SESSION 35: WHAT’S OLD IS NEW AGAIN: PAPER TO PAPERLESS-FRMAC AND BACK AGAIN

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Summary: Before the advent of portable computers, the internet, or cell phones, dose assessments were completed from pre-calculated tabular and graphical data tools. Raw data from field teams arrived via radio or landline, and raw data were transcribed to data forms and manually plotted on paper maps. Typists tabulated the data. Laboratory results were delivered on paper or transmitted by fax, and graphic designers created data products that were photographed for production and distribution. With the advent of powerful and portable computers and the internet, the whole process of data collection, storage, distillation into data products and distribution has been automated with smart tools. These tools directly upload field measurements to a computer database and TurboFRMAC dose assessment software interprets the field and laboratory results.

The Three Mile Island, Chernobyl, and Fukushima accidents all had a common theme of inconsistent field data, lots of it, and in the case of Fukushima, more data coming in faster. For example, at Three Mile Island, there were multiple agencies collecting data at similar locations, but when viewed in isolation the data were scattered and looked uncertain. One of the health physicists had the presence of mind to average the field data at the locations and plot the results. The new view of the data set then fit well to an exponential as a function of distance from the plant and thus made sense of the data.

Subsequent to the Three Mile Island accident, and formation of the Federal Radiological Monitoring and Assessment Center technology rapidly improved and powerful portable computer evolved, and so did the tools to aid the process of consequence management. Accurate geo-located field data are now uploaded directly to the cloud by the field teams, the National Atmospheric Advisory Center (NARAC) products are delivered on the Internet, with sophisticated graphics and analysis for the users.

The experience in Japan is another example of the role of the analyst. Data collected by the Aerial Measuring System (AMS) were confounded by the use of non-dedicated aircraft and other factors related to calibrations that converted the raw data to activity on the ground. The AMS calibration assumes the detectors are outside the aircraft, the terrain is flat, the height of the aircraft is known, and the source emitting radiation is on the ground. All of these assumptions were challenged so the skill of the analyst was essential in adapting the standard data processing methods.

The role of the analyst was the same then as it is now. Ultimately the quality of the data and careful assessments are elements that are needed to produce prompt and actionable assessments of the environmental conditions. Automation is limited in how much it can speed up the process or ensure the quality of the data. An analyst-in-the-loop is still needed to ensure good data comes in, so that valid and accurate assessments come out, no matter what confounding factors may be present.

Reference

Musolino, SV, Clark, H, McCullough, T, Pemberton, W. Environmental Measurements in an Emergency: This is not a Drill, Health Physics, 102(5):516-526; 2012.