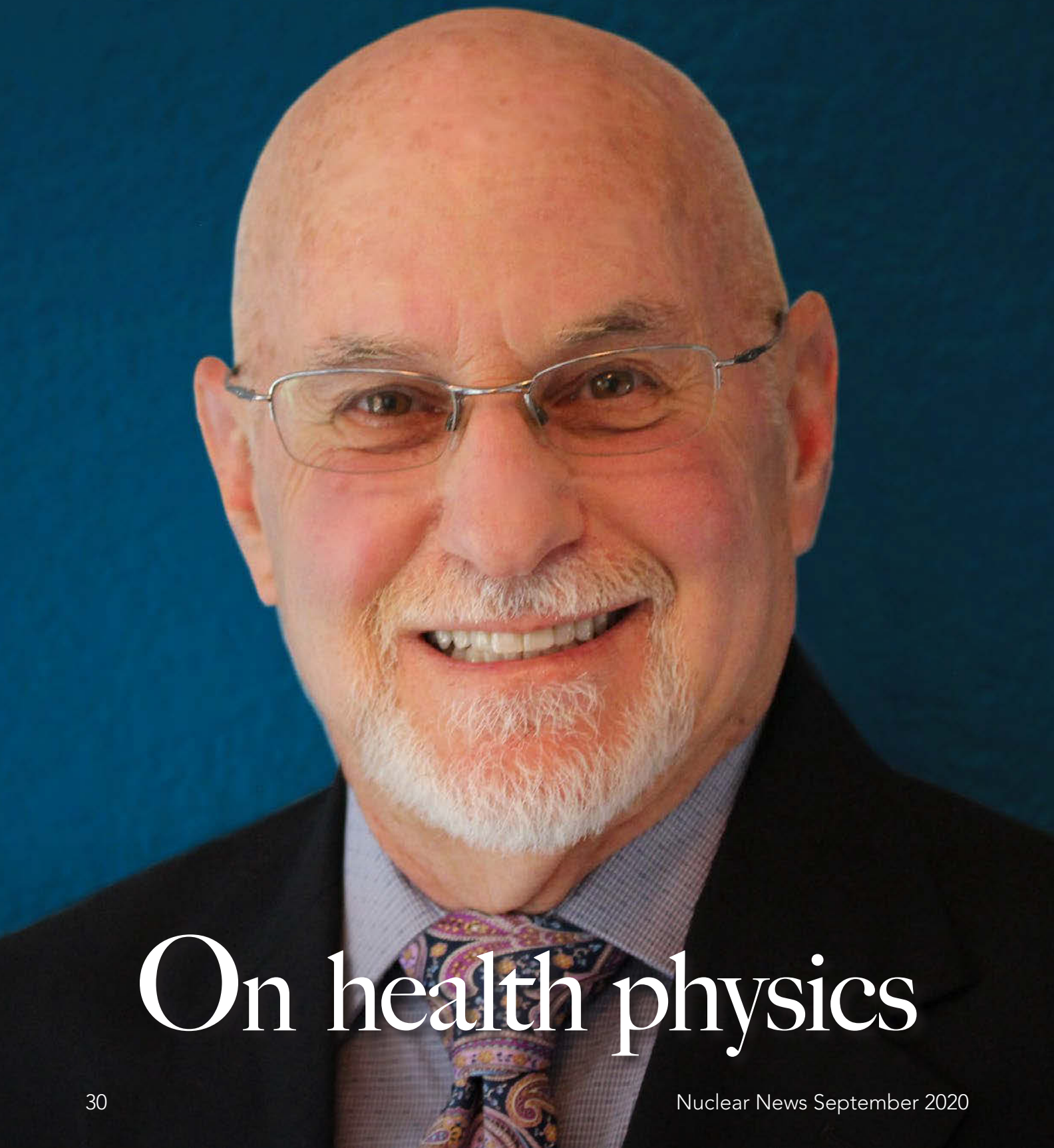
As seen in the September 2020 issue of **Nuclear News**

HPS's

Eric Goldin:



On health physics

Eric Goldin, president of the Health Physics Society, is a radiation safety specialist with 40 years of experience in power reactor health physics, supporting worker and public radiation safety programs. A certified health physicist since 1984, he has served on the American Board of Health Physics, and since 2004, he has been a member of the National Council on Radiation Protection and Measurements' Program Area Committee 2, which provides guidance for radiation safety in occupational settings for a variety of industries and activities. He was awarded HPS Fellow status in 2012 and was elected to the NCRP in 2014.

Goldin's radiological engineering experience includes ALARA programs, instrumentation, radioactive waste management, emergency planning, dosimetry, decommissioning, licensing, effluents, and environmental monitoring.

The HPS, headquartered in Herndon, Va., is the largest radiation safety society in the world. Its membership includes scientists, safety professionals, physicists, engineers, attorneys, and other professionals from academia, industry, medical institutions, state and federal government, the national laboratories, the military, and other organizations.

The HPS's activities include encouraging research in radiation science, developing standards, and disseminating radiation safety information. Its members are involved in understanding, evaluating, and controlling the potential risks from radiation relative to the benefits.

Goldin talked about the HPS (hps.org) and health physics activities with Rick Michal, editor-in-chief of *Nuclear News*.

The HPS recently released a position statement on nuclear power (hps.org/documents/nuclearpower.pdf). Would you summarize its important points?

The position statement on nuclear power has four main points.

First, the HPS supports the fact that the significant regulation and oversight provide for one of the safest means of electricity generation with an exceptional safety record.

A health physics poster by Oak Ridge National Laboratory from around 1947. Source: Atomic Heritage Foundation/ORNL

Second, nuclear power is reliable. The capacity factors are well over 90 percent, considerably higher than almost all renewable power sources.

Third, nuclear is the largest low-carbon source of electric generation.

Fourth, nuclear generation follows the International Commission on Radiological Protection's fundamentals for radiation protection, which means that an activity is justified when it provides a benefit, maintains radiation doses as low as reasonably achievable [ALARA], and ensures that no individual receives an excessive dose (stays below regulatory limits).

The position statement was a long time in the making. There are many in the HPS who did not want a radiation protection organization to look like it was advocating a particular industry. That is why the position statement relies on clear facts and focuses on radiation exposure of workers and the public. For ANS members, and everyone else for that matter, the position statement and many others are publicly available on our website.

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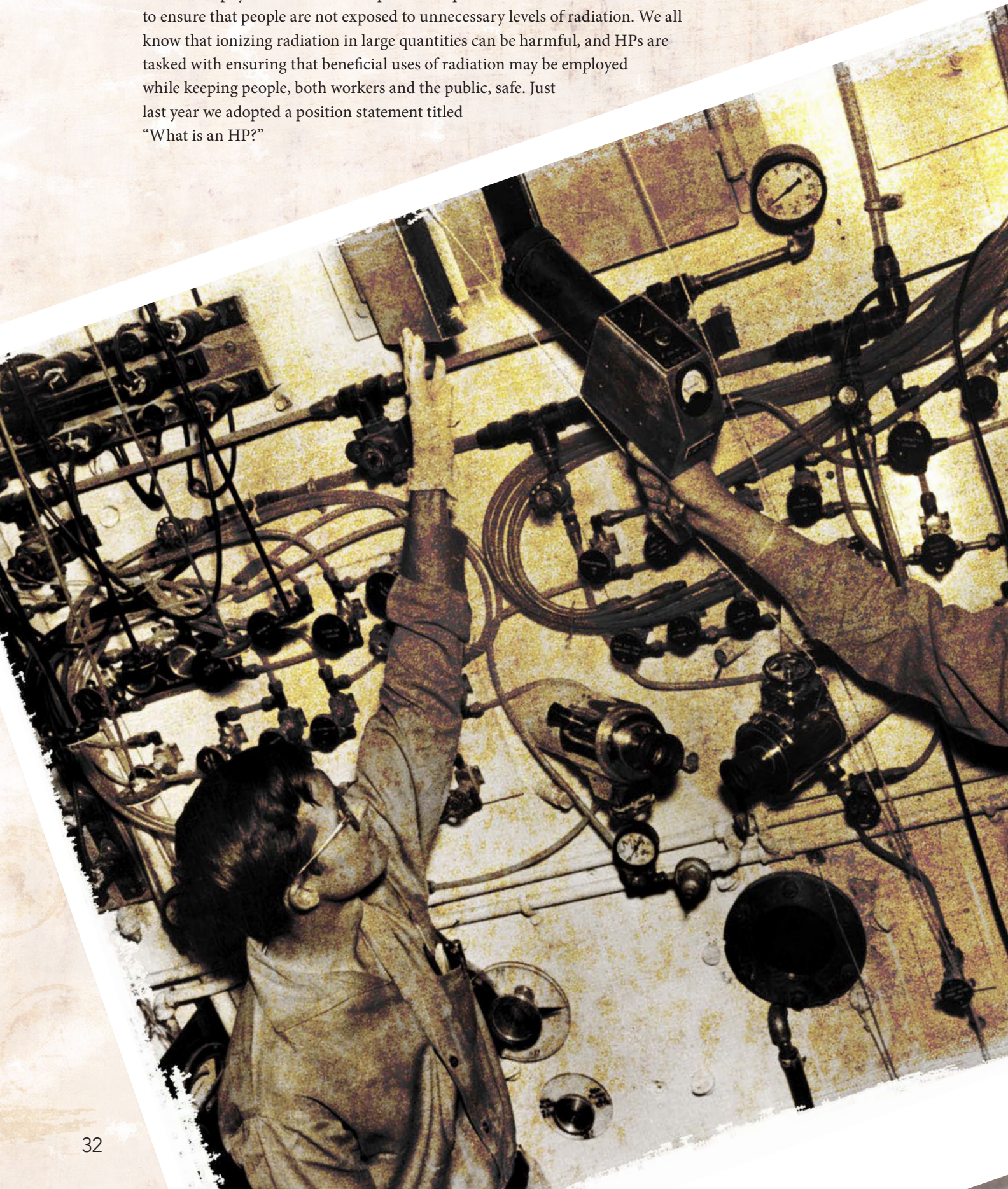
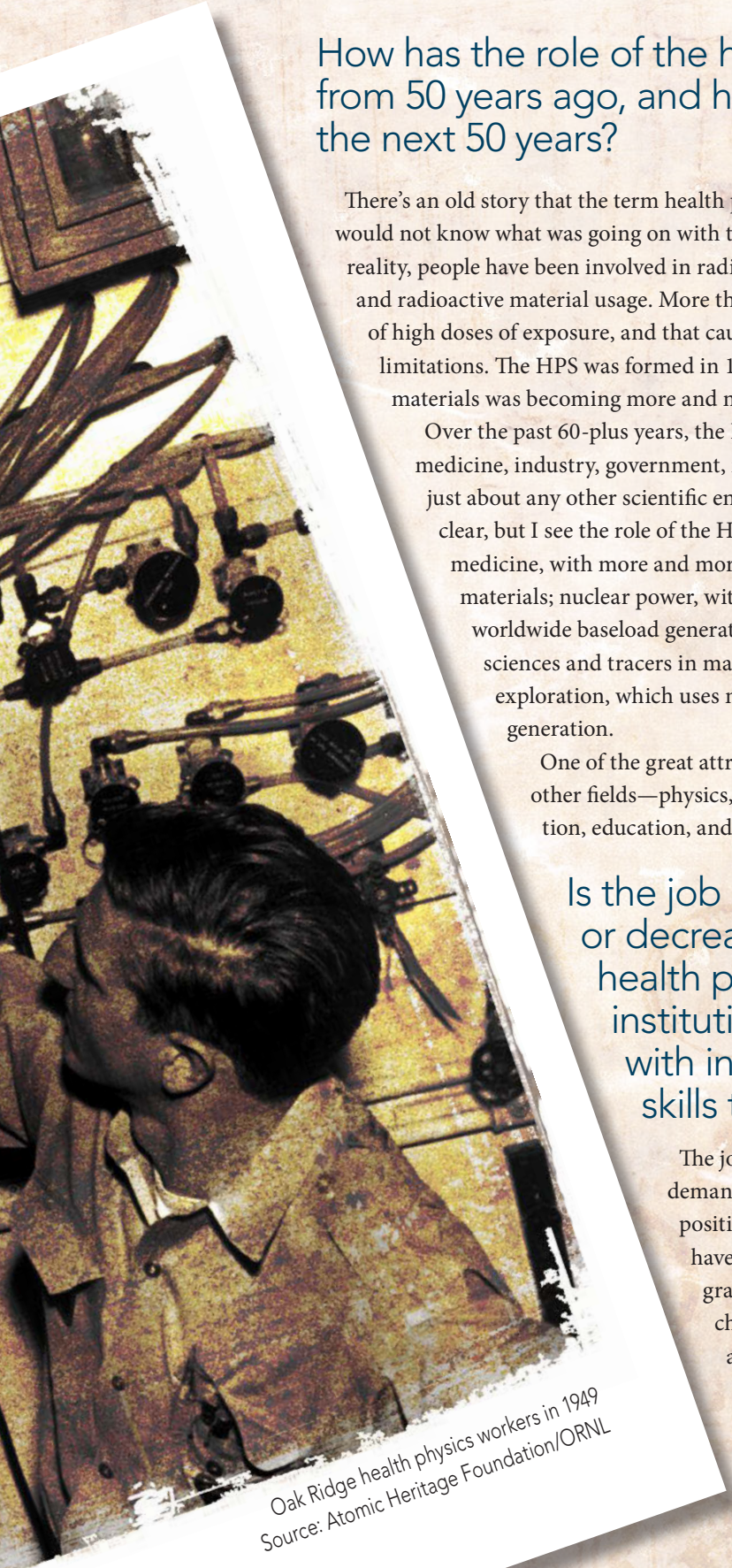
What is a health physicist?

A health physicist is a radiation protection professional, someone who works to ensure that people are not exposed to unnecessary levels of radiation. We all know that ionizing radiation in large quantities can be harmful, and HPs are tasked with ensuring that beneficial uses of radiation may be employed while keeping people, both workers and the public, safe. Just last year we adopted a position statement titled "What is an HP?"





Oak Ridge health physics workers in 1949
Source: Atomic Heritage Foundation/ORNL

How has the role of the health physicist changed from 50 years ago, and how will this role change in the next 50 years?

There's an old story that the term health physicist was deliberately coined so that people would not know what was going on with the Manhattan Project during World War II. In reality, people have been involved in radiation safety since the early days of radiation and radioactive material usage. More than 100 years ago, we recognized the detriment of high doses of exposure, and that caused the need to develop recommendations for limitations. The HPS was formed in 1956, when the use of radiation and radioactive materials was becoming more and more prevalent.

Over the past 60-plus years, the HPS has broadened to encompass fields in medicine, industry, government, military, nonionizing radiation, research, and just about any other scientific endeavor. My crystal ball has never been really clear, but I see the role of the HP in the future expanding in many areas—medicine, with more and more diagnostic tools that rely on radioactive materials; nuclear power, with small modular reactors, as well as expanding worldwide baseload generation; research, for things such as biomedical sciences and tracers in many fields; fusion generation; and even space exploration, which uses nuclear-powered spacecraft as well as electricity generation.

One of the great attractions of the field is that it draws on many other fields—physics, biology, chemistry, engineering, instrumentation, education, and public communication, to name a few.

Is the job market increasing or decreasing for positions in health physics? Are educational institutions supplying the market with individuals with the right skills to fill the market need?

The job market is increasing for HPs, and in fact, the demand is quite high, with many currently unfilled positions. We track job openings, and recently there have been many more open positions than there are graduates to fill them. However, one of our great challenges is to keep the academic programs alive because they typically have only a small number of students, and it's tough to convince colleges and universities to support small programs in this day of tight budgets.

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How is the HPS addressing the challenges of recruiting and engaging young members and encouraging diversity within the society?

We have a number of initiatives to encourage the participation of younger members—such as reduced membership dues, scholarships, and travel grants, for example—and have recently embarked on a program to expand diversity within the HPS. We just published a statement on diversity and inclusion and established a task force to initiate some objectives to address the current conditions.

In addition, two new sections of the HPS have been established: the Women in Radiation Protection Section and the Early Career Section, with a new website on the way. It is our hope that this will help us draw in and retain new members.

Are there ways for the HPS to better interact with ANS's Radiation Protection and Shielding Division and Isotopes and Radiation Division?

I'm sure that there are potential synergies between HPS and those two ANS divisions. I don't know for a fact, but I would guess that there are a number of HPS members who are also members of ANS, those divisions in particular. Perhaps we could consider some joint sessions in the future, especially with the current emphasis on virtual meetings. There is certainly plenty of overlap in the subject matter—shielding and medical radioisotope usage, for example.

What are current hot topics within the HPS?

I would split the hot topics into two areas, one scientific and one not. The scientific issue is the low-dose effects model, whether LNT [linear no-threshold model] or some other description of effects, if any, is valid. I'll talk about that in a few minutes. The nonscientific issue is what we call WARP—"Where are the radiation professionals?"

Nearly 20 years ago, the HPS recognized that we were going to run out of qualified, educated individuals to fill positions within the field unless there were improvements in funding, scholarships, recruitment, and retention. The National Council on Radiological Protection and Measurements created the WARP initiative and held a conference in 2013 with representatives from academia, governmental agencies, private industry, and professional societies to come up with actions to try to ensure adequate staffing in the field. It looks like we need to reinvigorate that effort.

Above left: Health physicists localizing and determining the isotope of radioactive materials in a trash compactor. Photo: Deirdre Elder.

Right: A decontamination exercise during a Radiological Emergency Response Operations class taught by the Center for Domestic Preparedness, in Annison, Ala. Photo: Hillary Haskins.

How will R&D drivers in HP make an impact in beneficial uses of nuclear technology (e.g., in energy, security, medicine, space, and defense)?

I'm probably not the right person to address R&D in the field, because it's been too long since I've been involved in academics, and my experience is all in applied HP. But I see tremendous innovations in instrumentation, such as wireless remote monitors, smart meters, and other developments that are terrific timesavers and, in many cases, allow for worker monitoring without having technicians in the same radiation environment.

One other area that I believe will be expanding greatly in the near term is medical applications. There are many new diagnostic tools using radioactive materials in medicine and industry, all of which will require care to ensure that workers and the public are kept safe from excessive exposure.

And, of course, continued research in low-dose and low-dose-rate effects and how that translates into regulatory limits and guidance, including cleanup criteria.

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What is the current position of the HPS on the LNT model?

The HPS has a position statement regarding radiation risk. It has several important messages: First is that there is no consistent evidence of human health effects below about 10 rem (100 millisieverts). Second, we recognize that molecular radiation effects are typically nonlinear, such that the LNT model is oversimplified. Third, there are dose-rate effects. Effects from smaller doses over long periods of time have not been demonstrated in epidemiological studies.

The HPS continues to advocate for more research in this field and is excited that there may be funding for low-dose and low-dose-rate research programs supported by the federal government. For myself, I'm sure dose rate should be considered in health assessments because of the differences in effects at all levels between high- and low-dose rates.

How is the HPS handling COVID-19 concerns?

Like most other professional societies, we've moved from face-to-face meetings to virtual meetings and lots of online activities. Our annual meeting was scheduled for early July in the Washington, D.C., area, but instead we will have a series of virtual workshop sessions during September. We've already conducted most of the required business meeting in a virtual format that went very well and had great "attendance."

I'll close by encouraging ANS members to consider joining the HPS, since there is so much overlap in our objectives.