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Book reviews

Air CFRs Made Easy

Second ed., Andre R. Cooper, Sr., Government Institutes, Rockville, MD, 2004, US$ 115.00, 451 pp. (8.5 × 11 in. format), ISBN 0-86587-953-2

To say the least, the number and complexity of the air pollution control laws are intimidating. This book makes that a little less so. The author defines CFR as follows:

> *The Code of Federal Regulations* (CFR) is the official compilation of regulations. The CFR codifies the general and permanent rules of executive departments and agencies that have been published in the Federal Register. The CFR is divided into 50 titles that represent broad areas subject to federal regulation. Each title is divided into chapters that usually bear the name of the issuing agency. Each chapter is further subdivided into parts covering specific regulatory areas. Most environmental regulations appear in Title 40. The CFR is revised yearly, with one-fourth of the volumes updated every three months. Title 40 is revised every July 1.

Cooper begins his second edition of *Air CFRs Made Easy* with a newly added Chapter 1 entitled "Suite of Environmental Laws." In it, he briefly describes all US environmental laws (this chapter is a repeat of one he included in his recently published book *Environmental Compliance Made Easy*; I reviewed this book recently in the journal).

Originally published in 1999, his current revision has four new chapters titled as follows: "Suite of Environmental Laws," "CAA & CFR Overview," "Risk Assessments," and "Training."

Given that the regulatory literature is voluminous, any simplification, guidance, or suggestion in dealing with environmental regulations is welcome. This book does just that. The author has designed the book to help the user ". . . drill down into the core of air quality regulations and aid (him/her) in finding what (he/she) is looking for quickly and efficiently."

The material in the book is described on the back cover as:

> Organized alphabetically by subject, this user-friendly reference includes air regulations covered in the 12 volumes of CFRs Title 40 Parts 1–86. Each chapter contains an explanation of the elements of the program—including the requirements under federal regulations—and helpful checklists of required items. Subjects covered include accident prevention regulations, acid rain control, emissions offsets, enforcement provisions, hazardous air pollutants, hazard assessments, mobile sources, national ambient air quality standards, permits, and State Implementation Plans (SIPs).

There are 20 chapters; the first three chapters are entitled: "Suite of Environmental Laws", "Introduction to Air Quality Management", and "CAA & CFR Overview." The remaining 17 chapters are arranged in alphabetical order. These chapters are: "Accident Prevention Regulations Hazardous Substances", "Acid Rain Control", "Emissions Offsets", "Enforcement Provisions", "Federal Responsibility Under the CAA", "Fuel Specification and Families", "Hazardous Air Pollutants", "Hazard Assessments", "Mobile Sources", "National Ambient Air Quality Standards", "National Emission Standards for Asbestos", "Permits", "Risk Assessments", "Radionuclide Emissions", "State Implementation Plan (SIP)", "Stratospheric Ozone and Global Climate Protection", and "Training."

I am not ordinarily a proponent of the inclusion of numerous and/or long appendices, but this book is an exception (with the possible exclusion of the glossary which contains a great deal of pedestrian information). The other appendices listed here contain much useful information: EPA Contacts and Web References, Environmental Hotlines, Selected EPA Air Quality Programs/Projects, Air Quality Web Sites and Related References, Subject Index to Air Quality CFRs, and Listed Section 112(r) Substances.

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A Case for Nuclear-Generated Electricity

Scott W. Heaberlin, Battelle Press, Columbus, OH, 2004, US$ 29.95, 326 pp., ISBN 1-57477-136-1

There are few authors whose books I have reviewed with whom I have agreed more, so the reader must be wary of this very positive non-critical analysis. Heaberlin and I agree totally on the need for, and the relative safety of, the production of electricity by nuclear power plants. In my opinion, which agrees with his, there is no alternative to the construction and operation of more nuclear power plants if the world's energy needs are to be satisfied. The secondary title of this book reveals his point-of-view—"Why I think nuclear power is cool and why it is important that you think so too." The

book's coverage is illustrated by the titles of its 10 chapters:

- Chapter 1. Summary;
- Chapter 2. The case for technology;
- Chapter 3. The case for electrical power;
- Chapter 4. A little basic nuclear science;
- Chapter 5. Nuclear reactor physics and nuclear reactors;
- Chapter 6. All the bad stuff about things nuclear;
- Chapter 7. Energy, the big picture and our choices;
- Chapter 8. The status of nuclear power today;
- Chapter 9. The future of nuclear power;
- Chapter 10. What all this means to you and what you can do?

Heaberlin, in his opening line of the book, says:

> "There is a lot of negative feeling about nuclear energy. I think that feeling is based on a lack of understanding of nuclear energy and the failure to see nuclear energy, energy in general and all of human technology in a wider, more appropriate context. My goal in this book is to explain nuclear energy to you and to give you some of that wider context. I believe that if you have some relevant facts and see those in valid context you will conclude that the negative feelings about nuclear energy are largely unfounded and in fact harmful to the future success of humanity."

Not the least of the features of nuclear energy production is the minimal waste resulting from the process. Production of electricity using nuclear power requires fuel amounts that are a fraction of the fuel used in electricity generation by coal. For example, to generate 10^9 W of power, one needs 2.6×10^6 metric tonnes of coal or 120 metric tonnes of nuclear fuel. Unlike production of electricity by coal and other fossil fuels, no carbon dioxide is produced. Moreover, fossil fuel combustion to product electricity yields 2/3 of the sulfur dioxide released to the environment and 1/5 of the nitrogen oxides. Both of these pollutants have significant impact on human health. Wastes produced by US nuclear power plants amount to 2530 tonnes per year; Coal power plants produce 66×10^6 tonnes per year while municipal waste amounts to 230×10^6 tonnes per year and human waste to 277×10^6 tonnes per year. Another limitation of coal and gas, the author notes, is their limited supply.

Some argue that renewable resources are the most favorable sources of new energy supply. Heaberlin discusses the role and outlook of electrical power generation by hydro, biomass, geothermal, sun and wind. For power production in 1999 in the United States using renewables, the following data were presented to illustrate the per cent of total US electrical generation by the various renewable sources: (1) hydro 8.4%, (2) biomass 1.6%, (3) geothermal 0.35%, (4) wind 0.12% and (5) solar 0.03%.

While advances are being made in the production of electrical power by both solar and wind devices, neither can produce the amount of electrical power needed on a consistent time basis (i.e. around the clock without ceasing production) at a cost approaching other production sources. Neither process is currently economical with subsidies required by US law that force power companies to purchase power from renewable sources at costs that may exceed their own generation costs.

The other important aspect of nuclear electrical power generation is public concern for its safety and ultimate radioactive waste production. In this context, the author notes that:

- nuclear power plants are not nuclear bombs;
- nuclear accidents, though they have occurred, have resulted in NO deaths in the United States;
- nuclear waste can be safely handled and stored and its amount is small compared to ash from coal combustion.

In his next to last chapter, Heaberlin notes the increasing demand for energy and diminishing fossil fuel supply. He notes nuclear energy can fill the void in power demanded by industrialized and industrializing companies provided we move fast but he fears we are not doing so. Heaberlin produces some sobering projections. He estimates the world will need a 60% increase in energy production in 20 years. Consequently, for nuclear power to maintain its current share of electrical production, the number of reactors should increase from 437 to 695 worldwide. Even if those reactors were built, the amount of coal burned would have to increase by 60% to produce needed electricity.

The last chapter, entitled "What all this means to you and what you can do?" is an exhortation to the readers to spur them to be public advocates for construction of nuclear power plants by contacting elected and non-elected officials, speak at public meetings, get engaged in education, try to educate the media on correct reporting, and not let public figures get away with uninformed public advocacy.

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Integrated Life-Cycle and Risk Assessment for Industrial Processes

Guido Sonnemann, Francesc Castells, Marta Schuhmacher, Lewis Publishers, Boca Raton, FL, 2004, US$ 149.95, 386 pp., ISBN 1-56670-644-0

This book represents the new paradigm in the engineers' approach to the environmental impact of technology. Pollution control has been superceded by pollution prevention and that analysis is being augmented by life-cycle assessment. This book integrates life-cycle assessment (described as a methodology used to evaluate the environmental impacts of a product during the span of its life-cycle) and risk assessment (described as a tool to evaluate potential hazards posed to human health and the environment by pollution). It