

INDIA'S MAJOR RADIATION INCIDENTS RESULTING INTO DEATH OR INJURY **(<http://www.johnstonsarchive.net/nuclear/radevents/index.html>)**

1. NEW DELHI, 1967

Date: May 1967

Location: Safdarjang Hospital, New Delhi, India

Type of event: Accidental exposure to source

Description: While replacing a Co-60 source in a teletherapy unit, an employee received a localized radiation exposure of about 800 rads to the hand while pushing the source into place. The employee noticed an immediate burning sensation but no other symptoms until 12 days later, when burning pain and itching developed. A blistering burn developed while the employee was hospitalized.

Consequences: 1 injury.

References: Bhushan, Vidya, Sept. 1973, "Large radiation exposure," *3rd IRPA Congress Proceedings*, on line, IRPA [http://www2000.irpa.net/irpa3/cdrom/VOL.3A/W3A_116.PDF].

Source: <http://www.johnstonsarchive.net/nuclear/radevents/1967INDA1.html>

2. INDIA X-RAY ACCIDENT, 1972

Date: July 1972

Location: India

Type of event: x-ray accident

Description: A worker using x-ray equipment discovered blisters on several fingers of the left hand in July 1972, which were determined to be the result of the worker's habit of holding a fluorescent screen strip to locate the x-ray beam. Estimated dose was 4,000-6,500 rad to the index finger and 1,000 rad to the middle and ring fingers.

Consequences: 1 injury.

References: Sundara Rao, I. S., P. S. Iyer, A. Kannan, S. P. Zapparde, and G. Subrahmanian, April 1977, "Radiation injury from analytical x-ray equipment," *4th IRPA Congress Proceedings*, on line, IRPA [http://www2000.irpa.net/irpa4/cdrom/VOL.3/P3_60.PDF].

Source: <http://www.johnstonsarchive.net/nuclear/radevents/1972INDA1.html>

3. INDIA X-RAY ACCIDENT, 1974

Date: 9 August 1974

Location: India

Type of event: x-ray accident

Description: A worker using an x-ray crystallography unit was exposed to the x-ray beam. After returning from a lunch break, he operated the unit for 15 minutes before realizing that one shutter was open, exposing his right forearm to the beam. A wound developed on the arm after 14 days which healed after 3 months, leaving a white scar. Dose was on the order of 8,000-12,000 rads to the skin or more.

Consequences: 1 injury.

References: Sundara Rao, I. S., P. S. Iyer, A. Kannan, S. P. Zapparde, and G. Subrahmanian, April 1977, "Radiation injury from analytical x-ray equipment," *4th IRPA Congress Proceedings*, on line, IRPA [http://www2000.irpa.net/irpa4/cdrom/VOL.3/P3_60.PDF].

Source: <http://www.johnstonsarchive.net/nuclear/radevents/1974INDA1.html>

4. VIKHROLI LOST SOURCE, 1982

Date: 1982

Location: Vikhroli, Bombay, India

Type of event: lost source

Description: An iridium-192 source was lost during transport. A railway worker found the source and suffered significant exposure, including a whole-body dose of 40 to 60 rad and localized skin exposure in the groin area of 150 to 3,500 rad, resulting in severe radiation burns in the pelvic region.

Consequences: 1 injury.

References: (1) Gangadharan, P. A. V. Lakshmipathy, B. K. S. Murthy, and Geetha Varadharajan, April 1988, "Assessment of radiation exposure to a non-radiation worker in an industrial radiography source transport accident," *7th IRPA Congress Proceedings*, on line, IRPA [http://www2000.irpa.net/irpa7/cdrom/VOL.2/S2_75.PDF]. (2) UNSCEAR, 2000, "Annex E: Occupational radiation exposures," in *Sources and Effects of Ionizing Radiation: United Nations Scientific Committee on the Effects of Atomic Radiation UNSCEAR 2000 Report to the General Assembly, with Scientific Annexes, Volume I: Sources*, UNSCEAR, on line at UNSCEAR [<http://www.unscear.org/docs/reports/annexe.pdf>].

Source: <http://www.johnstonsarchive.net/nuclear/radevents/1982INDA1.html>

5. MULUND, MAHARSTRA, 1983

Date: 1983

Location: Mulund, Bombay, India

Type of event: radiation accident

Description: Projector equipment with an iridium-192 source was operated by an untrained individual, resulting in dose of 2,000 rad to the skin and a whole-body dose of 60 rad. Radiation injury to the fingers required amputation of four fingers.

Consequences: 1 injury.

References: UNSCEAR, 2000, "Annex E: Occupational radiation exposures," in *Sources and Effects of Ionizing Radiation: United Nations Scientific Committee on the Effects of Atomic Radiation UNSCEAR 2000 Report to the General Assembly, with Scientific Annexes, Volume I: Sources*, UNSCEAR, on line at UNSCEAR [<http://www.unscear.org/docs/reports/annexe.pdf>].

Source: <http://www.johnstonsarchive.net/nuclear/radevents/1983INDA1.html>

6. VISAKHAPATNAM RADIOGRAPHY ACCIDENT, 1985

Date: 1985

Location: Visakhapatnam, India

Type of event: radiography accident

Description: Improper procedures and maintenance of a cobalt-60 radiography projector caused overexposures to two individuals. The operator received a skin doses of 1,000 to 2,000 rad, damaging the fingers of which one had to be amputated. Skin exposure to the assistant was 18 rad.

Consequences: 1 injury.

References: UNSCEAR, 2000, "Annex E: Occupational radiation exposures," in *Sources and Effects of Ionizing Radiation: United Nations Scientific Committee on the Effects of Atomic Radiation UNSCEAR 2000 Report to the General Assembly, with Scientific Annexes, Volume I: Sources*, UNSCEAR, on line at UNSCEAR [<http://www.unscear.org/docs/reports/annexe.pdf>].

Source: <http://www.johnstonsarchive.net/nuclear/radevents/1985INDA1.html>

7. YAMUANANAGER RADIOGRAPHY ACCIDENT, 1985

Date: 1985

Location: Yamuananager, India

Type of event: radiography accident

Description: Following a power failure, safety violations involving an iridium-192 radiography projector caused exposures of 800 to 2,000 rad to the hands of two operators. Each individual had to have two fingers amputated.

Consequences: 2 injuries.

References: UNSCEAR, 2000, "Annex E: Occupational radiation exposures," in *Sources and Effects of Ionizing Radiation: United Nations Scientific Committee on the Effects of Atomic Radiation UNSCEAR 2000 Report to the General Assembly, with Scientific Annexes, Volume I: Sources*, UNSCEAR, on line at UNSCEAR [<http://www.unscear.org/docs/reports/annexe.pdf>].

Source: <http://www.johnstonsarchive.net/nuclear/radevents/1985INDA2.html>

8. HAZIRA RADIOGRAPHY ACCIDENT, 1989

Date: 1989

Location: Hazira, Gujarat, India

Type of event: radiography accident

Description: Improper procedures and maintenance of an iridium-192 radiography projector caused overexposure to one worker, who received a whole-body dose of 65 rad and a localized dose to the fingers of 1,000 rad. Radiation burns on the fingers of both hands required amputation of the fingers.

Consequences: 1 injury.

References: UNSCEAR, 2000, "Annex E: Occupational radiation exposures," in *Sources and Effects of Ionizing Radiation: United Nations Scientific Committee on the Effects of Atomic Radiation UNSCEAR 2000 Report to the General Assembly, with Scientific Annexes, Volume I: Sources*, UNSCEAR, on line at UNSCEAR [<http://www.unscear.org/docs/reports/annexe.pdf>].

Source: <http://www.johnstonsarchive.net/nuclear/radevents/1989INDA1.html>

9. MAYAPURI ORPHANED SOURCE, 2010

Date: 12 March-April 2010

Location: Mayapuri, New Delhi, India

Type of event: lost source

Description: A cobalt-60 source at a scrap metal shop in Mayapuri caused radiation injuries to several individuals. The University of Delhi ordered a campus-wide "spring cleaning", during which a Gammacell 220 research irradiator unused since 1985 was identified for disposal. A campus committee of chemists concluded that the Gammacell's cobalt-60 source was "manageable", and the unit was auctioned on 26 February 2010 to a scrap metal dealer. The unit arrived at a scrap metal dealer in Mayapuri on or before 12 March. Sometime in March the owner cut off a piece of the source and gave it to another dealer who put it in his wallet. By late March the shop owner developed diarrhea followed by skin lesions; on 4 April the shop's owner was hospitalized with radiation sickness. Authorities found the source on 5 April. The dealer who had the sample developed local radiation injury on his buttock and later collapsed. By 14 April a total of seven individuals had been hospitalized with radiation injuries, with one more hospitalized and released. One individual, a 35-year-old male scrap metal worker, was transferred to another hospital on 13 April where he died on 26 April from multiple organ failure. Six individuals, including the owner of the first scrap dealer shop, remained hospitalized on 28 April at three hospitals; two individuals were in critical condition. Authorities recovered eight sources at the original shop, two at a nearby shop, and one from the dealer's wallet. Many of these were fragments of the original cobalt-60 source. Authorities also removed some contaminated soil. India's Atomic Energy Regulatory Board announced on 28 April having traced the origin of the source to the University of Delhi and additionally ordered the University to suspend use of radioactive sources, and by early May had launched an audit of Gammacell units in use at Indian universities. On 5 May the AERB stated that all material from the Gammacell unit was accounted for. Further cleanup of the scrap metal site in Mayapuri was conducted 15-16 May; several other hotspots at nearby sites are reportedly not hazardous.

Consequences: 1 fatality, 7 injuries

References: Atomic Energy Regulatory Board, 16 April 2010, "Incidents of radioactive material discovered in scrap dealers shops in New Delhi," *AERB*, on line [<http://www.aerb.gov.in/cgi-bin/prsrel/prsrel.asp?Mode=Prev&Istart=83>].

- Atomic Energy Regulatory Board, 28 April 2010, "Incident of radioactive material discovered in scrap dealers shops in New Delhi," *AERB*, on line [<http://www.aerb.gov.in/cgi-bin/prsrel/prsrel.asp?Mode=Prev&Istart=85>].
- Atomic Energy Regulatory Board, 5 May 2010, "Incident of radioactive material discovered in scrap dealers shops in New Delhi," *AERB*, on line [<http://www.aerb.gov.in/cgi-bin/prsrel/prsrel.asp?Mode=Prev&Istart=86>].
- Atomic Energy Regulatory Board, 18 May 2010, "Incident of radioactive material discovered in scrap dealers shops in New Delhi," *AERB*, on line [<http://www.aerb.gov.in/cgi-bin/prsrel/prsrel.asp>].
- Bagla, Pallava, 7 May 2010, "Radiation accident a 'wake-up call' for India's scientific community," *Science*, 328:679.
- Ghosh, Dwaipayan, 14 April 2010, "Another source of radiation in Mayapuri," *Times of India*, on line [<http://timesofindia.indiatimes.com/city/delhi/Another-source-of-radiation-in-Mayapuri/articleshow/5798907.cms>].

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- Yardley, Jim, 23 April 2010, "Scrap metal radiation raises concerns in India," *New York Times*, on line [<http://www.nytimes.com/2010/04/24/world/asia/24india.html>].

Source: <http://www.johnstonsarchive.net/nuclear/radevents/2010INDA1.html>