

IAEA SAFETY STANDARDS*for protecting people and the environment*

The closing date for comment is 31 May 2010.

**International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources
Draft Safety Requirements
International Atomic Energy Agency-- DS379**

1.4. Exposure to radiation can also induce the non-lethal transformation of cells, which may still maintain their capacity to divide. The body's immunological system for detecting and destroying abnormal cells is very effective. However, there remains a probability that the non-lethal transformation of a cell may lead to cancer in the exposed individual after a latency period, if it occurs in a somatic cell; or to heritable effects, if it affects a germ cell (i.e. a spermatozoon or an oocyte). The severity of this type of effect, called a 'stochastic' effect, is independent of the dose. The probability of occurrence of stochastic effects, while small at low doses, increases for higher doses. **For the purposes of these Standards, it is assumed that the probability of stochastic effects is proportional to the dose received, with no dose threshold**, and that the detriment-adjusted nominal risk co-efficient, which includes all cancers and heritable effects, is approximately 5% per Sv.

COMMENT: The International Commission on Radiological Protection has never acknowledged research on internal dose and supralinear effect at low dose.

These Standards also take account of the applicable recommendations of the ICRP.

1.7. These Standards are based on the following principles in the Fundamental Safety Principles:

Safety Principle 1: The prime responsibility for safety must rest with the person or organization responsible for facilities and activities that give rise to radiation risks.

Safety Principle 2: An effective legal and governmental framework for safety, including an independent regulatory body, must be established and sustained.

Safety Principle 3: Effective leadership and management for safety must be established and sustained in organizations concerned with, and facilities and activities that give rise to, radiation risks.

Safety Principle 4: Facilities and activities that give rise to radiation risks must yield an overall benefit.

Safety Principle 5: Protection must be optimized to provide the highest level of safety that can reasonably be achieved.

Safety Principle 6: Measures for controlling radiation risks must ensure that no individual bears an unacceptable risk of harm.

Safety Principle 7: People and the environment, present and future, must be protected against radiation risks.

Safety Principle 8: All practical efforts must be made to prevent and mitigate nuclear or radiation accidents.

Safety Principle 9: Arrangements must be made for emergency preparedness and response for nuclear or radiation incidents.

Safety Principle 10: Protective actions to reduce existing or unregulated radiation risks must be justified and optimized.

COMMENT: *The IAEA draft is based upon ICRP Publication 103, published in late 2007. That document is obsolete, as are the ICRP standards, due to the fact they are based upon the A-bomb Life Span Study, a single external gamma dose. The ICRP refuses to consider internal exposures from agricultural products and inhaled particulates nor has it made an attempt to translate hundreds of Chernobyl papers by Russian scientists. A much-needed book, **Chernobyl: Consequences of the Catastrophe for People and the Environment**, authored by three distinguished Russian scientists, was published last December by the New York Academy of Sciences. It references about 1000 papers, primarily in Slavic languages, whereas the 2005 IAEA/WHO Chernobyl Forum study cites only 350 mainly English publications. Other books that should be of interest to regulators and concerned scientists include the Recommendations of the European Committee on Radiation Risk (ECRR), **Health Effects of Ionising Radiation Exposure at Low Doses for Radiation Protection Purposes**, with an extensive reference list of 559 citations. The authors, five low-dose experts, criticize the ICRP model because it is based on a single external exposure (the A-bomb Life Span Study), In the words of the ECRR report,*

“It falsely uses data from one set of conditions—high-level, acute external exposure—to model low-level chronic internal exposure. The procedure is scientifically bankrupt, and were it not for political considerations, would have been rejected long ago.”

Another important ECRR book, **Chernobyl 20 Years On: The Health Effects of the Chernobyl Accident**, edited by UK physicist Chris Busby and Russian biologist Alexey Yablokov, refutes the UNSCEAR 2000 (United Nations Scientific Committee on the Effects of Atomic Radiation) report’s conclusion that perceived health effects are primarily psychosomatic. Many “experts” identify this condition as “radiophobia”-- an unwarranted fear of radiation (**This book can be accessed free full text at euradcom.org**). Its startling and disturbing discovery from the evidence presented:

“The effects of low-dose internal irradiation cause subtle changes in the genome that result in an increase in the general mutation rate...for all. Species, plants, animals, and humans...The effects of genomic instability are apparent in the evidence of massive harm to the organs and systems of living creatures at low doses of internal exposure, resulting in a kind of radiation ageing associated with random mutations in all cells...Whole biological systems collapse; at the cell level, at the tissue level, and at the population level.”

1.12. The conduct of activities or the operation of facilities that alter the radiation exposure situation by introducing a new source of radiation, change exposure or change the risk of potential exposure must be justified in the sense that they do more good than harm. In addition to protection and safety, **the concept of balancing good and harm also involves consideration of economic and social factors.**

COMMENT: *External costs never appear on corporate balance sheets.*

2.13. The government shall establish and maintain an appropriate and effective legal, regulatory and organizational framework for protection and safety in all exposure situations.

COMMENT: The NCRP and ICRP were organized by self-appointed medical physicists. Their reports are not subject to outside independent peer review, and current members nominate new enrollees, thus closing out scientists representing public interest groups.

2.14. The government shall ensure adequate protection of people and the environment, both now and in the future, against harmful effects of ionizing radiation. The government shall ensure such protection without unduly limiting the operation of facilities or the conduct of activities that give rise to radiation risks.

*COMMENT: This requirement is impossible to carry out when considering the almost continual releases of xenon, krypton, and tritium that escape the containment vessel. The Vermont State Senate voted (Feb 24) to refuse a license renewal for the Vermont Yankee reactor. Tritium releases are a major concern unless you listen to nuclear power executives who still claim the risk is *de minimis*.*

2.16. The government shall ensure that the regulatory body is effectively independent, in protection and safety related decisions, of persons and organizations using or otherwise promoting the use of radiation and radioactive material, so that it is **free from any undue pressure from interested parties and any conflict of interest.**

COMMENT: The NRC must take immediate steps to change the composition of its 15-member Advisory Committee on Reactor Safeguard, currently composed of 12 engineers and 10 who either worked for the nuclear industry or government agencies dealing with nuclear issues. This is in flagrant violation of the Federal Advisory Committee Act that requires advisory boards "to be fairly balanced...and will not be inappropriately influence by the appointing authority or by any special interest." This is a stacked deck and is not protective of the public health and safety, as mandated by the NRC mission statement.

2.31. The regulatory body shall establish a system for protection and safety that includes: (f) Provision of information to, and consultation with, parties affected by its decisions and, as appropriate, **the public and other interested parties.**

COMMENT: All government agencies should reserve advisory board slots for representatives of nongovernmental public interest organizations. Consultation implies collaboration, particularly on radiation issues that effect entire populations of living organisms.

3.149. Registrants and licensees shall ensure that no patient, whether symptomatic or not, receives a medical exposure unless:

(a) The examination or treatment has been requested by a referring medical practitioner and information on the clinical context has been provided, or is part of an approved health screening programme;

(b) The medical exposure has been justified by the radiological medical practitioner, in consultation with the referring medical practitioner when appropriate, or is part of an approved health screening programme;

(c) A radiological medical practitioner has taken responsibility as specified in para. 3.152(a);

(d) The patient has been informed, as appropriate, of the potential benefit of the radiological procedure as well as the radiation risks.

COMMENT: Informed consent is mandated under the Nuremberg Code and Helsinki

Accords but is seldom if ever provided to patients prior to an X-ray or CT exam because technicians either are not properly instructed [by radiologists or medical physicists] or the feat that full disclosure might cause patients to refuse future procedures. In her Archives of Internal Medicine editorial (Dec 2009) Rita F. Redberg that certain CT examinations may present a greater risk than any perceived benefit.

3.159. The exposure of humans volunteers for biomedical research is deemed to be not justified unless it is:

(a) In accordance with the provisions of the **Helsinki Declaration** and takes into account the guidelines for its application prepared by Council for International Organizations of Medical Sciences (CIOMS), together with the recommendations of the International Commission on Radiological Protection (ICRP).

COMMENT: The Helsinki Accords and the Nuremberg Code mandate informed consent, consistently ignored by radiology labs and untrained technicians. Radiologists and medical physicists are implicated as are medical schools that do not provide basic radiation units to medical students nor sponsor CMEs that deal with relevant radiation information.

3.174. Registrants and licensees shall ensure that there are procedures in place to **ascertain the pregnancy status of a female of reproductive capacity before performing any radiological procedure that may give a significant dose to the embryo or foetus**, so that this information can be considered in the justification for the radiological procedure and in its optimization.

COMMENT: Every dose to the foetus is "significant" and should be avoided. With the exception of the in utero work of Alice Stewart in 1957-58, the issue is seldom mentioned in medical journal papers or in mainstream media.

3.177. Registrant and licensees, through the application of the relevant requirements of paras 2.52, 3.40 - 3.43, and 3.49 shall ensure that all practicable measures are taken to **minimize the likelihood of unintended or accidental medical exposures arising from design flaws and operational failures of medical radiological equipment**, failures and errors of software, or as a result of human error.

COMMENT: When there are major delays in reporting to the authorities, as happened at Three Mile Island, Davis-Bessie, and Chernobyl, it proves there is little oversight by regulatory agencies. Of course, there were cover-ups by government officials, beginning with Hiroshima and continuing to this very day.

3.183. Registrants and licensees shall keep for a period specified by the regulatory body and **make available, as required, the following records:**

(a) In diagnostic radiology, necessary information to allow retrospective dose assessment, including the number of exposures and the duration of fluoroscopic examinations;

COMMENT: Current practices give little hope for corrective action. For example, no records of retakes during individual mammography examinations are recorded. Since radiation doses are cumulative one might assume this information would be of vital concern to medical physicists, radiologists, and lab supervisors.

(b) In image-guided interventional procedures, necessary information to allow retrospective dose assessment, including the duration of the fluoroscopy component and the number of images acquired;

(c) In nuclear medicine, types of radiopharmaceuticals administered and their activities;

(d) In radiation oncology, a description of the planning target volume, the dose to the centre of the planning target volume and the maximum and minimum doses

delivered to the planning target volume or alternative equivalent information on doses to the planning target volume, **the doses to other relevant organs selected by the radiological medical practitioner, the dose fractionation, and the overall treatment time.**

COMMENT: Protracted exposures have been found to carry a greater risk than an acute exposure at equivalent dose. According to recent press releases there have been major breakdowns in X-ray calibration, causing massive overdoses and even death.

Requirement 44: Preparedness and response to an emergency

The government shall ensure that protection strategies are developed, justified and optimized at the planning stage, and that the response in an emergency is undertaken through their **timely implementation.**

4.7. The government shall ensure that protection strategies are developed, justified, and optimized at the planning stage using scenarios based on the threat assessment in order to avoid deterministic effects and **reduce the risk of stochastic effects to the public.**

COMMENT: Risk can only be substantially reduced if ALL nuclear reactors are phased out. Some countries are doing just that.

Comments by Lynn Howard Ehrle, M.Ed, Senior Biomedical Policy Analyst, Organic Consumers Association and chair of OCA's International Science Oversight Board (pro bono), composed of 43 physicians, scientists, and policy Analysts from 11 countries. Ehrle is a consumer law / econ teacher, retired after 37 years. He was vice president and energy committee chair for the Consumer Alliance of Michigan Consumer during the 1970s and presented numerous briefs before the Public Service Commission in utility rate cases. Ehrle is author of *Consumer Rights: Battle In The Marketplace (1970)*, the first in-the-nation consumer textbook.

International Science Oversight Board (INSIGHT) Policy Statement
Nuclear Reactor Expansion Is Bad Science and Dangerous Policy

The 43-member International Science Oversight Board (INSIGHT) has identified nuclear reactor expansion as a significant and imminent threat to the public health and safety. Under the sustained pressure of a massive public relations campaign by the nuclear industry, George W. Bush, Tony Blair and Vladimir Putin have announced plans to bring on line a large number of new nuclear reactors. On June 18, 2008, Senator John McCain announced his plan to build 45 new reactors by 2030, with 100 as his goal. Claims that nuclear power can reduce greenhouse gases lack scientific foundation. This assertion is consistent with that of early enthusiasts who told the world “*electricity from reactors would be too cheap to meter.*” Now we are told not to worry about the thousands of tons of low and high-grade nuclear waste that accumulate annually. Recently, Mid-American Nuclear Energy Company, a subsidiary of Warren Buffett's Berkshire/Hathaway investment firm, announced it was canceling its plan to construct a new reactor in Idaho. Mr. Buffett's refusal to fund this expensive project sent a chill down the spine of the nuclear industry.

PS #1: NUCLEAR REACTOR EXPANSION

The International Science Oversight Board opposes the construction of new nuclear reactors and current efforts by the nuclear industry and its surrogates to extend the life of old reactors through the relicensing process. Compounding the problem is the fact that the International Atomic Energy Agency (IAEA) Statute requires it to “seek to accelerate and enlarge the contribution of atomic energy to peace, health, and prosperity throughout the world” (Article II). Ever since its inception the nuclear enterprise has demonstrated an inability to fulfill these lofty goals. Nuclear reactors represent an imminent threat to the public health and safety and are incompatible with the World Health Organization charter. Therefore, we urge the United Nations to take immediate steps to withdraw its endorsement of the IAEA. Additionally, the Board supports countries that have announced plans to phase out existing nuclear power stations and encourages other countries to follow suit.

Our Policy Statement is based upon historic documents and a substantial body of research by independent scientists who have NO ties to the nuclear/ radiology industry. A recently published study funded by the German government reveals a significantly elevated risk of childhood leukemia for those living within 5 km of all sixteen reactors. This is the first and only investigation implicating radioactive emissions from nuclear power stations and human health risk, thus providing powerful support to our call for a moratorium on the construction of new reactors (1. Kaatsch P, Spix C, Schulze-Rath R, et al. Leukaemia in young children living in the vicinity of German nuclear power plants. *Int J Cancer* 2008;1220:721-726 and 2. Spix C, Schmiedel S, Kaatsch P, et al. Case-control study on childhood cancer in the vicinity of nuclear power plants in Germany 1980–2003. *Eur J Cancer* 2008;44:275-284).

- a. The first electricity-generating reactors came on line during the 1950s. None would have become operational in the U.S. without massive government subsidies and favorable legislation, including a cadre of WW II nuclear engineers and nuclear physicists who soon found lucrative employment with the fledgling industry. Federal grants helped research universities create new departments of nuclear physics and nuclear engineering, and researchers obtained nuclear isotopes at discounted prices.
- b. **The Atomic Energy Act of 1946**, passed by the U.S. Congress, contained a proviso in Section 10, entitled “Control of Information,” that codified a novel principle known as “born secret” or “classified at birth.” This section also added a new term to the legal lexicon- “restricted data” (RD), with this definition- “*all data concerning the manufacture or utilization of atomic weapons, the production of fissionable material, or the use of fissionable material in the production of power.*” Because it was classified, this research could only be accessed on “a need to know” basis, or until it was declassified. “All data” included speculation and rumor, without regard to its source or accuracy. Radiation research was subsumed under the banner of “national security,” and independent scientists who breached official secrecy provisions could be charged with treason or espionage. Major provisions of the act are still in force today. The construction of nuclear reactors in the U.S. commenced under this cloak of secrecy, always with substantial government subsidies to the industry. The Hanford vitrification plant and Yucca Mt. disposal site have proven to be a government gift to private contractors but a colossal waste of taxpayer money. Now, the Department of Energy is spearheading the Global Nuclear Energy Partnership—without Congressional oversight, without a viable environmental impact statement, without discussion of long-term risks from plutonium and other radionuclides, and without independent scientific review. Furthermore, government funding continues to be unavailable to scientists who question the political or scientific justification for the entire nuclear enterprise.
- c. Despite the fact that BEIR VII concluded **there is no safe radiation dose**, nuclear industry executives refuse to acknowledge scientific evidence of significant risk from low-level radiation exposure.

Furthermore, they conveniently ignore a large and growing body of evidence that documents excess cancer and non-cancer risks from the daily release of radionuclides from nuclear power stations worldwide and the health detriment from nuclear accidents. In his 5 May 2007 letter in Environmental Health Perspectives INSIGHT board member Rudi Nussbaum cites numerous studies that estimate much higher levels of radionuclide releases from the Chernobyl accident than those reported by the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR 2000, *Sources and Effects of Ionizing Radiation, v.II, p.515*), that claims “*the average effective dose from external gamma radiation to recovery operation workers (liquidators) in the years 1986-1987 was about 100 mSv.*”

NOTE: Most of the Chernobyl dose was due to inhalation and/or ingestion of radioactive particles (alpha and beta), a much greater health risk than external exposures. UNSCEAR expresses concern only for external radiation (gamma). The Russian government developed a simple solution to the problem of “safe” levels of exposure. In March 1988, the government of Byelorussia decided to release information on radiation contamination, against the wishes of the central Soviet government. This immediately causes a problem. The government of Byelorussia establishes, in fact, that in the seriously contaminated areas of the regions of Gomel and Mogilev, the inhabitants will be exposed to radiation doses of 250 milliSieverts or more during the coming years, if they do not move. It is following this that the Soviet Minister of Health decides to raise the maximum permissible dose of radiation from 250 to 350 milliSieverts.

- d. The UNSCEAR report states, “*no somatic disorder or immunological defect could be associated with ionizing radiation caused by the Chernobyl accident*” (p.512) and then concludes, “*unfavorable psychosocial factors probably explain the differences between the exposed and non-exposed groups*” (p.514). This fraudulent explanation lends credence to claims by prominent nuclear physicists and radiologists that critics of these reports are suffering from “*radiophobia*” – an abnormal fear of radiation.
- e. The International Commission on Radiological Protection (ICRP) and the International Atomic Energy Agency (IAEA) continue to cite gamma dose (an external emitter) while ignoring internal emitters (alpha and beta). The policy makers of these two bodies are packed with self-selected nuclear and medical physicists, nuclear engineers and radiologists who have consistently minimized the risks from low-dose radiation. ICRP and IAEA reports are not subject to outside peer review by independent scientists and tend to support nuclear industry positions on key issues.
- f. The European Committee on Radiation Risk (ECRR) 2003 Report, *Health Effects of Ionising Radiation Exposure at Low Doses for Radiation Protection Purposes* (with 559 references), develops a scientific model based upon epidemiological evidence for cancer and leukemia in populations exposed to internal radioactive isotopes, including ⁹⁰strontium, ²³⁹plutonium, hot particles and depleted uranium. It challenges the widely accepted ICRP linear no-threshold model that applies the results of external acute radiation exposure to internal chronic exposures, using medium and high dose exposures to estimate low dose risk while ignoring recent research on the bystander effect and genomic instability. The dissonance between both models is dramatic when calculating the cancer pandemic and excess deaths resulting from hundreds of atomic weapons tests after Hiroshima and Nagasaki, with the global fallout exposures linked to nuclear power stations and the entire nuclear fuel cycle. In estimating deaths resulting from the nuclear program from 1945 to 1989, ICRP calculates only cancer mortality (based on the Japanese A-bomb survivors’ study)- 1,173,000 worldwide- whereas the ECRR model is more comprehensive. Using the same 1945 baseline, it calculates 61.6 million cancer deaths and 1.9 million fetal deaths from nuclear activity.

ECRR goes further and predicts a 10% loss in quality of life, including all diseases and conditions in those populations exposed to global weapons fallout. The ECRR report is edited by Scientific Secretary Chris Busby and 45 ECRR members and consultants, including the following INSIGHT board members-- Rosalie Bertell, Rose Goncharova, Wolfgang Koehnlein, VT Padmanabhan, Inge Schmitz-Feuerhake, Ernest Sternglass and Alexey Yablokov-- all of whom have long and distinguished research careers in the field of low-dose radiation risk analysis.

There are several critical issues that the nuclear industry refuses to acknowledge:

- There is no industry or government plan for the safe disposal of long-lived radionuclides nor is there independent monitoring of radioactive releases of gaseous waste to the air and water, including the venting of xenon, krypton, and tritium. The U.S. Nuclear Regulatory Commission Effluent Database of Nuclides for Nuclear Power Plants lists 107 radionuclides.
- Industry executives and energy “experts” claim nuclear power generation is a “clean” technology, but they do not account for carbon dioxide emissions from uranium mining and enrichment, transportation, production (reactor parts, equipment and building materials), on site construction, accidents and waste disposal. A 2006 nuclear life-cycle analysis by the **Oko-Institute** in Dernstadt calculated 31 grams of CO₂ per kWh of electricity generated in German nuclear power stations. The study concluded, *“net CO₂ emissions of electricity from gas-fired ICE cogeneration plants are lower than CO₂ emissions of electricity produced in nuclear plants” (oeko.de).*
- Several countries have announced plans to phase out their nuclear reactors, including Italy, Germany, The Netherlands, Sweden and Belgium.
- The nuclear industry has been quick to understate the seriousness of reactor accidents and, in some cases, has made a conscious effort to hide these events from regulatory bodies and the public. It has always minimized the fallout and health risks from the Russian facilities at Mayak, Semipalatinsk, Chernobyl, Sellafield (UK), Hanford and Three Mile Island (US). The most recent example is in statements from executives of Tokyo Electric Power to the effect that radioactive releases from the earthquake-stricken Kashiwazaki reactor pose little threat to human health, although other accounts of the accident portray a much more hazardous scenario. Recently, German and Swedish press reports indicate that two nuclear power stations near Hamburg had to be shut down, one because of a fire and the other closed indefinitely due to overloaded capacity. The plants, owned by the giant Swedish energy company, Vattenfall Europe, failed to report the accidents in timely fashion, causing three top executives to resign, apparently without loss of income. Anti-nuclear activists are demanding that the plants be shut down permanently.
- On May 16th, three weeks after the Chernobyl accident (26 April 1986). The French Central Protection Service Against Ionizing Radiation (SCPRI) took readings of radioactive particulates on the ground. The readings ranged from 25 Becquerels (Bq) a square meter in Brittany to 500 Bq/m² over the whole eastern part of France. Another measure of fallout from the Institute of Radioprotection and Nuclear Security (FR) found deposits of ¹³⁷cesium (Cs) ranging from 20,000 Bq/m² to as much as 40,000 Bq, 40-80 times greater than the second measure but 800-1600 times greater than the first measure! Corinne Castanier, director of CRIIRAD, an independent laboratory, stated this is the sign of *“SCPRI’s incompetence or that of a deliberate lie.”* A 2005 report by the Institute

for Nuclear Protection and Security supported the earlier CRIIRAD data, as reported in *LeMonde* (“Chernobyl’s Impact on France Was a Thousand Times Underestimated,” 26 April 2006).

- A troubling transnational corporate conspiracy of vested interests, the **PhFarMedNuChem Industrial Complex** (pharmaceutical, agribusiness, biomedical, nuclear, chemical) now dominates public health policy worldwide. Its heavily funded lobbying and public relations campaign in support of a new generation of nuclear power stations controls the debate, aided and abetted by a servile media.
- External costs of nuclear power generation are absent from annual reports. The human and ecosystem detriment is never discussed by mainstream media outlets. Huge quantities of water are required to sustain the system, and if a heat wave causes river water temperature to remain at a high level, reactors must be shut down. Continuous radioactive emissions are never disclosed nor is there discussion of the inevitable increase in cancer incidence or non-cancer diseases, the continuous discharge of heated water into lakes and rivers, and the tons of fish and micro-organisms each year that die as they are sucked onto the screens of intake pipes. The most egregious and unethical consequence, though, is that we are forcing future generations to become nuclear watchdogs over highly radioactive wastes that remain toxic for thousands of years—**without informed consent.**
- **A 2005 15-country study of radiation workers in the nuclear industry (*Brit Med J*)** concluded that 1-2% of cancer cases were attributable to low-dose radiation exposure. 407,391 workers were individually monitored for external radiation with a total follow-up of 5.2 million person years. The authors observed that “the general practice in radiation protection is to estimate risks for protracted exposures to low doses by extrapolating from situations of acute exposure to high doses. For this, **a linear dose response model** with no threshold is assumed and risk estimates are divided by two to allow for the assumed reduced carcinogenicity of exposures received at low dose rates. (This model is based upon the A-bomb life span study that conveniently ignores evidence of a **supralinear curve** at low dose.) The lead author of the 52-member team of investigators was **Elisabeth Cardis**, chief of the Radiation and Cancer Unit, International Agency for Research on Cancer.
- In 2008, the German government funded a study (KiKK) to investigate health risks around all 16 nuclear power plants. Much to the surprise of the researchers, (and nuclear power advocates in the U.S.) their investigation revealed a significant elevation in childhood leukemia for those living within 5 km of each reactor.

Scientists should never forget the prophetic words of the eminent biochemist, Erwin Chargaff, who discovered the rules of DNA base pairings (later named *Chargaff’s rules*) and was awarded the National Medal of Science in 1975. Ehrle interviewed him three times, once in 1995, again in 1998 and in 2001, just months before his death (at 96) in 2002. The *New York Times* Obituary author, Nicholas Wade, rightly observed, “**Dr. Chargaff became a forceful if lonely critic of molecular biology...A man of wide culture and learning, he did not fit easily into the sharply focused world of scientific specialists,**” as demonstrated by these statements.

Science was the never-ending search for truth about nature, a quest that would help us understand the workings of the world. That era ended with the splitting of the atomic nucleus, with the ability to modify the hereditary apparatus. A new era has begun: science is now the craft

*of the manipulation, modification, substitution and deflection of the forces of nature...What I see coming is a gigantic slaughterhouse, a **molecular Auschwitz**, in which valuable enzymes, hormones and so on, will be extracted instead of gold teeth (Nature, 21 May 1987).*

We are dealing here [genetic recombination] much more with an ethical problem than with one in public health, and that the principal question to be answered is whether we have the right to put an additional fearful load on generations that are not yet born. I use the adjective 'additional' in view of the unresolved and equally fearful problem of the disposal of nuclear waste. Our time is cursed with the necessity for feeble men, masquerading as experts, to make enormously far-reaching decisions (Science 1976; v.192).

Draft by **Lynn Howard Ehrle, M. Ed**, senior biomedical policy analyst-- Organic Consumers Association and chair-- International Science Oversight Board (an OCA project); member-- Radiation Research Society, Amer. Federation of Teachers and Natl. Educ. Assoc.

Revisions by members of the **Radiation Policy Group**: Rosalie Bertell (PhD), Elena Burlakova (DrSc), Chris Busby (PhD), Katsumi Furitsu (MD, PhD), Barbara Rose Johnston (PhD), Wolfgang Koehnlein (PhD), William Maxfield (MD), Rudi Nussbaum (PhD), VT Padmanabhan (MPH), Marvin Resnikoff (PhD), Inge Schmitz-Feuerhake (PhD), Janette Sherman (MD), Ernest Sternglass (PhD), Alexey Yablokov (Dr Biol, Sc D) and Alla Yaroshinskaya (PhD).

Submitted to the 43-member INSIGHT Board by the Radiation Policy Group and ratified on this, the 5th Day of September 2007.