MARYLAND
Department of the Environment

Facts About...

Radiation Monitoring in Drinking Water – Iodine-131
April 18, 2011

Highly sensitive radiation monitors operated by the Environmental Protection Agency (EPA) and states across the country have detected **very low levels** of radioactive material in the air. These levels are consistent with estimated releases from the damaged nuclear reactors in Japan. These findings were expected, given that radioactive material is known to travel in the atmosphere.

The Maryland Department of the Environment (MDE), the Maryland Department of Health and Mental Hygiene (DHMH) and the Maryland Department of Natural Resources (DNR) will continue to monitor the radiation levels in air, rain water, milk and drinking water. So far the radiation amounts are so small that, according to United States Nuclear Regulatory Commission standards, they are at least ten thousand times less than amounts that would cause a public health concern.

What is the radiation of concern?
Iodine-131 is the type of radiation that has been detected in the atmosphere. However, we are exposed to radiation every day, both from natural sources, such as minerals in the ground and radiation from the sun, and from man-made sources such as medical x-rays. The average annual radiation dose in the U.S. is 620 millirems (mrem) per person. Many drinking water sources have very low levels of radioactive contaminants ("radionuclides"), most of which are naturally occurring, however, it is uncommon to find even low levels of iodine-131 in the environment unless it is in the direct vicinity of a nuclear plant or in certain wastewater discharges.

What is iodine-131?
According to EPA, iodine-131 is produced during operation of nuclear reactors and in the detonation of nuclear weapons. When released to the environment from nuclear power plants, it is usually in gas form. It has a half-life of about eight days and emits beta particles and gamma radiation upon radioactive decay. Iodine-131 is also used in medicine to diagnose and treat cancer of the thyroid gland.

How can iodine-131 affect people's health?
When ingested, some iodine-131 concentrates in the thyroid gland. The rest passes from the body in urine. Radioactive iodine is used to help diagnose and treat thyroid problems. Long-term (chronic) exposure to radioactive iodine can cause nodules, or cancer of the thyroid. However, the levels currently being measured in Maryland are far below those that would be expected to cause any significant increase in the risk of cancer, especially since exposure is not expected to last for a long time.

How is MDE's Water Supply Program monitoring the risk to water supplies?
MDE and DHMH have been monitoring iodine-131 levels in air, rain water, milk and drinking water. Iodine-131 was not detected in raw or finished water samples from five community drinking water systems that were sampled during the weekend of March 26, 2011. Beginning in April, MDE initiated sampling of raw and finished water of several large community surface water systems on a weekly basis to monitor the presence of iodine-131. Based on results of sampling to-date, no Iodine-131 has been detected. We will keep water systems informed of our sampling results. MDE may also periodically look at other drinking water sources around the State.

Are there any groups of people that are more sensitive to radiation exposure?
Infants, pregnant women and women who are breastfeeding are particularly sensitive to radiation. However, levels measured to date are still many times below the health risk even for these groups. At this time, there is no need to take extra precautions with regard to drinking water.

Should I be concerned about contamination of my water system because of radiation leaking from the crippled Japanese reactor?
Because iodine-131 has not been detected to-date in samples collected from surface drinking water sources, there is no immediate need for concern. MDE is monitoring water systems and we will keep you apprised of our findings. If additional actions are needed we will notify Maryland's water systems. Iodine-131 has been found in precipitation in several different states across the country. Such concentrations have not been documented in water supplies.

Our water system is supplied by wells; is my system at risk?
Since the contaminant of concern has a short half-life (8 days), properly constructed and well-maintained groundwater systems are not a concern.

Are there private laboratories certified by the State of Maryland to conduct iodine-131 analyses?
No. These contaminants are not specifically regulated and as such labs are not certified to conduct the analyses.

Should I begin to conduct sampling of my water system?
MDE is conducting representative sampling of surface water systems throughout the State. At this time, especially since there have been no detections, we do not believe it is necessary for water systems to conduct sampling on their own.

What type of treatment is effective at removing iodine-131?
EPA guidance states that ion exchange and reverse osmosis are the best available treatment for removal of iodine-131.

Is this likely to be a long-term problem?
Given the uncertainty related to the nuclear reactors in Japan, we don't know how or whether levels of radiation currently seen in surface water and rain water will change in the immediate time period. However, according to the Centers for Disease Control, iodine-131 disappears relatively quickly in the environment. MDE, DHMH, DNR, and federal agencies will continue to monitor and re-evaluate the situation as long as necessary.

Who can I contact for the best information about my community?
You may call MDE Water Supply Program at (410) 537 3702 or contact your local health department. For additional sources of information please see the following websites:

EPA	http://www.epa.gov/japan2011/
CDC	http://emergency.cdc.gov/radiation/isotopes/iodine131surfacewater.asp
DHMH	http://www.dhmh.state.md.us/pdf/press%20release%20march%2027.pdf
MDE	http://www.mde.state.md.us/programs/PressRoom/Pages/032711.aspx
DHMH	http://www.dhmh.state.md.us/pdf/iodine%20131factsheet32811.pdf
DHMH	http://www.dhmh.state.md.us/pdf/overview.pdf