Beyond Nuclear thanks ICRP for the opportunity to comment on its draft recommendations: TG93 *Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident*, and is pleased to submit the following:

While ICRP recognizes how intractable recovery from a nuclear disaster is, it nevertheless supports the idea of a recovery process – which ICRP states could last several years. The ongoing environmental processes that re-suspend radioactivity and move it to different areas, coupled with the difficulty in measuring contamination, make full recovery from a nuclear disaster impossible. The “co-expertise” recovery processes advocated by ICRP will leave people (particularly women and children) living in contaminated areas with an increased risk to their health – in some cases for many generations.

ICRP’s constitution states its objective: “to advance for the public benefit the science of radiological protection.” While ICRP clearly sees consideration of economic and social impacts as part of its objective, ICRP’s use of optimization and justification – concepts that work against the human right to health according to the United Nations Human Rights Council – creates recommendations that cannot possibly protect adequately against radiation exposure. Chronic low-dose radiation exposure poses an existential, inter-generational threat to our DNA. The cost of having to relocate economic production enterprises to clean areas just doesn’t compare.

The ultimate reality of ICRP’s recommendations is that they will place the burden for radiation protection on community members rather than the industry that contaminated their homes in the first place. This inequitable shift of responsibility – from industry and government to individuals – is why these comments focus mostly on the long-term recovery recommendations in the context of human exposures, and do not attempt to address both the emergency response and recovery process.

ICRP realizes that the recovery process from a nuclear disaster will most likely be long and arduous, and often not ensure the health and well-being of affected communities as outlined by ICRP’s own recommendations. Therefore, ICRP should adjust its recommendations in the following manner:

1. **ICRP should recommend that, at the least, women (particularly those of childbearing years) and children depart land contaminated by nuclear disasters.**

2. **ICRP should abandon encouraging broad public acceptance and use of “co-expertise processes”.** Even if all processes are non-coercive and transparent, they may still fail to meet ICRP exposure recommendations; be abandoned over time due to cost; or abandoned due to the arduous nature of the constant vigilance necessary to maintain them.

3. **ICRP should abandon optimization and justification principles, on which “co-expertise processes” rely, as non-compliant with the right to health per the United Nations Human Rights Council determination.**

4. **ICRP should recommend contaminated land not be used for agriculture.**

5. **ICRP should recommend food contaminated with man-made radionuclides not be consumed, particularly by women and children; and that import and export of contaminated food occur only for research.**
There is little chance for full environmental or societal recovery after a nuclear disaster in many affected areas. ICRP admits as much – more than once – in its draft recommendations.

ICRP recognizes, for instance, that there can be considerable impact from a nuclear disaster for a very long time, “A nuclear accident is an unexpected event that profoundly destabilises people and society, generates great complexity, and requires mobilisation of considerable human and financial resources. Beyond the legitimate fear of all those affected regarding the deleterious health effects of radiation exposure, the societal, environmental, and economic consequences of a major nuclear accident, and the response to that accident, are considerable and last for a very long time” (lines 2085-2088) although ICRP doesn’t hazard a guess as to how long “very long” is.

In fact, over 30 years after the Chernobyl meltdown, the “recovery process” still continues: “there are no legal regulatory documents [in the Russian Federation] determining the transition of settlements from contaminated areas to normal living conditions, and no such transitions have occurred to date.” (lines 2816-2817)

ICRP recognizes the stochastic (random) nature of radiation harm and that a threshold should not be assumed. Even small doses of radiation can cause disease: “Cancer and heritable effects for which the probability of occurrence increases with dose and severity is independent of the dose received are assumed, for the purpose of radiological protection, to have no threshold.” Stochastic impact will increase as doses increase. So any increase in overall radiation exposure during the long-term, or recovery phase, will increase disease risk. This damage compounds across generations.

ICRP recognizes that cleanup may not be possible: “…radiological contamination is not only unexpected but also unwelcome, and it impacts all stakeholders. Although removal of contamination is desirable, it may not be possible or optimal.” (lines 631-632) More worrisome, within the ICRP framework, and with government and industry consent, removing contamination may not be their desired (optimal) result because of costs or other, non-health related reasons.

ICRP recognizes environmental damage: “Damage to fauna and flora was seen after the Chernobyl accident, ranging from the death of forests and a reduction in the number of soil invertebrates, to reports of genetic changes in some species” (lines 338, 339); and that even in the context of protective actions, the already bad situation can be made worse, causing further
damage to the environment from efforts to mitigate human exposures: “This is particularly true regarding the choice of actions to decontaminate the environmental medium (e.g. soil), as this is likely to affect the organo-mineral fertility of the soil in the long term, and introduce disruption in biodiversity.” (lines 508-510) This presents victim communities with a stark and unforgiving choice – clean up to protect humans, or to protect the environment? This is unworkable.

ICRP points to an additional horrible conundrum we may face because of a nuclear disaster – does one choose health, or community, society, friends, stability? “However, in some cases, particularly for large nuclear accidents, the addition of complementary protective actions could result in more harm than good due to the accumulation of significant social disruption” (line 561-562). In other words, acting to protect health could result in harm to social structure, which ICRP argues could be worse than exposure. People forced into this untenable choice between health and community, at the very least, need to know and understand the true risks. ICRP agrees. (line 649-650). In fact, communities should never have to face this dilemma in the first place. However, when faced with this choice, governments and industry post-Fukushima and Chernobyl have pressed community members, sometimes with coercive and bullying tactics, to choose the least-cost options, at the expense of long-term health. Women and children are particularly vulnerable, not only to radiation exposure, but also to these coercive tactics.

ICRP disrecommends use of current reference levels, which include the 20 mSv per year that Japan has contended would be safe; and even realizes the difficulty in maintaining a decent life over the long-term within the range of 10 mSv per year, their upper dose level recommendation: “Therefore, it is not recommended to select reference levels beyond 10 mSv per year when it is estimated that such exposures could continue for several years, which may be the case once the recovery phase starts. In addition, experience from Chernobyl and Fukushima has shown that for exposure levels of the order of 10 mSv per year, it is difficult – given the multiple societal, economic, and environmental negative consequences associated with the long-lasting presence of contamination, and the numerous restrictions imposed on everyday life by the protective actions – to maintain sustainable and decent living, working, and production conditions in affected areas (see Annexes A and B).” (lines 839-846)

ICRP recognizes that maintaining “protective action” during the long-term phase of recovery, may be difficult and does not guarantee that the lower end of the reference level (1 mSv range per year) can be attained even with these actions: “…exposure of people living in contaminated areas depends largely on their living conditions, which cannot be strictly controlled, and it is therefore not possible to guarantee that all individual doses will be kept in the range of 1 mSv per year in the long term.” (lines 851-854)

ICRP recognizes the difficulty in measuring and determining environmental levels of contamination and that “temporary” relocation may actually last “several years”, “Experience from the Chernobyl and Fukushima nuclear accidents has demonstrated that releases can result in very complex deposition patterns that require consideration of temporary relocation. Temporary relocation is the planned removal of people for an extended period of time (e.g. weeks, months, or several years” (lines 1390-1392) and that contamination levels can sometimes vary “by factors of up to 10–100 within the same village” (line 977) in the case of Chernobyl.

Perhaps because ICRP recognizes the generational burden placed on communities that host nuclear reactors, ICRP states that “emergency and recovery plans should be prepared in
advance...” line 137) of a disaster. This is an important step in informing a community of the perils that they risk should a nuclear disaster occur at the facility in their midst.

Despite recognizing the political, societal and technical difficulties of recovery, ICRP recommendations are based on the assumption recovery is possible. This disconnect between ICRP recommendations and what is actually achievable, would result in harm to public and environmental health, particularly the health of women and children.

ICRP comes tantalizingly close to recognizing disproportionate physical impacts on women and children: “The Commission recommends paying particular attention to children and pregnant women, for whom radiological risks may be greater than for other groups of individuals.” (line 675-676) Research shows that women and children are definitely at greater risk. All parts of the nuclear fuel cycle are implicated in childhood disease and negative pregnancy outcomes, which can include perinatal mortality, childhood cancers -- particularly central nervous system cancers and leukemia, cardiovascular and respiratory issues, subclinical yet negative impacts on neural and blood cell development, and more. Females are at greater risk from radiation exposure than males. These health impacts are associated with doses that ICRP deems “allowable” during the intermediate and recovery phases (Table 6.1).

ICRP states that living in a contaminated environment threatens not only physical health, but mental health: “Studies have revealed that anxiety among mothers generated by the presence of contamination in their daily life is a strong stress factor that can induce inappropriate behaviour (lack of sensitivity or even violence), which can hinder the emotional and social development of their children.” (lines 437-439) The best way to handle this threat is by removing mothers from the contamination. Normalizing exposure by encouraging women and children to live in a contaminated environment and eat contaminated food is unacceptable. Yet this is what ICRP supports, because it claims, incorrectly, such a choice remains with the individual.

ICRP supports allowing people to resettle contaminated areas, only after certain conditions are met (lines 608-609), and ostensibly through their own choice, which ICRP says is essential for proper resettlement: “…individuals have a basic right to decide whether or not to return. All decisions about whether to remain in or leave an affected area should be respected and supported by the authorities, and strategies should be developed for resettlement of those who either do not want or are not permitted to move back to their homes.” (lines 1570-1572) Does this happen in practice? This is to be an individual choice, according to ICRP, regardless of how “great” the contaminated area is or how much it has “recovered”. Realistically, though, the pressure from government and industry to resettle contaminated areas will be great. As we see in Japan post Fukushima people are being financially forced to resettle contaminated areas with little consideration for how continual doses of man-made radiation will affect current or future generations. ICRP’s own models show increasing damage with each generation of equivalent radiation exposure. (ICRP 103, pp 53-56) Without a full understanding of what these risks imply, even people who have the resources to choose whether or not to live in a contaminated area will be making resettlement decisions lacking full knowledge of potential health outcomes – outcomes which current science may not fully represent.

For individuals who (are forced to?) live with contamination, ICRP implies that they can be protected adequately by participating in “co-expertise processes”, which to date have included projects like ETHOS and protocols like PRPC (practical radiation protection culture): “The co-
The Co-expertise process

- Establishing dialogues to share experience and knowledge
- Engaging affected people in measurements and sharing results
- Identifying self-help protective actions and organizing collective vigilance
- Implementing local projects with the support of experts

...and how it fails

- While increased susceptibility of women and kids is recognized, this often does not translate into fully protective action.
- Measuring food and environment will not guarantee that radiation dose meets even inadequate ICRP levels.
- Governments may cease to continue support of these processes, ultimately abandoning communities in contaminated areas and not guaranteeing any support for health monitoring or treatment.
- Individuals and communities living in contaminated areas will have to continue these processes in addition to normal life, for decades.

Proponents, including ICRP, claim these processes create autonomy: “Combined with the co-expertise process, a radiological protection culture enables people to restore their autonomy regarding decisions,” (line 2019) despite a number of shortcomings that make even experts unclear about the long-term implications of continually contaminating oneself while saving industry money. (Nadesan 2013) ICRP’s claims are made despite their own admission that measuring contamination is difficult; maintaining this process will still not guarantee doses stay at ICRP’s recommended levels; and that disease risk is increasing, especially for women and children. What good is autonomy in the face of ignorance, uncertainty and misguidance?

ICRP again claims that: “The issue at stake is not to make people accept the risk, but to allow them to make informed decisions about their protection and their life choices (i.e. respecting their dignity).” (lines 2140-241) Measuring contamination of locally grown food is encouraged as a “self-help protective action” (lines 1881-1884), for instance. This sounds reasonable, empowering, and equitable, but in practice it has not been.

Project ETHOS in Belarus – the first co-expertise process after a nuclear power disaster – was in part a French nuclear industry initiative that began after Chernobyl melted down. It encouraged populations to monitor and consume locally grown, often contaminated, food. ETHOS targeted mothers with small children in particular. Proponents claimed that this initiative would help relieve mothers of the guilt of having to feed contamination to their children. Their guilt was not removed by providing uncontaminated living conditions, but by telling mothers some contamination was safe -- contrary to the risks ICRP recognizes even at low doses. Relocation, the healthiest option and the one ICRP claims everyone should have the right to exercise, was
unavailable. Relocation had proven expensive and publicly damaging to nuclear technology’s image, risking future investment. (Topcu 2013) Although it appears the ETHOS project has ceased in Belarus, it is still active in post-Fukushima Japan and is facilitated by ICRP. (Ando ICRP 2016)

ETHOS, PRPC and the co-expertise process increase risk to health, particularly for women and kids. These protocols also support a recovery/rehabilitation regime that shifts health and recovery responsibilities from industry and government to individuals and communities. Even if a community could undertake and endure this process for the decades (or longer) required, there is no guarantee that funding or training provided today will be available tomorrow.

What sounds like self-determination and empowerment, encouraging people to: “build their own benchmarks about radioactivity; collect relevant information to make informed decisions about their protection and to take actions (self-help protection); (lines 2010-2011), could very well prove untenable for the long-term, as intimated by ICRP. Living under a co-expertise/PRPC will, by ICRP’s own admission, take unrelenting effort: “Hence, the government, or the responsible authority, together with the stakeholders, will need to constantly evaluate the effectiveness of the protective actions in place, including self-help protective actions carried out at community or individual levels, in order to provide adequate support on how to ensure long-term protection and further improve the situation.” (lines 1696-1699) And it will take ongoing official support: “The sustainability of such a system will require the establishment of continued maintenance and training programmes by national and local authorities.” (lines 1856-1857) The co-expertise process must be integrated into the everyday life of individuals, practiced for decades, and continue to be supported (funding for equipment, training and experts) by authorities. There is no guarantee that health will be monitored or health services will be offered. This is the opposite of practical and preventive. It also serves to obscure any resulting health impacts because these processes are instituted with the assumption that they will be carried out to the letter and that there will be no discernible health impacts definitively attributable to radiation exposure. This is despite current research showing that low doses harm health.

These protocols promise autonomy and empowerment, but really they result in privatization of radiation exposure risk. They place the blame, and cost, for any subsequent health impacts on community members, not on industry (Stawkowski 2017) (Topcu 2013) where they belong. As time passes, costs continue, and the contamination outlives many a political regime, these communities may very well be abandoned to their fate without the help or guidance to continue a PRPC. The incentive, as borne out by experience post Chernobyl and Fukushima, is to provide no individual relocation or long-term resources to all those affected, contrary to ICRP’s wishful thinking.

EHTOS and PRPC are based on the principles of optimization and justification, which ICRP claims fall within the ethical goals of society: “Justification thus goes far beyond the objective of radiological protection, which is to avoid or reduce exposure, as it may also have various health, psychological, societal, economic, environmental, and political consequences. Thus, justification falls under the overall ethical goal of societies, which is to contribute to the health and well-being of individuals and the quality of life of affected communities, with preservation of biodiversity and sustainable development representing an integral part.” (line 531-535) However, the first-ever human rights investigation of a nuclear meltdown aftermath – at Fukushima –
determined that “The ICRP recommendations are based on the principle of optimisation and justification, according to which all actions of the Government should be based on maximizing good over harm. Such a risk-benefit analysis is not in consonance with the right to health framework, as it gives precedence to collective interests over individual rights. Under the right to health, the right of every individual has to be protected.”

ICRP recommendations make nuclear power a more appealing energy source than it actually is by pushing a narrative that does not recognize the permanence of contamination. Yet foodstuffs from across the globe remain contaminated, even from above ground bomb tests that occurred a half century ago. Because some health impacts of radiation exposure are latent or subclinical, true damage from exposure to radiation (even through the early phases of co-expertise processes) can remain difficult to attribute to a cause, during which time irreversible political, societal and health decisions have been made.

Overall, ICRP’s position that nuclear disasters are “recoverable”, despite their own statements to the contrary, helps give a false impression that nuclear power is less impactful to our health and environment and is therefore, a viable energy source. Chernobyl and Fukushima tell a different story. When the best hope experts can offer for recovery is convincing people that it is fine to feed their children food contaminated with anthropogenic radionuclides, humanity has failed its imperative to protect.

ICRP through the co-expertise process, seeks to allow some higher levels of food contamination: “Higher radiological criteria may also be set to preserve local production, which may be deeply embedded in traditions or which may be essential to the economy of the entire community.” (lines 1438-1439), and seeks to spread this food internationally. That means risk does not stay within the contaminated area: “There may be situations where a sustainable agricultural economy is not possible without placing contaminated food on the market. As such foods will be subject to market forces, this will necessitate an effective communication strategy to overcome the negative reactions from consumers outside the contaminated areas.” (ICRP 111 2009)

Risk of importing polluted food is not theoretical. Contaminated tea has been exported from Japan [SimplyInfo.org 2015]; wild blueberry spread, sourced from Bulgaria, was contaminated with radiocesium higher than Japan’s limit—up to 165 Bq per kg. (Shukan Asahi 2013) The spread was labeled “organic” and is still sold in stores in the U.S. where the radiocesium intervention limit is 1200 Bq/kg (12 times the current limit in Japan). Meanwhile Japan, at the time of detection, had removed the preserves from its stores. Ingestion of contaminated food constituted most of the post-Chernobyl doses, (Brown 2019a, P 234) so eating this food will increase risk, particularly if it is a favored food e.g. for preparing daily peanut butter and jelly sandwiches for a child. Radiocesium accumulates in the body over time when regularly ingested. (ICRP 111, Figure 2.2) Spreading contaminated food across the globe also indicates that a nuclear disaster anywhere is a nuclear disaster everywhere and that permission for protective actions should be received from additional stakeholders, particularly when the issue is contaminated food.

ICRP repeatedly states how intractable the problem of long term radiological contamination is and yet they still try to offer remedies using protocols that, according to the UN Commission on Human Rights, violate the human right to health. When ICRP acts like long-term recovery is possible, its recommends actions that fall short of fully protecting the public, much less wildlife
and the environment. These recommendations can lead to discrimination and bullying. Once stable and happy communities are being asked to make impossible decisions between community life, ancestral land, and long-term health risk. It is cruel to ask this. Yet this is the burden that using nuclear energy places upon us. The one action ICRP is silent on is the one action that will guarantee we will never have to make this impossible and cruel decision: abandoning nuclear power altogether.