

Date: 7/24/96  
To: Elaine Gallin  
From: Ed Haskell  
Re: Comments to reports of US and Russian SRCs concerning JCCRER dosimetry proposal.

Dear Elaine,

Unfortunately, I won't be able to join in the conference call since I am attending meetings in Hiroshima on Semipalatinsk and DS/86. If you are reading this it means I was able to make the phone system to work from my hotel room. It might be useful if you could refax this to others who will be joining in on the call.

I agree with the general comments of the US and Russian SRCs that more detailed plans are necessary, that plans for implementation and collection of biological materials are needed, that the EPR capability of the Inst. for Metal Physics be firmly established and that use be made of existing EPR expertise in Russia (and perhaps other CIS members). In my opinion the value of doses derived from biological materials for input and validation of modeling efforts has been greatly understated. Tooth enamel is an excellent, long term dosimeter for external gamma radiation, and its value, when combined with EPR of dentine, may extend to quantification of internal emitters. EPR measurements provide direct links to actual absorbed dose in humans. Without them, the credibility of models will suffer, particularly since biological materials are available now and the technology is rapidly being developed for large scale implementation. If biological materials are not collected and analyzed now, it is likely that they will be in the future but at far greater expense (exhumation) and with far greater uncertainties.

In my opinion the dosimetry effort should:

1. Implement selection and collection of biological materials at autopsy and at routine dental extraction.  
Time is critical for securing materials which can provide direct dose measurements. The population of Mayak and the Tcha River is aging and each unautopsied death results in loss of direct dosimetric material. Exhumation is a very expensive alternative which can be avoided if steps are taken now. Informal arrangements may already have been made with authorities in some cases. These arrangements and contacts should be reviewed and a plan which assures collection of biological materials from individuals of target profiles in key locations should be developed and implemented quickly. Teeth should also be collected from routine (medically necessary) extractions through the dental community. This mode allows for simultaneous collection and documentation.
2. Establish on location EPR capability at the Institute of Metal Physics. Dr. Alex Romanyuhka has established himself as an innovator and leader in the area of EPR dosimetry of teeth even though virtually all of his research has been conducted while visiting other laboratories. An EPR spectrometer should be purchased so that research can be conducted on location, and a local staff can be trained in sample preparation and routine EPR analysis.

3. Utilize established EPR capabilities in Russia and other members of the Commonwealth of Independent States (CIS). Ongoing programs involving Chernobyl (Ukraine/USA; European Union(EU)/CIS) and Semipalatinsk (Russia/EU/Japan) are also using, or hope to use EPR measurements of teeth. Excellent, established EPR dosimetric capability exists in Russia and other CIS countries. This expertise should be exploited for quality assurance, technique development and even routine dose measurements. Institutes with EPR dosimetric capabilities include:

Medical Radiological Research Centre (MRRRC) Russian Academy of Medical Sciences, Obninsk, Russia.: V. Stepanenko, V. Skvortsov, and A. Ivannikov.  
Comments: Established dosimetry on teeth. Extensive numbers have been examined. Excellent quality. Good equipment. This facility should definitely be used. I have talked with Dr. Stepanenko about the possibility of collaboration and he is in full agreement as to its potential value to all projects.

Scientific Center of Radiation Medicine (SCRM) Academy of Medical Sciences of Ukraine, Kiev, Ukraine.: V. Chumak, S. Sholom.  
Comments: Established dosimetry on teeth. Extensive numbers have been examined. Excellent quality. Good equipment. This facility should also be used. Dr. Chumak also recognizes the value of collaboration.

Inst. of Semiconductor Physics (ISP), Kiev, Ukraine.: A. Bugai.  
Comments: Good basic research. Animal teeth from contaminated areas have been examined. Equipment less reliable.

Inst. of Geochemistry, Mineralogy and Ore Formation (IGRM), Kiev, Ukraine.: A. Brik.  
Comments: Innovative basic research. Little dosimetry experience. Equipment less reliable.

Research Institute of Radiation Medicine (RIRM), Minsk, Belarus.: V.A. Kirillov and S.V. Dubovsky.  
Comments: No established dosimetric capability. Poor results in interlaboratory comparison.

4. Coordinate efforts with ongoing EU/ CEC projects.

A collaborative dosimetry project is just getting underway under the scientific funding mechanism Framework IV (FIV) of the EU. The project involves laboratories located throughout Europe and will include laboratories in the CIS under a complementary program known as Copernicus. The purpose of these programs is to assess the feasibility of solid state (EPR, TL and OSL) and biological methods for retrospective dosimetry as well as modeling efforts which may be applied to accident sites in the CIS. These projects are built on two previous dosimetry programs; most recently ECP-10, another EU funded project and an IAEA Cooperative Research Program (initiated by the U of U) before that. The University of Utah has been involved in each of these programs including FIV. Funding available to participants is extremely small. Results of this effort will be directly applicable to the JCCRER project as well as the dosimetric studies of

Chernobyl and Chelyabinsk. Arrangements should be made with the EU for the U.S. to provide funds for specific aspects of the project to allow research and collaboration to progress at a reasonable rate. The approach to this collaboration should be done with sensitivity. The FIV project leaders should have the opportunity of specifying which aspects of the programs they would like to have U.S. input into. A full blown plan presented to them will probably not work. I have talked with project leaders and they feel that collaboration would be very beneficial to all concerned. They are encouraged by the participation of the University of Utah and feel that it is a good step to much broader collaboration.

5. Develop and implement quality assurance programs.

In addition to the studies planned by the FIV/Copernicus program methods should be developed and tested for the routine application of EPR dosimetry by the laboratories directly involved in the Urals and the Ukraine. Programs to test the methods can be implemented on a bilateral basis between the U.S. and Russia or on a trilateral basis between the U.S., Russia and the Ukraine. The issues which need to be addressed are now well established and programs for their implementation could be developed quickly.