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Radiation Injury in Workmen's Compensation

*Richard E. Hendricks**

IN THE PAST TEN to fifteen years, the industrial use of radioactive materials or radiation producing equipment has been increasing, and it can be expected that this increase will continue with the growing complexity and sophistication of our industrial society. As the number of industries using equipment and products of the nuclear age increases, an increasing number of workers are likely to develop injuries and diseases related to their work.¹ Not only will widespread industrial use of radiation result in more possibilities for injury, but also more experience with these materials will make their harmful tendencies more discernible. Whether because of expanded uses of the fruits of the nuclear age, or because of more insights into radiation caused diseases, in years to come more employees are likely to find themselves filing claims for workmen's compensation because of alleged radiation-caused diseases or illnesses.

What are radiation diseases and injuries? Which occupations are likely to give rise to radiation exposure? Do present workmen's compensation laws provide coverage for such injuries and diseases, and to what extent? How is a claim processed? Can the present laws be improved, and what efforts are being made—or should be made—to improve them?

Types of Radiation Injury

The term radiation, as used in this article, refers to electromagnetic waves. Such waves are produced by electrical equipment and radioactive materials over an extremely wide range of frequencies and since waves in certain frequency bands or ranges have similar properties, such ranges are named for ease in reference. Four general types of radiation are discussed in this article: ultraviolet, infrared, microwave,² and ionizing radiation.³ The practicing attorney does not necessarily need the scientific or medical background to discuss the various types of radiation in detail, but should know that they exist, that they may cause various injuries and diseases, and arise in various occupations. It

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¹ Woodward & Fondiller, Inc., A Report on Ionizing Radiation Record Keeping, 3 Studies in Workmen's Compensation & Radiation Injury 1 (U. S. Dep't of Labor & AEC, 1966).

² U. S. Dep't of Health, Education & Welfare, Occupational Diseases, A Guide to Their Recognition (Public Health Service Publication No. 1097) at 259 (1966); see bibliography at 264-65.

³ *Id.* at 265; see bibliography at 271-72.

will be sufficient for the purpose of this article to highlight some radiation related injuries and diseases and occupations and to point out some reference material.

Ultraviolet radiation may come from exposure to sunlight, welding, or some photosensitizing chemicals.⁴ Sunburns are recognizable to everyone and generally are not harmful; however, extreme conditions such as senile keratoses, squamous cell epitheliomas, and basal cell epitheliomas may develop from exposure to ultraviolet waves from the sun.⁵ Welding can cause keratoconjunctivitis or burns like sunburn to exposed areas of the body.⁶ Contact with photosensitizing agents may result in burns and blisters. Coal tar, an industrial photosensitizer, can induce skin cancer.⁷

Infrared radiation causes burns, and as a result the worker exposed to such radiation will normally be aware of its presence. Extended exposure of the eyes to infrared may cause posterior cataract, while low grade exposures may result in eye fatigue or headaches.⁸

Microwave radiation includes electromagnetic frequencies from 300 megacycles, or megahertz, to more than 30,000 megacycles. Normally, radiation in this frequency range is associated with tracking radar, radio relay, and television transmission; however, radio frequency ovens and diathermy devices make use of the heating effect of microwaves in industrial and medical settings as well as the home.⁹ Like infrared, microwave radiation causes localized skin heating but with deeper penetration.¹⁰

Apprehension over the possibility of injury to man by microwaves is based to some degree on the fact that intense and prolonged microwave exposure has caused severe injuries to experimental animals.¹¹ Extensive studies by at least one group, however, have failed to directly connect microwave radiation with heart disease, leukemia, bone and lung cancer, or degenerative nervous diseases in humans.¹² The biological effects of microwave radiation apparently are dependent to a

⁴ U. S. Dep't of Health, Education & Welfare, *op. cit. supra* note 2 at 260-61; a list of occupations which might entail exposure to ultraviolet radiation is given at 261. In Oregon from 1958 through 1962, there were 27 claims for ultraviolet radiation, all involving eye injury (letter, October 4, 1967 from Don Hanna, Chief Industrial Hygienist, Workmen's Compensation Bd., State of Oregon).

⁵ *Id.* at 260.

⁶ *Ibid.*

⁷ *Id.* at 261.

⁸ *Id.* at 261-62; see list of occupations at 262.

⁹ *Id.* at 262.

¹⁰ *Id.* at 263; see list of occupations at 263-64.

¹¹ Barron & Baraff, *Medical Considerations of Exposure to Microwaves (Radar)*, 168 J.A.M.A. 1194 (1958).

¹² *Id.* at 1199.

great extent on the frequency, or wave length, and the energy of the waves.¹³

Ionizing radiation,¹⁴ by far the most studied form of radiation in the Workmen's Compensation field,¹⁵ refers to electromagnetic radiation which interacts with gases, liquids, or solids to produce ions, or electrically-charged particles. The term "ionizing radiation" is also used in reference to charged or neutral particles which may be emitted from a radioactive material or source. This type of radiation has always been with us, but in recent years the magnitude of the hazard has increased so as to make it significant.¹⁶ The number of radiation workers has increased rapidly since the beginning of the wartime atom bomb project and will continue to increase.¹⁷ Ionizing radiation can be produced naturally or artificially,¹⁸ and its ability to cause biologic damage is well documented.¹⁹ One study in New York showed the highest external exposures were among workers in radium processing, luminous dial painting, industrial radiography, and nuclear fuel element fabrication.²⁰

The biologic effects of ionizing radiation may be genetic, or somatic, with somatic effects including acute and chronic radiodermatitis, acute and chronic radiation syndrome, skin cancer, leukemia, cataracts,²¹ sterility, and general shortening of the life span. Genetic effects are unknown.²² The effects of small amounts of low dose rate radiation may be relatively subtle and large-scale studies are required to demonstrate these effects on a statistical basis.²³ As to somatic effects, there is a latent

¹³ Morgan, *Microwave Radiation Hazards*, 21 AMA Archives of Industrial Health 570 (1960).

¹⁴ U. S. Dep't of Health, Education & Welfare, *op. cit. supra* note 2 at 265; see list of occupations at 269-70.

¹⁵ Hearings on H.R. 16920 and S.3722 before the Joint Committee on Atomic Energy, 89th Cong., 2nd Sess. (1966). Included in the record of these hearings are statements and reports by many government and private authorities on radiation.

¹⁶ U. S. Dep't of Health, Education & Welfare, *op. cit. supra* note 2 at 265.

¹⁷ Dunham, *Health Hazards from Ionizing Radiation*, 2 Archives of Environmental Health 144 (1961).

¹⁸ U. S. Dep't of Health, Education & Welfare, *op. cit. supra* note 2 at 265.

¹⁹ *Id.* at 267; U. S. Dep't of Commerce (National Bureau of Standards), *Permissible Dose from External Sources of Ionizing Radiation*, Handbook 59 (1959).

²⁰ Abrahams, Carmichael & Kleinfeld, *A Study of Occupational Radiation Exposure in New York State*, 22 Am. Industrial Hygiene Ass'n J. 124 (1961).

²¹ For an extensive study of cataracts, see Merriam & Focht, *A Clinical Study of Radiation Cataracts and the Relationship to Dose*, 77 Amer. J. Roentgenology, Radium Therapy and Nuclear Medicine 759 (1957).

²² U. S. Dep't of Health, Education & Welfare, *op. cit. supra* note 2 at 267; see generally Howley & Robbins, *Radiation Hazards from x-ray Diffraction Equipment*, 2 Radiological Health Data and Reports 245 (U. S. Dep't of Health, Education & Welfare, 1967).

²³ Dunham, *op. cit. supra* note 17 at 145.

period between the time of principal exposure to the ionizing radiation and its outward manifestation.²⁴ One writer who conducted field investigations into the coverage of radiation injuries in several states, the federal government and a Canadian province, lists various types of diseases and body disorders found or alleged to be due to ionizing radiation.²⁵

This article makes no attempt to deal with the labyrinthine problem of causal relationship in a radiation injury claim, except to observe that the difficulty seems to arise from lack of knowledge about radiation and its effects on the human body,²⁶ and the fact that records containing evidence of exposure, and amounts thereof, are in many instances not available.²⁷

Coverage and Volume of Cases

In order to determine which states provide compensation benefits for radiation workers, and how claims are processed, the author has surveyed all of the states as well as the Bureau of Employees' Compensation, a federal agency. The following material draws heavily from replies by appropriate officials to questionnaires, and from the results of other surveys made in the past few years. The response to the author's survey was very gratifying,²⁸ and the state and federal administrators were quite helpful and expansive in their replies. Many had little or no experience in radiation injury claims,²⁹ as is shown below, but responded to the extent of their experience.

All of the jurisdictions provide coverage for occupational diseases, either in a general statute or in a separate occupational disease law. Only one state does not cover radiation claims through definition of an occupational disease. Oklahoma does "not at the present time" cover this

²⁴ *Id.* at 146.

²⁵ O'Toole, *The Incidence, Nature & Adjudication of Workmen's Compensation Claims Involving Radiation Exposure & Delayed Injury*, 2 *Studies in Workmen's Compensation & Radiation Injury* 9 (Dep't of Labor and the AEC, 1965); see generally Woodward & Fondiller, *op. cit. supra* note 1 at 11.

²⁶ Hearings, *op. cit. supra* note 15 at 73-82, statement by Dr. Chas. L. Dunham, Director, Division of Biology and Medicine, Atomic Energy Commission. Any of the previously cited medical articles clearly suggests the lack of medical knowledge and/or agreement among physicians.

²⁷ The problem of record keeping was dealt with exhaustively in the Congressional hearings on H.R. 16920 and S.3722, *supra* note 15. The proposed legislation related to uniform record keeping and workmen's compensation coverage for radiation workers.

²⁸ Forty six states replied, as well as the Bureau of Employees' Compensation, U. S. Dep't of Labor. The Bureau of Employees' Compensation administers two workmen's compensation laws (5 U.S.C. 8101-8150 and 33 U.S.C. 901-950, as extended), accordingly a total of 48 statutes are included in this survey.

²⁹ Woodward & Fondiller, *op. cit. supra* note 1 at 55. This report found 12 states with radiation claim experience as of 1965.

type of injury or disease.³⁰ The state of Alabama added radiation injury coverage on September 7, 1967.³¹

The responses regarding claims experience in the last ten years shows that either the industrial use of radiation producing material and equipment is extremely safe, or the connection between injuries and diseases and exposure to radiation is vague, and potential cases go unreported, or the states do not have very accurate reporting or record-keeping systems.³² As a result, this survey and others conducted in the past several years show that the volume of claims is small.³³ Twenty-one states reported no experience in claims whatsoever in the last ten years. Eight states could not state whether they had had such claims, and five indicated they had had radiation claims but did not have statistical data available and could not cite figures. The Bureau of Employees' Compensation has had experience but stated that statistics are not available. Ten states were able to give the number of cases reported in the ten-year period.

Of the jurisdictions reporting in the instant survey that they had experience but no statistics, two states and the Bureau of Employees' Compensation had reported some statistics in a study on Workmen's Compensation Claims involving radiation exposure and delayed injuries by O'Toole.³⁴ The list below includes the statistics reported to O'Toole:

California	46
Colorado	13*
Connecticut	1
Iowa	1
Maryland	3*
Nevada	6
New Jersey	50
New York	26
Ohio	25
Oregon	30
Washington	6
Wisconsin	3
Bureau of Employees' Compensation	105*
Total Cases	315

* Figures from the O'Toole report

³⁰ Letter from A. R. Swank, Jr., Presiding Judge, State Industrial Court, State of Oklahoma, to the author May 26, 1967.

³¹ Letter concerning S.B. 395 from Ramon C. Miller, Workmen's Compensation Division, Dep't of Industrial Relations, State of Alabama, to the author October 3, 1967.

³² See also Hearings, *op. cit. supra* note 15.

³³ O'Toole, *op. cit. supra* note 25 at 8; Woodward & Fondiller, *op. cit. supra* note 1 at 18.

³⁴ O'Toole, *op. cit. supra* note 25 at 6.

Processing and Benefits

The principal question put to the administrators was: is the statutory coverage of radiation claims similar to other injuries or occupational diseases, and are such claims handled by the agencies in a similar manner? In other words, if a radiation injury or disease case develops, how is it handled and what might the victim expect in the way of benefits? The following generalizations are based on the information furnished the author by those fifteen states and the federal agency reporting radiation injury experience.

Claim Forms

The radiation injury claim forms may differ from those used in a traumatic injury, although in most instances the states reported that they do not. In those states that do not have a radiation injury or disease form *per se*, radiation claims for injury and disease are likely to be handled on an occupational disease form rather than on an occupational injury form.

Time Limitations

Of particular importance to the attorney and his client is the period of the statute of limitations for filing a claim. The states were divided about equally as to whether the statute of limitations in a radiation case is different from the statute covering a traumatic injury claim. A number have a separate statute of limitations for occupational diseases generally, including radiation induced diseases and injuries.

Some states have special statutes of limitations for radiation disease claims. Nevada, for example, amended its law in 1967 to obviate time limitations in radiation claims.³⁵ Other states have statutes defining the period for timely filing of a claim as running from the last date of exposure,³⁶ or the date the employee knew of his disease and knew or should have known of the employment relationship with the disease.³⁷

As the states gain experience in the area of occupational disability arising from radiation, they will no doubt adjust their timely filing requirements.³⁸ The comprehensive O'Toole study did not find time limi-

³⁵ Letter from C. A. Heckathorn, Chairman, Nevada Industrial Commission, State of Nevada, to the author May 12, 1967; see also Wisconsin Workmen's Compensation Act, § 102.17(4) relative to ionizing radiation.

³⁶ Letter from Mrs. C. C. Silva, Deputy Labor Commissioner, State of N. Mexico, to the author May 22, 1967.

³⁷ The New Jersey Compensation Act was extended by Chapter 126 of the Laws of 1966 to provide for filing a claim ". . . within one year after the employee knew or ought to have known the nature of the disability and its relation to his employment"; see also Federal Employees' Compensation Act, 5 U.S.C. 8122(b).

³⁸ Estep & Allan, Radiation Injuries & Time Limitations in Workmen's Compensation Cases, 62 Mich. L. Rev. 259 (1963), gives a detailed discussion of time limitations generally in radiation claims.

tations to be a major problem. Of 109 cases studied by O'Toole, the question came up in only seven, and four claims were defeated because the filing deadline had expired.³⁹ Another study conducted by Woodward-Fondiller, Inc. found occupational disease statutes of limitations covering radiation claims by direct reference or inference, with a wide variety in limit periods.⁴⁰ Still another study by David B. Johnson found wide differences of opinion among union representatives, employers, and insurance carriers as to the ideal time requirement.⁴¹

Medical and Compensation Benefits

A radiation victim is entitled to necessary medical care in all jurisdictions reporting, although one state limits the medical expenses to \$2500.⁴² In states having a statutory maximum for medical expenditures, radiation claims are presumably subject to the same restrictions.

Only three of the reporting states do not provide compensation for temporary total or temporary partial wage loss.⁴³ The remaining states and the Bureau of Employees' Compensation provide compensation if the radiation induced disease or illness causes partial or total wage loss. All the states, with one exception,⁴⁴ allow awards for permanent disability in radiation cases. The coverage for disfigurement is far from universal, although a majority of the reporting states have statutes extending to permanent conditions of this type. Eleven states do not compensate a victim of radiation-induced disfigurement. Two states would pay for disfigurement of the face and neck only, while another would compensate for disfigurement only if there is a loss in earning power caused thereby. Three states admitted to uncertainty in the area of disfigurement awards.

The period of eligibility for medical care or monetary compensation in cases of radiation injury is the same as for other injuries with only a few exceptions. The Johnson report found that unlimited medical benefits for radiation injuries was favored generally; Michigan has achieved this via administrative interpretation.⁴⁵

³⁹ *Op. cit. supra* note 25 at 29.

⁴⁰ *Op. cit. supra* note 1 at 55.

⁴¹ Federal State Cooperation in Improvement of Workmen's Compensation Legislation, 1 Studies in Workmen's Compensation & Radiation Injury 195 (U. S. Dep't of Labor & AEC, 1965).

⁴² Letter from Peter S. Marthakis, Hearing Examiner, State of Utah, to the author May 19, 1967.

⁴³ The Arizona, Georgia & New Hampshire statutes cover temporary total disability only.

⁴⁴ Letter, *op. cit. supra* note 35.

⁴⁵ *Op. cit. supra* note 41 at 195.

Administrative Handling

The states vary greatly in the manner of handling radiation claims with most handling them the same as any other claim. Two jurisdictions⁴⁶ have the radiation claims handled separately and/or all handled by one individual. The purpose for having one individual handle the claims is to keep a close check on this type of claim; a special file is kept for record keeping and special handling. A few states report to the state department of health or to the Atomic Energy Commission. Seven other jurisdictions report special handling of radiation claims but did not elaborate on their procedures.

Most jurisdictions do not investigate radiation injury claims as a matter of standard practice. Some may, dependent on reports, or in select claims, or if an interested party requests investigation, or if state or certain municipal employees are filing. The state health department or division of industrial hygiene, or the industry or insurance carrier may investigate radiation claims, but no specific information was elicited in this study. Twenty-three jurisdictions reported that they did not furnish information to the state department of health, whereas seventeen do or would if radiation cases were reported.

Changes Suggested

On the whole, workmen's compensation administrators are satisfied with the coverage of radiation claims provided by the laws which they administer. Three administrators surveyed are not entirely satisfied; one feels a need for a change to cover radiation claims more precisely, another a need for amelioration in radiation injuries, and the other a need for expanded coverage. In three states the law was changed in 1967,⁴⁷ and in one other legislation is pending as of this writing.⁴⁸

In 1966, there was a major but unsuccessful Congressional legislative effort to improve the chances of a radiation injury claimant to recover, at least from a record keeping standpoint.⁴⁹ This measure would have attacked the problem of inadequate record keeping and would have assured an employee of documentary evidence of his cumulative exposure while working in the radiation industry, whether he worked for one

⁴⁶ Letter to the author from Duane S. Stookey, Supervisor of Industrial Insurance, State of Washington, June 15, 1967; letter to the author from T. A. Tinsley, Director, Bureau of Employees' Compensation, July 19, 1967.

⁴⁷ Nevada, North Dakota, Alabama. The North Dakota law was amended to cover impairment and effects from radiation fairly traceable to the employment. The changes in the laws of the remaining states were not specified.

⁴⁸ Georgia.

⁴⁹ H.R. 16920 and S.3722, A Bill to Amend the Atomic Energy Act of 1954, as amended, to authorize the AEC to provide financial assistance to states participating in a uniform system for persons engaged in occupations involving exposure to ionizing radiation, and for other purposes, introduced Aug. 9, 1966, 89th Cong., 2nd Sess.

or many employers. It would also have provided statistical data to aid in tracing the relationships of exposure to various diseases.⁵⁰

Certainly there can be improvements in the statutory coverage of radiation injuries, particularly in the areas of time limitations and benefits payable. Where latent diseases are involved, the period for filing a claim should commence to run when the employee knows of his disease and knows or should have known of its connection to his employment. Alternatives to this test, such as a period of years from the exposure or no time limitation are inequitable. The former bars many latent disability claims; the latter exposes the employer to unjustifiably stale claims.

Medical benefits should be extended to all effects of the job induced condition, regardless of how much money is spent or how long treatment continues. An employee should be able to receive compensation for any temporary total, temporary partial, or permanent radiation caused disability.

While considered here for the radiation claim, these suggested improvements could, however, be applied to compensation coverage generally in many states. This raises a question of whether the radiation injury is a major problem in workmen's compensation or only a novel type claim. This writer does not propose to draw any conclusions as the field is too new. Until adequate studies have been made to ascertain the long term effects of relatively low amounts of exposure, industrial radiation must be viewed at arm's length. Any studies, whether medical or statistical, which are reasonably designed to illuminate the question should be encouraged.

⁵⁰ See introductory remarks by Representative Melvin Price, Co-sponsor with Senator John O. Pastore, in Hearings, *op. cit. supra* note 15 at 1.