, if you return to the RadNet Query Builder, you will need to reselect the monitor location or ID.

## Establishing Monitor ID and Location Criteria

These are selected the same way you did above. To select more than one item in the list, you must use the CONTROL + *click*. See *Figure 4* to view selection options.

Monitor numbers with the “RN” preface are deployable monitors. The deployable monitor list will be selectable when the *Monitor Type*, “Deployable Monitor” is listed (see *Figure 1*).

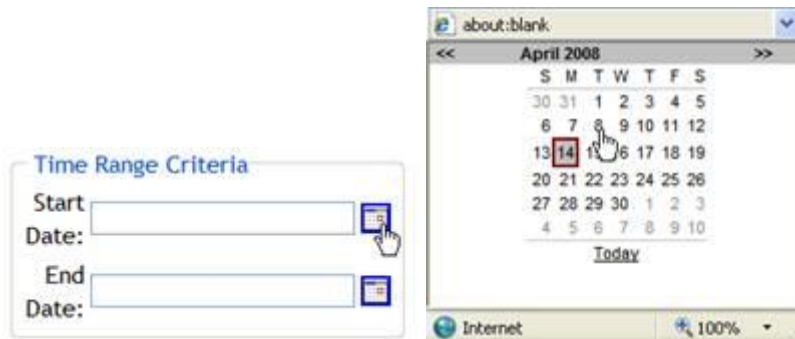


**Figure 4**

Note: For practical purposes, most users will not know the *Deployable Monitor Id* and will instead select *Fixed Monitor Location*.

## Establishing Time Range Criteria and Submitting Your Query

Select a *Start Date* and *End Date* using the *Time Range Criteria* box. Clicking on the calendar icon on each line will cause a pop-up calendar to appear for your use. See *Figure 5*.



**Figure 5**

If you do not set the Time Range Criteria, then the system will default to the previous seven days. The system will display only the most recent 400 results (400 is the maximum number of results that can be displayed in CDX). If the start and end dates are left blank, the system will display the most recent 400 results (400 is the maximum number of results that can be displayed in CDX).

When you have finished entering your desired criteria, click on the  button.

## Understanding Query Results

Figure 6 below is an example of a RadNet Query Result. Note that the Query Parameters the user entered –Location, Start/End Dates – are listed at the top of the table.

### Query Parameters:

**Location Names:** OH: CINCINNATI,  
**Query Start Date:** 09/04/2014  
**Query End Date:** 09/11/2014  
 Fixed data selected.

Query Result for monitoring location OH: CINCINNATI. Total Number of Records: 190

 Download  Printer-Friendly

Please adjust paper orientation to Landscape in the browser print dialog before printing.

Note: click on a column header to sort results appropriately

Measurement End	Beta Gross Count	Fixed Monitor ID	Gamma Energy Range 10	Gamma Energy Range 2	Gamma Energy Range 3
2014-09-04 00:17:31	0.0000	504.0000	45.0000	1,438.0000	
2014-09-04 01:17:42	0.0000	504.0000	44.0000	1,494.0000	
2014-09-04 02:17:55	0.0000	504.0000	45.0000	1,536.0000	
2014-09-04 03:18:07	0.0000	504.0000	45.0000	1,568.0000	
2014-09-04 04:18:19	0.0000	504.0000	44.0000	1,602.0000	
2014-09-04 05:18:31	0.0000	504.0000	47.0000	1,662.0000	
2014-09-04 06:18:43	0.0000	504.0000	47.0000	1,617.0000	
2014-09-04 07:18:55	0.0000	504.0000	48.0000	1,585.0000	
2014-09-04 08:19:07	0.0000	504.0000	49.0000	1,602.0000	
2014-09-04 09:19:19	0.0000	504.0000	47.0000	1,636.0000	
2014-09-04 10:19:31	0.0000	504.0000	50.0000	1,692.0000	
2014-09-04 11:19:43	0.0000	504.0000	52.0000	1,759.0000	
2014-09-04 12:19:54	0.0000	504.0000	51.0000	1,808.0000	
2014-09-04 13:20:07	0.0000	504.0000	52.0000	1,720.0000	
2014-09-04 14:20:19	0.0000	504.0000	50.0000	1,599.0000	
2014-09-04 15:20:31	0.0000	504.0000	50.0000	1,623.0000	
2014-09-04 16:20:44	0.0000	504.0000	49.0000	1,524.0000	
2014-09-04 17:20:56	0.0000	504.0000	47.0000	1,396.0000	

Note: Zero values for "Beta Gross Count" and/or any "Gamma Energy Range" indicates that data are not available.

**Figure 6**

Depending on the amount of data requested and the screen size of the user's computer, it may be necessary to use the scrolling feature, both horizontally and vertically, in order to view all the data.



## Sorting, Downloading and Printing Data

The user can change the sort order of the display by clicking on the various column headings. For example, if the user clicks on the column labeled in *Figure 6* “Gamma Energy Range 2,” the table will be sorted from low-to-high with this column as the sort filter. Clicking on the column header a second time will cause the table to be sorted from high-to-low. The user can select any column header as the sort default.

Two icons marked “Download” and “Printer-Friendly” are located toward the upper right corner of the table. *Download* opens a new window and downloads the RadNet Query Result in Microsoft Excel (.xls) format. *Printer-Friendly* opens a separate window that allows the user to directly print the RadNet Query Result.

## Plotting Data

You can select the criteria you used in your query to create a *Scatter Plot*, *Line Graph*, or both. The first step is to identify which criteria you would like on which axis. On scatter and line graphs, the x-axis and y-axis each display a different criterion (for example, date and gamma energy range). The x-axis shows values horizontally, increasing from left to right; the y-axis shows values vertically, increasing from bottom to top.

The first graphical plot option is to create a quick graph choosing only one criteria and displaying that criteria's data for the past 7 days. In *Figure 7* the criteria, "Gamma Energy Range 5" has been selected.

Graphical Plots for the Past 7 Days

Fixed Monitor Location  
OH: CINCINNATI

Fixed Monitor Data Category

- Gross Beta
- Gamma Energy Range 2
- Gamma Energy Range 3
- Gamma Energy Range 4
- Gamma Energy Range 5
- Gamma Energy Range 6
- Gamma Energy Range 7
- Gamma Energy Range 8
- Gamma Energy Range 9
- Gamma Energy Range 10

Scale

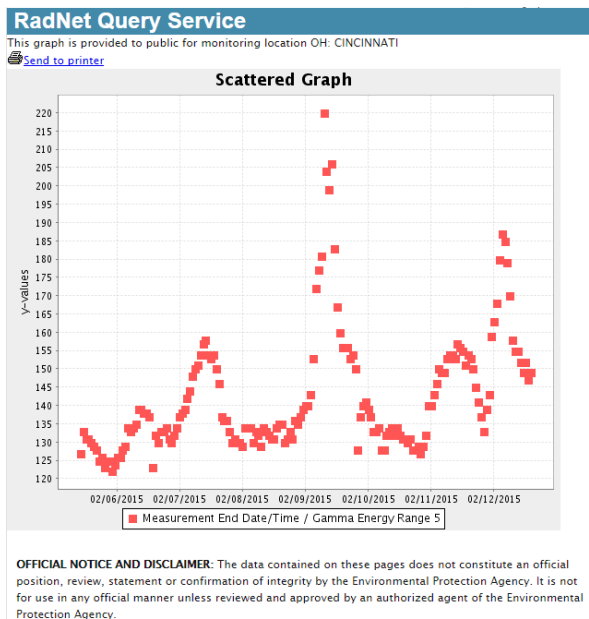
- Normal
- Logarithmic

**Note:** Vertical axis of logarithmic plot may not have numeric labels if data range is not large. Negative values will not work with logarithmic plots.

Graph Type

**Figure 7**

Once you select *Scatter Plot* at the bottom of the page, a new window opens which will display the results of the inquiry in *Figure 7*. The scatter plot created is shown in *Figure 8*.



**Figure 8**

The second way to graph data is by creating a *Custom Graphical Plot*. With this option you can choose the X-axis criteria and select several options for the Y-axis. Using the dropdown menu for the “X-Axis Column,” select the criterion you wish to appear on the x-axis. Next, select the criteria you wish to appear in the y-axis. It is recommended that you do not choose to graph the parameter that was chosen to be the x-axis since the result will be a meaningless straight line and will distort the plot significantly.

Hint: Select “Measurement End Date/Time” if you plan to plot the data against time of measurement, which is the recommended way to display the data.

Custom Graphical Plot

X-Axis Column  
 Measurement Start Date/Time

Y-Axis Column  
 Gamma Energy Range 5 Gross(CPM)

Available Columns

- Beta Gross Count Rate(CPM)
- Gamma Energy Range 10 Gross(CPM)
- Gamma Energy Range 2 Gross(CPM)
- Gamma Energy Range 3 Gross(CPM)
- Gamma Energy Range 4 Gross(CPM)
- Gamma Energy Range 6 Gross(CPM)
- Gamma Energy Range 7 Gross(CPM)
- Gamma Energy Range 8 Gross(CPM)
- Gamma Energy Range 9 Gross(CPM)
- Measurement End Date/Time

Selected Columns

- Gamma Energy Range 5 Gross(CPM)

Scale  
 Normal  Logarithmic

**Note:** Vertical axis of logarithmic plot may not have numeric labels if data range is not large. Negative values will not work with logarithmic plots.

Graph Type

Figure 9

Now that you have identified how you want your data arranged, all you need do is select either the “Scatter Plot” button or the “Line Graph” button at the bottom of the page.

Your selection will appear as a pop-up window. *Figure 10* shows the selected criteria from *Figure 9* as a line graph.

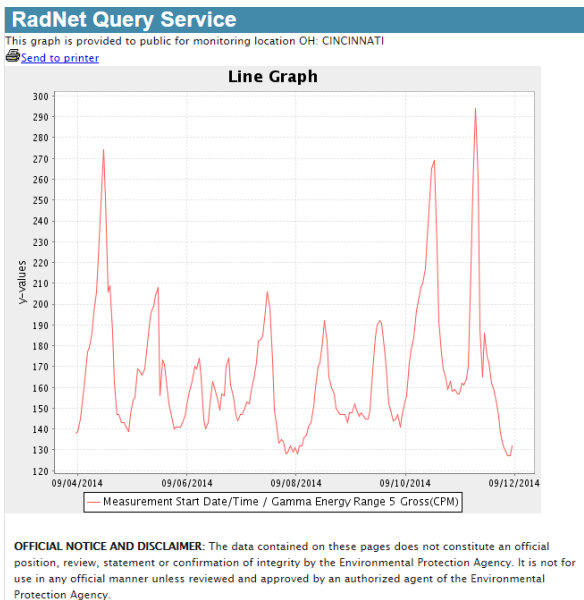


Figure 10

On some computers, depending upon the screen resolution, the plotted data points can appear very faint or small. If this is the case, you may want to decrease your screen resolution (different operating systems use different methods to adjust screen resolutions).

To print the graph, select "Send to printer" located above the top left of the scatter plot or graph. To close the pop-up window, click on the red "X" in the upper right hand corner of the pop-up.

Closing the pop-up will return you to the RadNet Query Results webpage where you can choose to plot another graph, change the graphing criteria, or navigate elsewhere.

## A Sample Query

The sample query listed below is presented for example purposes only, and, as such, the location and other parameters chosen are arbitrary.

Suppose you live in Cincinnati, Ohio, and you want to analyze local gamma radiation that falls within *Gamma Energy Range 5 Gross (CPM)*.

Since it's not helpful to compare one monitor site to another (due to each location having its own typical ranges dependent on local factors), you decide that you should look at a week's worth of data from the fixed monitor located in Cincinnati. You choose the week of September 4-11, 2014.

In the RadNet Query Builder, you select "Fixed Monitor List" as the Monitor Type, you choose "*Gamma Energy Range 5 Gross (CPM)*" and "Measurement End Date/Time" as the Selected Columns. You will need to choose "OH: CINCINNATI" as the Fixed Monitor Location, and you set the Time Range Criteria to start at "09/04/2014" and end on "09/11/2014." These selections are displayed below in *Figure 11*.

**RadNet Query Builder**

Monitor Type:  Deployable Monitor List  Fixed Monitor List

**Available Parameters**

- Beta Gross Count Rate(CPM)
- Fixed Monitor ID
- Gamma Energy Range 10 Gross(CPM)
- Gamma Energy Range 2 Gross(CPM)
- Gamma Energy Range 3 Gross(CPM)
- Gamma Energy Range 4 Gross(CPM)
- Gamma Energy Range 6 Gross(CPM)
- Gamma Energy Range 7 Gross(CPM)
- Gamma Energy Range 8 Gross(CPM)
- Gamma Energy Range 9 Gross(CPM)
- Measurement Start Date/Time

**Deployable Monitor Id**

- RN01
- RN02
- RN03
- RN04
- RN05

**Time Range Criteria**

Start Date:

End Date:

>

>>

<

<<

**Selected Parameters**

- Gamma Energy Range 5 Gross(CPM)
- Measurement End Date/Time

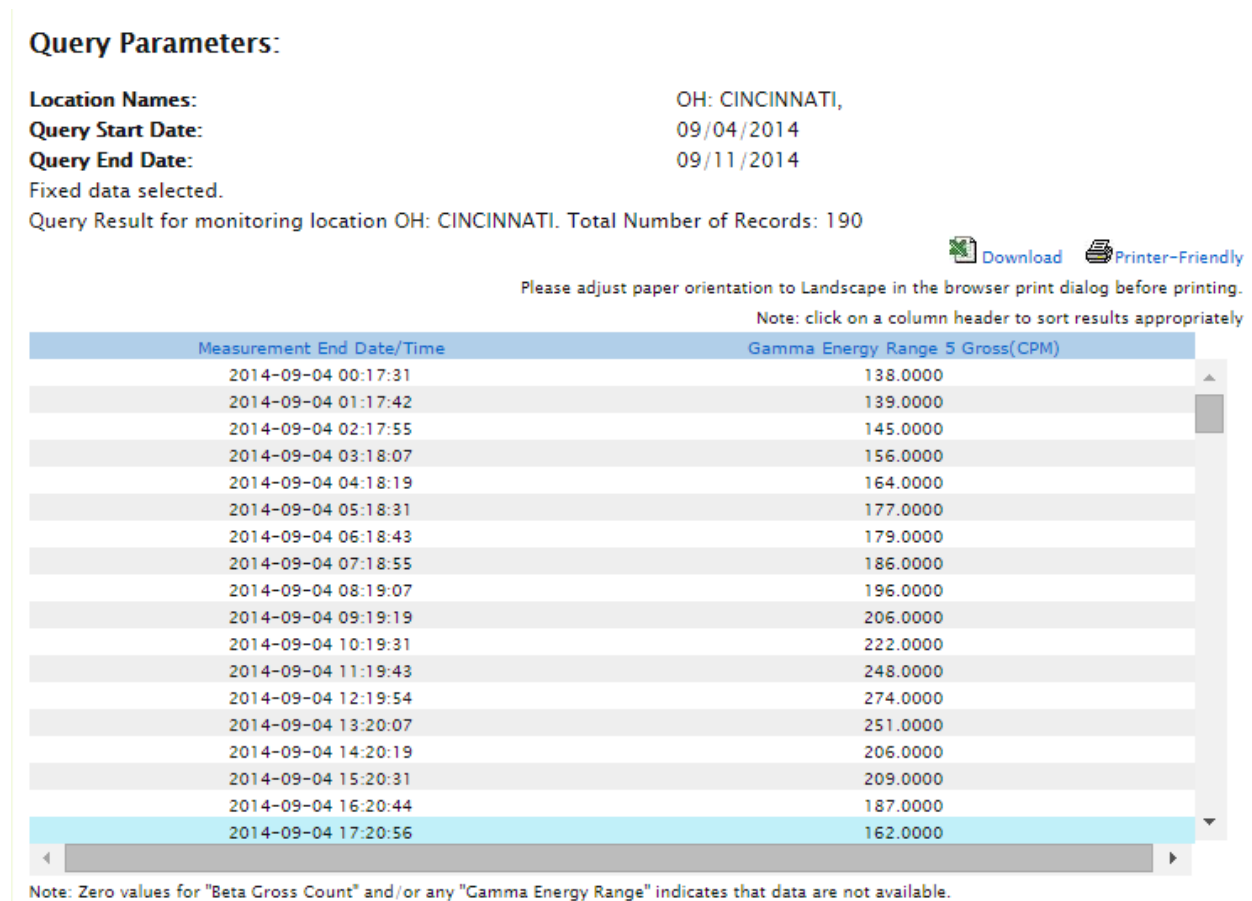
**Fixed Monitor Location**

- NY: ROCHESTER
- NY: SYRACUSE
- NY: YAPHANK
- OH: CINCINNATI
- OH: CLEVELAND

Note: The query is limited to 400 entries and if both start date and end date are left blank, the query returns 400 most recent data entries.

Figure 11

When you submit this query, you receive the results shown below in *Figure 12*.

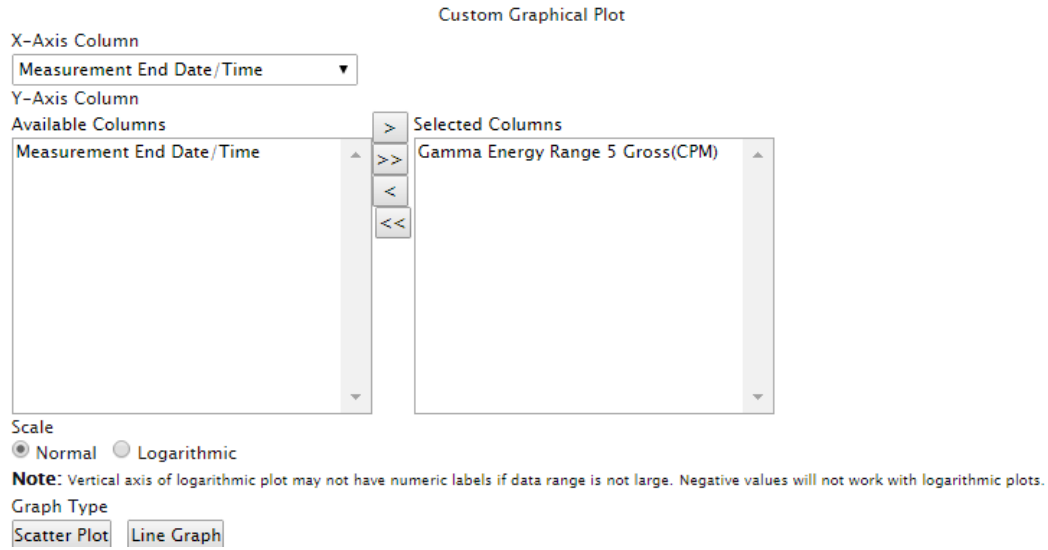


**Figure 12**

One hundred ninety records are shown for the Cincinnati monitor between the days September 4, 2014 and September 11, 2014. By default, the data are listed in chronological order from the time that the measurements were recorded. If you wanted to sort the results from low gamma count rates to high gamma count rates, click the column header "Gamma Energy Range 5 Gross (CPM)".

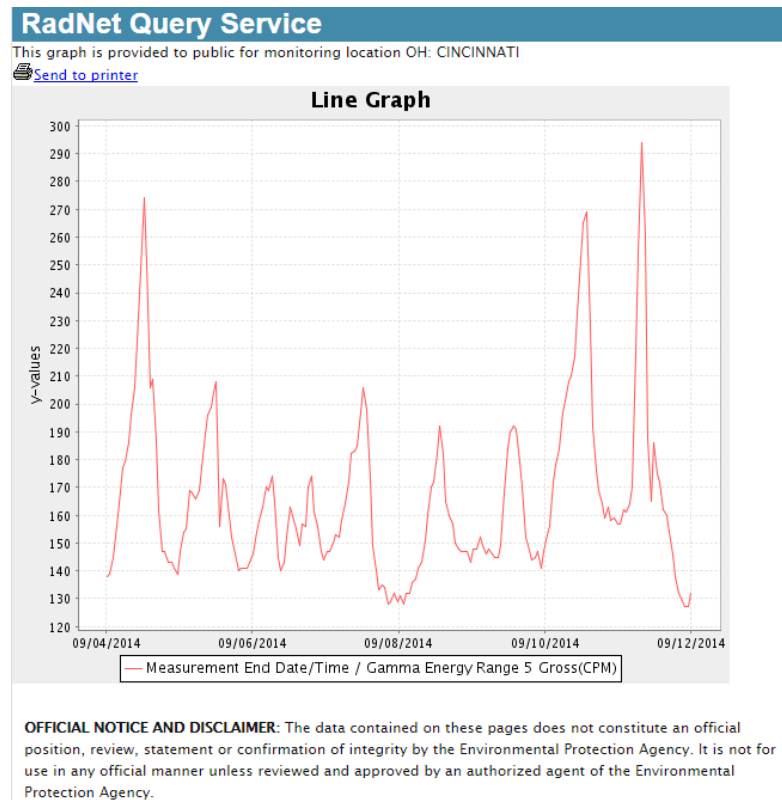
Once the columns are sorted, it is easy to see that the lowest measurement during this period was at 22:52 (10:52 pm) on September 11, 2014 (127 CPM), and the highest measurement was at 7:45 AM on September 11, 2014 (294 CPM). These values are well within the range of normal day-to-day fluctuations and therefore pose no cause for concern. [EPA has senior scientists dedicated to the RadNet air monitoring program who review all abnormally high data from every monitor, every business day, with the intent of verifying there is no cause for concern.](#)

You can create custom scatter plots or line graphs by defining the x- and y-axes, as shown below in *Figure 13*. You will see the "Custom Graphical Plot" selections at the bottom of the RadNet Query Results webpage. Generally, most users should choose the "Measurement End Date/Time" as the x-axis.



**Figure 13**

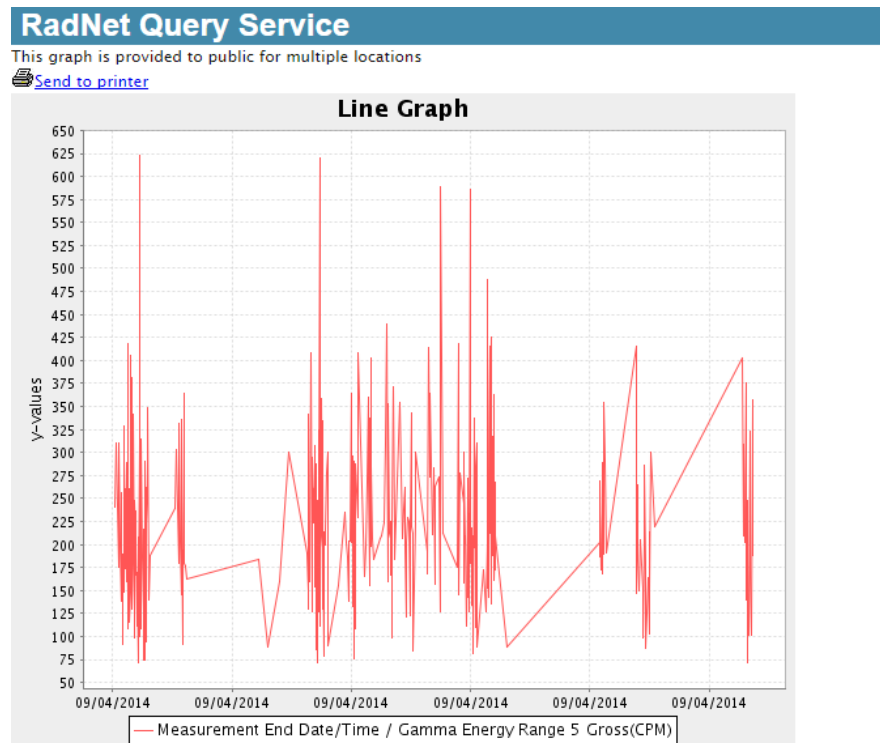
The resulting line graph is displayed below in *Figure 14*. The Gamma Energy Range 5 Gross (CPM) are plotted along the vertical y-axis, and the dates/times are shown from earliest to latest along the horizontal x-axis. The graph shows that the highest CPM during the timeframe was recorded early in the day on September 11th, and that the lowest was recorded late in the evening on the same day.



**Figure 14**

Note that the y-axis will always cover the entire range (minimum to maximum) of the data being plotted. This may make normal data fluctuations appear to be significant changes in the data. *Figure 14* shows routine changes, but some of the fluctuations appear to be significant simply due to the scale on the y-axis that is automatically selected by the graphing software. EPA has senior scientists dedicated to the RadNet air monitoring program who review all abnormally high data from every monitor, every business day, with the intent of verifying that these fluctuations are no cause for concern.

*Figure 15* shows the same data, but only for September 4, 2014. Note how these data fluctuate very little in *Figure 15* for the date, but appear to be significantly different in *Figure 14* below. In both graphs, the fluctuations are insignificant. The appearance that these fluctuations are significant is due to the scaling of the graph since it scales automatically from lowest to highest values, regardless of what they are.



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**Figure 15**



## Glossary

**Beta Radiation:** Fast moving electrons emitted from a nucleus during radioactive decay. Beta particles are emitted from man-made (e.g., strontium-90) and natural radiation sources (e.g., tritium, carbon-14, and many naturally-occurring radon daughters such as bismuth-214).

**Counts Per Minute (CPM):** The number of decays of radioactive material that are detected by a radiation detector in one minute.

**Deployable Monitor:** Mobile RadNet monitors that can be moved for use during drills, alerts or an emergency event. These monitors are significantly different than the Fixed (Stationary) RadNet Air Monitors.

**Fixed (or Stationary) Monitor:** Also referred to as Fixed Monitor. Permanently positioned and continuously operating monitors that sample particulates in the air and obtain gamma radioactivity spectra in real-time.

**Gamma Energy Range:** A specific range of gamma energies (See Gamma Radiation, below). The fixed RadNet monitors' computer system breaks the gamma energy spectrum into ten contiguous gamma energy ranges.

**Gamma Radiation:** Weightless packets of energy, gamma rays often accompany the emission of alpha or beta particles from a nucleus. They have neither a charge nor a mass and are very penetrating. One source of gamma rays in the environment is naturally-occurring potassium-40. Man-made sources include cobalt-60 and cesium-137. Gamma rays from specific nuclides are emitted in discrete energies which may be used as a "fingerprint" to identify the source of the gamma rays.

**Gross:** Combined or total sum (as in "Gross Beta").

**RadNet:** The EPA's comprehensive network for monitoring radioactivity and ionizing radiation in the environment with more than 130 near-real-time air monitors nationwide. Formerly known as the Environmental Radiation Ambient Monitoring System (ERAMS), RadNet has continuously monitored multiple media, including air, precipitation, drinking water, and milk since its inception in 1973. Information and monitoring data is available at <http://www.epa.gov/radnet/>.