Behind the Nuclear Curtain:
Radioactive Waste Management in the Former Soviet Union

Don J. Bradley
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Don Bradley has demonstrated that he is the undisputed heavyweight authority on what is known in the West about the management, or more appropriately "mismanagement," of radioactive materials in the former Soviet Union (FSU). Bradley and his colleagues at Battelle's Pacific Northwest Laboratory (PNL) for years have been collecting and analyzing nuclear waste and related data of the former Soviet Union for the U.S. Department of Energy (DOE). This latest book represents an update of Bradley' three volume work, *Radioactive Waste Management in the USSR,* released between 1990-1992.

Behind the Nuclear Curtain is an exceptional piece of work. It now becomes *the* reference book on the subject. Written primarily for use by nuclear and health physics professionals, Bradley's book is well researched and the data are extensively referenced. There are some 300 tables, figures, and photographs which make it a particularly valuable resource.

After an introduction and overview Bradley provides us with a short chapter on waste management agreements between the U.S. and FSU which should have been relegated to an appendix. This is followed by a description of the Ministry of Atomic Energy (Minatom) and other institutions with nuclear waste management responsibilities. The next 16 chapters review the entire Soviet/Russian nuclear fuel cycle—civil and military from uranium mining to high-level nuclear waste management. There are separate chapters devoted to the principal plutonium

production sites—Ozersk (Chelybinsk-65), Seversk (Tomsk-7), and Zheleznogorsk (Krasnoyarsk-26)—as well as to the Chornobyl accident, nuclear weapon testing, naval waste management and ocean dumping, and waste transportation.

Two things are striking about this work—what is revealed and what remains secret. *Behind the Nuclear Curtain* reveals that the management of Soviet Union/Russia nuclear waste was both criminal and tragic, and that this tragedy continues. At Chelyabinsk-65 at least 130 million curies of radioactivity has been released directly to the environment, some 120 million curies directly into Lake Karachai. (pp. 372 and 403). To put this into prospective 120 million curies is about 50% of the HLW tank inventory at Hanford (p. 403), or alternatively, it is about three times the total Cs-137 and Sr-90 released as fallout from worldwide atmospheric nuclear testing. (p. 615). As a result of planned and accidental releases at Chelyabinsk-65, about 500,000 people received an "elevated radiation dose," and about 18,000 were relocated. (p. 372) During the two year "recovery" period following the 1957 waste tank explosion at Chelyabinsk-65, approximately 30,000 workers received radiation dosed greater than 25 rems. (p. 412) At both Tomsk-7 and Krasnoyarsk-26 over 30+ years a total of about 1.5 billion curies of liquid high-level waste has been injected into aquifers several hundred meters deep—a practice that continues to this day without clear evidence that this practice will not have a significant long-term human health impact (pp. 178, 183-184, and 620). Krasnoyarsk-26 operates a dual system of injection and discharge wells; as radioactive waste is pumped in, underground stratal water is drawn off for civilian needs. (p.182). Anyone versed in the language of nuclear technologists can find a parade of other horribles in *Behind the Nuclear Curtain*. Bradley leaves it for others to translate these into the human health consequences understandable by a lay audience. Given

the limited distribution of these data in Russia, *Behind the Nuclear Curtain* should be translated and distributed in Russia, along with its yet to be written sequel for public readership.

It is clear from *Behind the Nuclear Curtain* that much, if not most, of Russia's nuclear legacy remains a dark secret. Bradley reveals that the Tomsk-7 site has several contaminated ponds that rival or possibly exceed the contamination in Lake Karachai (p. 451); yet there is no comparable discussion of these in the unclassified literature. Also, there is no discussion of the plutonium fires, accidents, and environmental releases from the plutonium pit manufacturing facilities at Chalyabinsk-65 or at Tomsk-7. A single shortcoming of *Behind the Nuclear Curtain* is that it does not include data more closely associated with nuclear weapons. For example, the inventory of plutonium in civil spent fuel is estimated, but there are no estimates of the plutonium and tritium produced by the military production reactors, even though these estimates could have been easily derived and would be useful to the arms control community. Also, the nuclear weapon laboratories are all but forgotten, and there is no mention of weapon assembly/disassembly plants. These omissions are unlikely oversights, but a consequence of PNL's intelligence mission, DOE classification rules, and PNL's and DOE's desire to retain a good working relationship with the Russians. On the other hand no other organization could have produced such a fine book on this subject.

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