American Nuclear Society

A Day With The Atom

...living with zest!

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Prepared in Cooperation with the International Atomic Energy Agency

So what would our world be like today if radiation had not been harnessed to serve our human needs? One way to gain a small appreciation for this modern servant is to go through a typical day with our antennas particularly sensitized for radiation awareness.

6:00 am

Our alarm clock goes off and the day begins. We wearily look at the clock or our wristwatch, now aware that we can see the dial through the darkness because the dial is luminescent. We then flip the light switch, with full expectations of instant illumination. If we live in the United States, there is a 20% probability that the electricity delivered to power those lights comes from a nuclear power plant. In France, that probability would rise to nearly 80%. Even if the power came from coal, the most probable source worldwide, we know that at least some of the pollutants currently discharged directly into the atmosphere might eventually be removed by electron beam processing.

6:10 am

We now go to the bathroom and use the toilet. Whereas most sewage is currently treated by chemical means, gamma rays from radioisotopes can be used to process sewage without generating additional waste streams, since the products can be used for fertilizer. The recognition that this technology is on the way resonates with our environmental awareness. We then shower and either insert our contact lenses or affix our eyeglasses. The saline solution in which our contact lenses were stored overnight has been irradiated to kill any microbes that may be irritants to our tender eyes. If, instead, we choose to put on our eyeglasses, we now recall that several radiation procedures were used to assure high quality of that glass.

6:30 am

As we put on our clothes, we ponder the fact that the cotton in our undergarments is now grown in a more productive fashion, due to improved cotton strains developed using radioactive tracer procedures. Clothes made from synthetics likely also benefited from radiation tracking processes somewhere in the development phase.

6:45 am

We then trudge into the kitchen and head straight for the refrigerator, thankful that plentiful supplies of electricity allow us to keep our many food products cold and free of excessive spoilage. We proceed to fry an egg on a pan equipped with a special coating—where the thickness of this coating was likely determined by radiation gauges. The ceramic or plastic plate upon which we slide our fried egg undoubtedly benefited from radioisotopes to assure uniformity of the materials of the plate itself. Our silverware likely benefited from radiation thickness gauges both during the making of the sheet metal from which the utensils were subsequently stamped and during the special coating process. For the first time, we become aware that our full package of breakfast cereal was precisely measured by radiation leveling, or density gauges to assure us that the weight stated on the cardboard container was accurate.

7:20 am

Making one more trip to the refrigerator, we stare thankfully at the array of fruits and vegetables that we have for selection. Many of these varieties would not have been possible were it not for the greatly accelerated agricultural breeding process made possible by using radioisotopes for either mutation or tracing purposes. As we pour creamer into our coffee or tea, we marvel that this creamer can remain on our shelf for long periods without refrigeration because the container was irradiated prior to being filled to assure the absence of microbes.

7:25 am

As we reach for the morning paper, our mind now flashes back to the paper mills responsible for making such huge amounts of paper available to us so economically. This affordability is largely due to the radiation thickness gauges that allow the paper production process to be precisely and automatically controlled with amazingly high throughput. We then flip on the radio or TV, now cognizant that the wiring in these devices is very likely protected with radiation treated insulation.

7:30 am

After finishing breakfast, we struggle to the medicine cupboard where we take our vitamins and/or our prescribed medication, now aware that such modern marvels would not be possible without the radioisotope tracers employed in so many parts of the development and testing process.

7:35 am

Before leaving for work, we prepare a sandwich for lunch, again reflecting on the conveniences afforded by shrink wrap or aluminum foil that radiation processes helped to produce. We hope that the slices of turkey, ham, or beef placed in our sandwich do not have salmonella, trichinosis, or E-coli. It should have been sufficiently cooked to remove these dreaded concerns, but we look forward to the day when all such foods have been irradiated—to be absolutely sure they are safe.

7:45 am

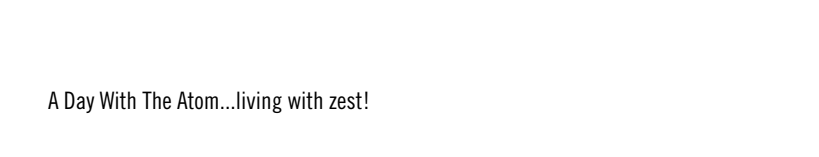
It's about time to leave for work, but the baby's cry indicates that a quick diaper change is first in order. Thankfully, the super-absorbent material used in the disposable diaper (a direct result of radiation grafting) makes the job easy, without having to change the bedding.

8:00 am

As we get into our car to drive to the office, school, or factory, we are thankful that the engine starts quickly and smoothly. Much of the credit for this vast improvement over earlier models is due to advanced materials for the engine—made possible by using radioisotopes to determine engine wear, lubricant levels, etc. All the steel used in the car benefited directly from radiation techniques, both in the original foundry and in the final metal rolling process. The tires may have been vulcanized by radiation, rather than by the older sulfurization process. All the glass in the vehicle was perfected via radiation moisture monitors in the manufacturing process.

8:15 am

We roll down the window and marvel at the clean air, a rarity in many places. The use of radioisotopes is becoming more widely used everyday to pinpoint the sources of atmospheric pollution, a necessary step for successful abatement programs. With the advent of nuclear-generated electricity, less coal must be burned. In the height of dependency upon coal for heat and electrification of London, 3000 people died from air pollution in 1952 over a period of only four days.



8:30 am

We finally approach our place of work. If we are fortunate, the floor sparkles as it reveals a wood-grain surface hardened for beauty and easy maintenance via radiation-induced cross-linking in the polyethylene materials. We are refreshed that all exits in the building are clearly marked by illumined exit signs, powered by a radioactive source that is 100% reliable (even when the electricity goes off). As we approach the drinking fountain, we are thankful that the best water supplies locally available were likely found by using radioactive tracer techniques to assess the groundwater hydrology.

5:00 pm

After work we drop by to visit a friend still recuperating at the local hospital. Our new awareness of nuclear medical advances calls our attention to the fact that one out of every three patients entering such a facility derives direct benefits from radioisotopes. Our friend is doing nicely because his ailment was detected quickly and precisely using radioactive diagnostic methodology. Given this new awareness, we decide to stop by the radiology department and get our annual chest x-ray. We are also reminded that dental care is now much better because of the routine diagnostic x-rays taken prior to performing actual corrective measures.

6:30 pm

We then return home for dinner and impulsively turn up the heat or the air conditioner. Again, the electricity delivered for such service could be from a nuclear power plant. Our dinner is seasoned with spices that almost certainly have been irradiated to prevent insect infestation. If we are in a hurry and simply use the microwave oven for cooking, we become mindful that this device depends upon a form of radiation to perform its essential function.

7:30 pm

After dinner we buzz over to the airport to pick up a friend. We are thankful that the lights that illuminate the runway are powered by tritium, a radioactive substance that continues to operate independent of any electrical failures or storm conditions. The welds in the wings of the airplanes are routinely inspected using neutrons from special radioactive sources, as are the welds affixing the jet engines to the wings. Likewise, all luggage boarding the aircraft is screened using radiation procedures to minimize the threat of concealed weapons or explosive devices. As a result of these advances, air travel is considerably safer today than any other mode of transportation.

9:00 pm

Finally, it is time to climb in bed and get a good night's sleep. Such contentment is aided by the knowledge that our trusty smoke detector, which operates with a built-in radioisotope, is 100% reliable throughout the day and night.

As we reflect back over the day, we are no less than astounded by the degree to which radiation processes have already been harnessed to enrich our life. Recognizing this enormous progress, made largely over the past half-century, we can only dream in wonderment over what the future of radiation technology may hold for us and for our children.

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July 2013

Additional applications of radiation are detailed in Dr. Waltar's book, *Radiation and Modern Life* (ISBN 1-59102-250-9).