

DOCUMENTATION OF OCCUPATIONAL ACCIDENTS AND DISEASES BY IONISING RADIATION IN GERMANY

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The investigation of accidents and diseases, caused by ionising radiation, is important not only from the more technical point of „accident prevention“ but even more from medical and biological aspects in investigating human response to exposure of ionising radiation.

As industrial use of radiation sources grew rapidly from the 70th on, and so did the workforce handling the sources, it is evident, that the amount of occupational exposed persons who will now come to an age where (spontaneous) cancer diseases become manifest is also growing. There will be a certain number of people who will declare this disease being caused by the occupational exposure. Investigation and decision in such cases have to be performed in short time and will be enhanced by a good experience from former cases.

In Germany the workman's compensation institutions (Industrial Injury Insurance Institutes [III] - Berufsgenossenschaften) are responsible for all questions of medical care, rehabilitation and compensation of occupational accidents and diseases. They decided to provide a registry for all cases which came to investigation. Since 1980 the institute of radiation protection which was founded in the late 70th by two of this III (Berufsgenossenschaft der Feinmechanik und Elektrotechnik and Berufsgenossenschaft der Chemischen Industrie) is performing the data-collection. The quality of the data depends of course on the details which are reported to the Institute in each case and on the criteria, when at all a case should be reported to the registry. Unfortunately it was not possible to edit general reporting criteria. Each Industrial Injury Insurance Institute in Germany (there are 36 of them) decides by itself about the reporting criteria. Of course this leads to a loss of information as is shown later.

For statistical purposes the numbers of occupational accidents and diseases, categorised to the causing influence, which have been announced for compensating at the III, are reported to the ministry of health and are edited in the annual „Accident Prevention report“ of the federal government.

A more detailed view to this numbers can be derived from the annual report of the III's association.

Figure 1 gives a annual distribution for the last ten years of all cases where overexposure was announced as reason of injury or disease and also shows how many cases left, where the investigation gave reason to certify this relation and where the injury or disease was acknowledged as occupational.

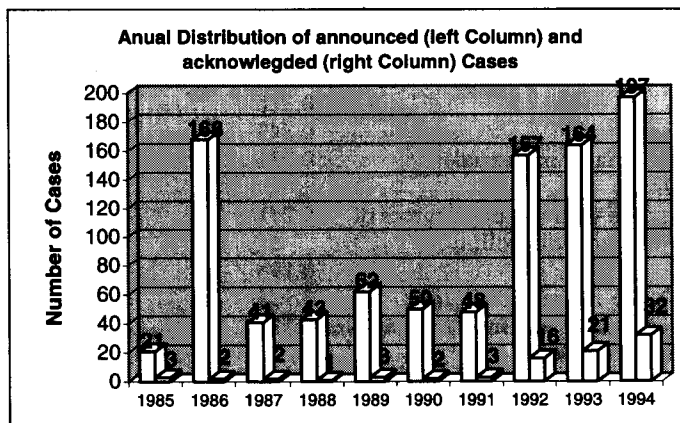


Fig.1 Annual distribution (1985-1994) of injuries and diseases which have been announced as occupational disease due to ionising radiation and which have been acknowledged as those.
(Without the numbers of the III of the mining industry - see text)

It becomes obvious, that the number of diseases which proofed to be radiation induced is much smaller than the announced number. The peak at 1986 results from German workers in the former SU near Tschernobyl whose registration was done in precaution and without having been really exposed. Although the numbers of the III of the mining industry are taken off, the increase from 1992 on results from miners of the uranium mining in the former DDR. According to special regulations in Germany a certain number of those compensations have to be done by other III.

As can be seen from Fig.1. a total amount of 951 cases of announced diseases (and injuries) have been reported in Germany from 1985 to 1994. Not included in this number are the cases announced to the IIII of the mining industry. Further not included are the incidents which had happened in the former DDR. Using the same criteria, we will find only documents of 361 cases in our registry. Only 37% of all cases are reported by the IIII to our institute.

An enhancement was brought in by updating the registry with the cases from the former DDR. The much more centralised system of occupational health and safety including radiation protection of the workers promoted the centralised collecting of the documents.

Including this cases and extending time to 1995 makes it possible to look to total of 517 cases.

As the health situation of the east German uranium miners is subject of special investigation programs, all of this cases will be omitted in the further analysis of this paper.

If doing so, 371 documents are remaining. 102 of them are connected to Tschernobyl as described previous. So there are left 269 files in the registry which indicate the situation in industry and health service. A view to the annual distribution of the year of announcement is done in fig. 2.

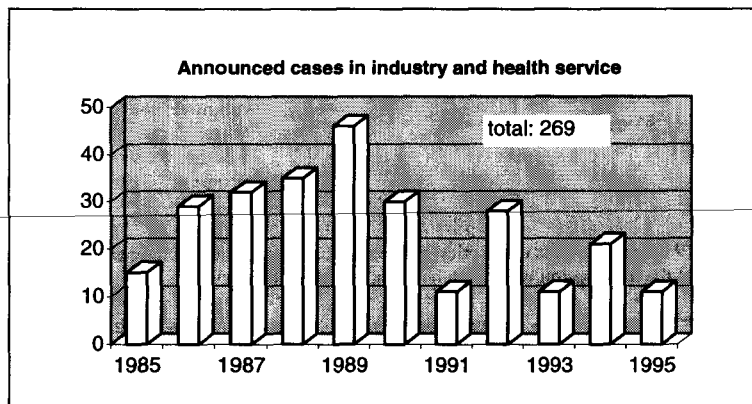


Fig.2 Annual distribution (1985-1995) of injuries and diseases which have been announced as occupational caused by ionising radiation. All cases connected to mining and the registered cases in connection with Tschernobyl (see text) have been omitted.

After a continuous increase until 1989, which corresponds to the increasing number of radiation workers, the numbers seem to decrease until today much faster than the number of radiation workers decreases (today about 340,000 persons). We presume, that this decrease is caused simply by rearranging the administration structures of the IIII after the German unification in October 1990 which led to a certain neglecting of reporting. It will be one of the next investigations of the registry to check this phenomenon.

The next step of analysis is to get a survey of the branches where the cases are coming from. This is indicated in fig. 3.

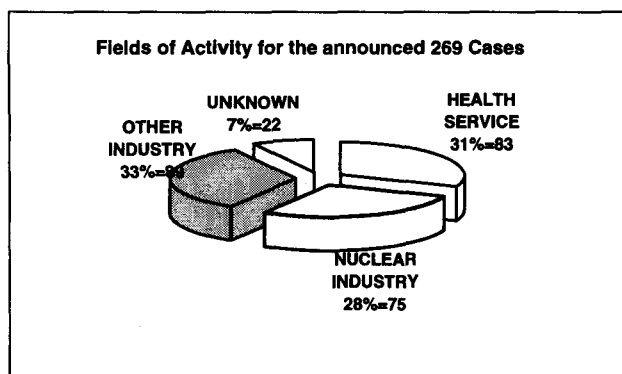


Fig. 3 Distribution of the left 269 announced cases to the reporting branches

According to missing reporting criteria, only in 165 of the 269 files we find a clear indication of the state of the case. That means, that 104 cases have been reported at a certain state of investigation, but the reported information was never updated. So we are not able to classify them, we even do not know, whether they are still in work, whether they are acknowledged or refused.

Finally we can work through the 165 remaining cases. Figure 4 shows that in 110 of this a decision was made: 19 have been acknowledged and 91 have been refused. In 55 cases work is still in progress.

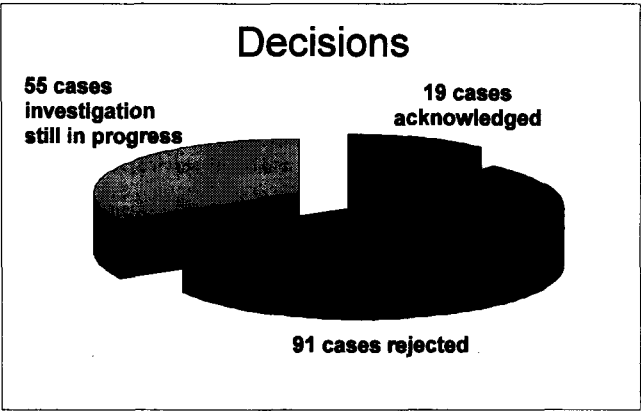


Fig.4 Only in 165 of the reported files is indicated which decision was made or whether the work is still in progress.

Interest is focused now to those 19 cases where the connection between radiation exposure and disease was accepted. The following tables list the information which can be taken out of the registry.

# of cases	Exposure
3	acute
15	chronicle
1	unknown

As can be noticed from this table, the by far most accepted diseases are caused by chronic exposure. 13 of these belong to the health service and concerns to physicians or medical personnel who used to apply X-rays - often in the 50th and 60th without adequate radiation protection measures. Two of the acute cases come from the non-destructive material testing and one is registered in health service again.

Information about diagnoses is sometimes poor and is given in the next table. Unfortunately, the dose information

# of cases	group of diagnoses/reported doses
2 acute	X-ray-burn; ulcers
4 chronic	cancer of homeopathic system/515 mSv/-/1500mSv/1000mSv all eff.
1 chronic	cancer of thyroid/1019mSv eff.
1 chronic	cancer of the skin/150 Gy org. (thumb)
9 chronic	unknown
1 acute	unknown

in the registry is quite insufficient. Even in cases of acute radiation injuries sometimes effective dose is reported but organ dose or skin dose is omitted. Sometimes a dose value is given but is obviously wrong. In other cases the reported unit of a dose-value does not fit the rest of the information.

Although a lot of information can be derived from the registry, it is shown in this paper, that a reanalyses of the original data documents is necessary for enhancing the quality of the medical and dosimetric data.