RADIOLOGICAL ACCIDENT IN YANANGO pdf

1: Yanango orphaned source,

In February a serious radiological accident occurred in Yanango, Peru, when a welder picked up an Ir industrial radiography source and put it in his pocket for several hours.

A B Stratofortress carrying two Mark 39 nuclear bombs broke up in mid-air, dropping its nuclear payload in the process. Eight fatalities and more than 30 people were over-exposed to radiation. The crisis is generally regarded as the moment in which the Cold War came closest to turning into a nuclear conflict [60] and is also the first documented instance of mutual assured destruction MAD being discussed as a determining factor in a major international arms agreement. Wood River Junction criticality accident. Resulted in 1 fatality , The KC was completely destroyed when its fuel load ignited, killing all four crew members. The BG broke apart, killing three of the seven crew members aboard. The non-nuclear explosives in two of the weapons detonated upon impact with the ground, resulting in the contamination of a 2-square-kilometer acre 0. The aircraft was carrying four hydrogen bombs when a cabin fire forced the crew to abandon the aircraft. Six crew members ejected safely, but one who did not have an ejection seat was killed while trying to bail out. The bomber crashed onto sea ice in Greenland , causing the nuclear payload to rupture and disperse, which resulted in widespread radioactive contamination. Soviet submarine K reactor near meltdown. One of the reactors started up automatically when the control rods were raised to a higher position. Power increased to 18 times its normal amount, while pressure and temperature levels in the reactor increased to four times the normal amount. The automatic start-up of the reactor was caused by the incorrect installation of the control rod electrical cables and by operator error. Radiation levels aboard the vessel deteriorated. Plutonium solution was poured into a cylindrical container with dangerous geometry. One person died, another took a high dose of radiation and radiation sickness, after which he had two legs and his right arm amputated. Lucens reactor in Switzerland undergoes partial core meltdown leading to massive radioactive contamination of a cavern. Columbus radiotherapy accident, 10 fatalities, 88 injuries from cobalt source. Anatoli Bugorski was working on U , the largest Soviet particle accelerator , when he accidentally exposed his head directly to the proton beam. He survived, despite suffering some long-term damage. Over 1, tons of radioactive mill waste and millions of gallons of mine effluent flowed into the Puerco River , and contaminants traveled downstream. In , a small capsule containing highly radioactive caesium was found inside the concrete wall of an apartment building. The accident was detected only after the residents called in a health physicist. Houston radiotherapy accident, 7 fatalities. Radiation accident in Morocco , eight fatalities from overexposure to radiation from a lost iridium source. Fernald Feed Materials Production Center gained notoriety when it was learned that the plant was releasing millions of pounds of uranium dust into the atmosphere, causing major radioactive contamination of the surrounding areas. Eventually, his remains were discovered inside a uranium processing furnace located in Plant 6. Soviet submarine K accident. Ten fatalities and 49 other people suffered radiation injuries. Soviet submarine K reactor almost had a meltdown. Sergei Preminin died after he manually lowered the control rods, and stopped the explosion. The submarine sank three days later. Four fatalities, and following radiological screening of more than , people, it was ascertained that people received serious radiation contamination from exposure to caesium All the objects from within those houses were removed and examined. San Salvador, El Salvador; one fatality due to violation of safety rules at cobalt irradiation facility. Soreq, Israel; one fatality due to violation of safety rules at cobalt irradiation facility. Eleven fatalities and 27 other patients were injured. Neswizh, Belarus; one fatality due to violation of safety rules at cobalt irradiation facility. Jilin, China; three fatalities at cobalt irradiation facility. The explosion released a cloud of radioactive gas. Tammiku, Estonia; one fatality from disposed caesium source. Radiotherapy accident in Costa Rica. Thirteen fatalities and other patients received an overdose of radiation. Harold Daniels and several others die from cancers and radiation burns related to the exposure. Sarov, Russia; one fatality due to violation of safety rules. The Acerinox accident was an incident of radioactive contamination in Southern Spain. A caesium source managed to pass through the monitoring equipment in an Acerinox scrap metal reprocessing plant. When melted, the caesium caused the release of a radioactive cloud. Samut Prakan radiation accident: Meet

Halfa, Egypt; two fatalities due to radiography accident. Instituto Oncologico Nacional of Panama, 17 fatalities. Patients receiving treatment for prostate cancer and cancer of the cervix receive lethal doses of radiation. Mihama Nuclear Power Plant accident, 4 fatalities. Hot water and steam leaked from a broken pipe not actually a radiation accident. Mayapuri radiological accident , India, one fatality after a cobalt research irradiator was sold to a scrap metal dealer and dismantled. Thirteen of these tested positive for internal radioactive contamination increasing their risk for future cancers or health issues. A second leak at the plant occurred shortly after the first, releasing plutonium and other radiotoxins causing concern to nearby communities. The source of the drum rupture has been traced to the use of organic kitty litter at the WCRRF packaging facility at Los Alamos National Laboratory, where the drum was packaged and prepared for shipment. Between 16 July and 23 September , the United States maintained a program of vigorous nuclear testing , with the exception of a moratorium between November and September By official count, a total of 1, nuclear tests and two nuclear attacks were conducted, with over of them taking place at sites in the Pacific Ocean , over of them at the Nevada Test Site , and ten on miscellaneous sites in the United States Alaska , Colorado , Mississippi , and New Mexico. Estimating exact numbers, and the exact consequences, of people exposed has been medically very difficult, with the exception of the high exposures of Marshall Islanders and Japanese fishers in the case of the Castle Bravo incident in A number of groups of U. The passage of the Radiation Exposure Compensation Act of allowed for a systematic filing of compensation claims in relation to testing as well as those employed at nuclear weapons facilities. Scenes such as this were typical during the s. From to the government conducted atmospheric tests at the nearby Nevada Test Site. This handbill was distributed 16 days before the first nuclear device was detonated at the Nevada Test Site. Trafficking and thefts[edit] See also: Vulnerability of nuclear plants to attack The International Atomic Energy Agency says there is "a persistent problem with the illicit trafficking in nuclear and other radioactive materials, thefts, losses and other unauthorized activities". The burglars escaped without acquiring any of the uranium held at the facility.

2: Reported Radiation Overexposure Accidents Worldwide, A Systematic Review

CIRCUMSTANCES OF THE ACCIDENT RADIATION PROTECTION INFRASTRUCTURE IN PERU The national authority responsible for regulating radiation safety in Peru is the Institute Peruano de Energia Nuclear (IPEN). There are almost authorized users of radiation sources in the country, 70% of which use medical diagnostic X ray equipment.

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3: The radiological accident in Yanango | National Library of Australia

THE RADIOLOGICAL ACCIDENT IN YANANGO INTERNATIONAL ATOMIC ENERGY AGENCY VIENNA, VIC Library Cataloguing in Publication Data The radiological accident in Yanango. â€" Vienna: International Atomic Energy Agency, p.: 24 cm. STI/PUB/ ISBN Includes bibliographical references. 1.

All relevant data are referenced in Table 1 of the paper. Abstract Background Radiation overexposure accidents are rare but can have severe long-term health consequences. Although underreporting can be an issue, some extensive literature reviews of reported radiation overexposures have been performed and constitute a sound basis for conclusions on general trends. Building further on this work, we performed a systematic review that completes previous reviews and provides new information on characteristics and trends of reported radiation accidents. We retrieved the reported overexposure cases, systematically extracted selected information, and performed a descriptive analysis. From these, reported radiation accidents were retrieved, involving overexposed people, of whom died from their overexposure. The number of reported cases has decreased for all types of radiation use, but the medical one. Additionally, the types of reported accidents differed significantly across regions. Conclusions This review provides an updated and broader view of reported radiation overexposures. It suggests an overall decline in reported radiation overexposures over The greatest share of reported overexposures occurred in the medical fields using radiation therapy and fluoroscopy; this larger number of reported overexposures accidents indicates the potential need for enhanced quality assurance programs. Our data also highlights variations in characteristics of reported accidents by region. The main limitation of this study is the likely underreporting of radiation overexposures. Ensuring a comprehensive monitoring and reporting of radiation overexposures is paramount to inform and tailor prevention interventions to local needs. Introduction Radiation overexposure accidents are uncommon, but can have severe long-term health consequences. Radiation is used in various settings. Major sectors include industrial, medical, and military. Some key applications are electricity production, sterilization of material equipment or food, development of nuclear weapons, radiography imaging techniques for welds inspection, radiation therapy, and radiology imaging techniques e. X-ray radiography, fluoroscopy, computed tomography. These last decades, the medical sector in particular experienced a fast growth in the use of ionizing radiation that allowed better diagnostics and treatments [1 â€" 2]. In order to guide all facets of prevention, it is critical to understand the reasons and events behind radiation overexposures. Radiation-related harms have been reported over the years in all sectors, along with those resulting from orphan sources. Harmful effects of radiation overexposure include deterministic effects e. These effects can take from weeks to years to manifest, with severity depending upon multiple parameters including the total radiation absorbed dose, the radiation dose rate, the volume of body exposed, the parts of the body and tissues involved, the radiation source at stake, as well as personal characteristics of overexposed people e. Furthermore, local and global overexposures to the body translate into different health outcomes and therefore different treatment needs. Global overexposure of 1 Gray Gy or above induces acute radiation syndrome ARS characterized by consecutive hematopoietic, gastrointestinal, and neurovascular syndromes [3]. Local skin overexposures of 3 Gy or more are likely to lead to acute local radiation injuries LRI , which may be associated with extreme pain. Local organ overexposures of typically 2â€"8 Gy are likely to result in organ dysfunction e. In addition, this type of injuries often progresses over time due to inflammatory waves, inducing the spread of radionecrosis, and requires long-term treatment [5]. In order to decrease the risk of harm associated with ionizing radiation, its use is often regulated at the country level. They evaluate radiation risks, provide recommendations, and promote safe use of radiation technologies, which evolve rapidly and gain in complexity. Yet, in an era where resources are scarce, it is essential to identify the most pressing issues in order to better target prevention actions such as training, which can lead to dramatic improvements in the safe use of radiation [6]. Several non-systematic reviews of radiation overexposure accidents have been published in the literature. The UNSCEAR organization performed the most extensive review, which it considers "a sound basis for conclusions regarding the number of significant radiation accidents that have occurred, the corresponding levels of radiation exposures and number of deaths and injuries, and the general trends for various practices", despite unavoidable underreporting [7]. Additionally, several voluntary registries of radiation overexposures have been developed. Other registries focus only on the medical sector. Our objective was to evaluate the impact of past prevention programs and potential remaining needs for prevention planning. In this report, we present the search strategy and results of our review, and a descriptive analysis of the retrieved radiation overexposure accidents. For the purposes of this review, we elected to use the IAEA definition of accident, which is "Any unintended event, including operating errors, equipment failures or other mishaps, the consequences or potential consequences of which are not negligible from the point of view of protection or safety" [11]. Our study focused on radiation accidents resulting in one or several people overexposed and meeting our inclusion and exclusion criteria. A second keyword search in titles was performed as follows: The third search was based on the following Mesh terms: Reference titles and summaries were screened manually and discarded if not relevant. Selected publications were read in full text for data extraction. Cross-referencing was used to retrieve additional relevant articles. Full reports were read for retrieved cases and extracted if relevant. Inclusion and exclusion criteria A case of radiation overexposure was defined as presenting at least one of the following criteria: The thresholds used in this review are based on the literature, keeping in mind that these thresholds are not absolute boundaries [3], [4], [12 â€" 18]. Cases that met none of these criteria were excluded, as were suicide and criminal acts. For cases without occurrence date, we used date of first symptoms as first proxy and date of report as second proxy. Finally, similar cases issued from different reports but with insufficient information to decipher whether they were different or not, were not integrated in the database to prevent duplicates. Selection process Two independent researchers screened and reviewed data sources against the inclusion criteria. For selected reports, full-text documents were evaluated and extracted manually by one reviewer and double-checked by a second reviewer. Any divergence between reviewers regarding selection process was resolved through discussion. Extracted data items For each accident, select information was extracted into a data sheet. Selected data included date and place of occurrence, number of overexposed people and number of people dying from their overexposure, days between exposure and death, type of overexposed people i. Reported symptoms, course of treatment, and treatment outcomes were also recorded when available. Finally, accidents were categorized by sector of occurrence: A category "others" included overexposure accidents resulting from scientific experiments and unknown causes. For cases with incomplete information, missing data were reported as unknown in our extraction sheet. Quality of selected articles and reports Only cases published in peer-reviewed journals or reported by official experts in radiation management e. Furthermore, all sources selected for data extraction addressed our review question, which was to understand the characteristics of reported radiation overexposure accidents worldwide and their evolution between and Among these, only sources showing evidence of radiation overexposure, as defined in our inclusion criteria, were considered for extraction. Analysis Our extraction sheet was used to assess the distribution of reported radiation overexposure accidents along recorded items and over time. Results Study selection process Out of articles and reports identified, met our eligibility criteria and were extracted Fig.

4: Radiation accidents and other events causing radiation casualties--tabulated data

In February a serious radiological accident occurred in Yanango, Peru, when a welder picked up an iridium industrial radiography source and put it in his pocket for several hours.

Share1 Shares Radioactivity, especially radioactivity used in cancer treatment and diagnostic testing, saves the lives of thousands of people every year. However, radiation is also deadly to humans when not handled properly. Large accidents and disasters, like the Chernobyl nuclear reactor explosion and the Fukushima Japan nuclear power plant catastrophe, get the headlines and, justifiably, make the public nervous about the use of radioactive fuel to generate electricity in nuclear power plants. However, less commonly reported are small incidents where several people, maybe dozens, are exposed. In some cases, a few of these people die as a result of accidental exposure to high radiation levels. Tragically, many of these incidents though not all occur in underdeveloped countries, through the recycling and sale of scrap metal. Others are related to industrial accidents, and even medical treatment errors. But all have the potential to expose unsuspecting individuals to radiation. Listed in chronological order, here are ten more examples of tragedies involving radioactive materials that resulted in death. On December 6, , a used metal teletherapy unit pictured containing a source container with about 6,, one-millimeter pellets, each with radioactive cobalt 60, was deliberately opened in a scrap yard in Ciudad Juarez, Mexico. The pellets were scattered throughout the scrap yard, and a magnetic loader further dispersed the radioactive pellets, when the scrap metal was converted to steel products on December 10, Contaminated products included steel rebar and table pedestals, manufactured from the contaminated steel and shipped to the US. The contamination went undetected until January 16, , when a truck carrying the contaminated rebar took a wrong turn at the Los Alamos, New Mexico, scientific laboratory and set off an automatic radiation sensor. Later that same day, five more trucks carrying contaminated steel were stopped at the Mexican border, near El Paso, Texas. Over the following weeks, about tons of contaminated steel were identified and recovered in the US. Some of the contaminated table parts had already been made into finished tables and had to be retrieved from restaurants. In February, , Mexican officials determined that ten individuals had been exposed to high levels of radiation. One of these subsequently died from their injuries. An aerial survey of the Ciudad Juarez area in March of that year, located 21 contaminated zones including a pickup truck with children playing on it. In Sinola, Mexico, authorities had to destroy homes that had been built with the contaminated rebar. This time the orphaned source was an iridium source. Many individuals received significant overdoses of radiation that required medical attention, and eight people died. The source was used to radiograph welds â€" a non destructive analysis where ionizing radiation is used to look for defects in the metal that cannot be seen any other way. The source became separated from the shielded container used to store it, and the source itself had no markings indicating it was radioactive. Somehow, a worker found the source and took it home, where it stayed for some weeks, exposing the family to radiation. Over time, the radioactive source was handled by multiple people, and led to the exposure to high levels of radiation of at least people. Twenty of those showed sign of radiation exposure and needed hospital treatment. At least four people died. This time it was a cesium source, which had been left behind when a private radiotherapy institute moved to a new location. Left unsecured for two years, it was eventually located by scrap hunters scavenging for metal. Not knowing what they had, the scavengers took the unit home, tried to open it and in the process, damaged the cesium source. This led to the contamination of hundreds of people as well as the environment, which resulted in a six-month radiation clean up. More than , people ended up being monitored for radiation as a result. One such use is sterilization of medical instruments, and even food products. A high energy cobalt radioactive source was being used at just such a plant in Soreq, Israel, in June, , when the source used in the irradiation process became stuck in its rack. Two conflicting warning signs were provided to the operator of the irradiation machine, which may have confused him. He bypassed the safety systems designed to prevent an operator from being exposed, and came up with procedures so that he could enter the irradiation room and free the blockage. As a result, the operator entered the room and was, himself, irradiated. He was exposed to high levels of radiation and died only a month later. Tragically, this was not the first, nor would it be the last incident involving a source which had become stuck in such a facility. In February, , in San Salvador, El Salvador, a cobalt source became stuck and again, workers bypassed safety systems and entered the irradiation room. This time, three men went into the room to free the stuck source. In the process, all three received high doses of radiation. The legs and feet of two of the men were so burned by the radiation that they had to be amputated. The third man died six months later. In October, , in Nesvizh, Belarus, a cobalt source became jammed in the product transport system and the operator entered the facility to clear the blockage, once again, bypassing several safety systems. The source became active for about one minute and the operator was exposed to high levels of radiation as a result. He was taken for special medical treatment in Minsk, Russia, but died days later. On December 7, , maintenance was performed on the electron accelerator used to treat cancer patients at the clinic. The unit was started again the following day, December The Spanish Nuclear Safety Board inspected the unit, and found the power of the electron accelerator was set too high, and it was taken out of service on December 20, But, by then, many patients had been exposed to higher than expected, and unsafe, levels of radiation. The affected patients immediately suffered skin burns and effects to internal organs and their bone marrow. The first patient died on February 16, The last fatality occurred on December 25, The 14 year old instrument had a breakdown in the electron beam accelerator control system. The service man who repaired the instrument incorrectly increased output power, so patients that should have received therapy at 7 million electron volts MeV were instead treated at 40 MeV. The hospital manager blamed the technician, and the Spanish Health Minister blamed GE, the manufacturer of the instrument. After a court hearing, the technician and GE were found to be at fault. The device was taken out of service and disposed of, in While undergoing treatment, a 3. The error went unnoticed because the staff did not conduct routine inventory checks of all radioactive sources. The patient died 93 hours later, at her nursing home, from exposure to radiation from the source. The catheter containing the source was removed from the woman and disposed of as normal medical waste. The waste disposal company discovered the radioactive source during routine checks for radioisotopes. The subsequent Nuclear Regulatory Commission NRC investigation found that 94 individuals at the center, the nursing home and the waste disposal company had been exposed to radiation. They had no authorization to enter this facility. Inside they found a metal container and removed it from the facility. Inside the metal container was a radioactive source. They were able to open the container and expose themselves to the radiation from the source. The radiation exposure killed one of the three brothers, and led to the exposure of many others. However, upon examining the radiation injuries of another family member, a physician realized they were all related to radioactivity. The physician alerted authorities who were able to contain the damage from being worse than it otherwise would have been. An error was made in calculating the dose rate when the instrument was restarted. Before the error was caught in September, , patients who had been treated using the instrument had been exposed to significantly higher levels of radiation than expected. By July, , nine months after the accident, 42 of those patients had died. All of the patients showed classic signs and symptoms of over exposure to radiation. The tele therapy unit has a source holder and shield made from lead, and surrounded by stainless steel. It weighed about pounds. In the center of the holder was the cobalt source. The tele therapy unit had been taken out of service by the hospital many years previously, and had been in storage, along with several other pieces of radioactive machinery, in another location. Eventually, three of these units were moved to a garage and it was there that the one tele therapy unit was stolen for sale as scrap metal. On January 24, , two men purchased the tele therapy unit as scrap metal, and drove it through Bangkok to their home. On February 1, , these two men, along with a third man, tried to pry apart the unit but were unsuccessful. They then gave up and decided to take the unit to a scrap yard. While there, one of the men sitting in the car draped his one leg over the unit. At the scrap yard, the men asked the scrap yard employee to use a torch to cut open the unit, which he did. A second employee of this scrap yard was positioned behind the employee who used the torch to cut thorough the stainless steel box and lead cylinder. A yellow, foul smelling smoke came from the unit and two pieces fell out onto the ground. The man with the torch picked them up. The female owner of the scrap yard came out and ordered the men to take the unit back to their house, and continue working on it there. They put the, now cut open, tele therapy unit back into their car and drove back home. Though they began to feel sick and nauseous, they did manage to finally separate the stainless steel and lead assemblies, and returned with them to the scrap yard the next day. In total, the four men who had obtained the tele therapy unit, and six people at the scrap yard, including the man who cut it open with a torch, the man working beside him, the female owner, her husband and two others were exposed to high levels of radiation. By mid February all had developed signs of radiation sickness, and had been admitted to hospitals. The treating physician noticed the people were suffering from apparent radiation exposure, and contacted Thailand authorities who dispatched two health physicists to investigate. Using a radiation meter and driving through the area near the scrap yard, the eventually noticed higher than normal radiation levels and determined the location of the radioactive source. Unfortunately, the source was buried in amongst tons of other scrap metal. Authorities then spent many days carefully removing pieces of scrap metal until they were finally able to locate the actual source and safely remove it.

5: Nuclear and radiation accidents and incidents - Wikipedia

Note: Citations are based on reference standards. However, formatting rules can vary widely between applications and fields of interest or study. The specific requirements or preferences of your reviewing publisher, classroom teacher, institution or organization should be applied.

6: 10 More Cases of Deadly Radioactive Exposure - Listverse

the radiological accident in yanango On February 20, , a radiological accident occurred in Yanango, Peru. A worker on a hydroelectric construction site picked up, with his right hand, an unshielded radioactive sealed source of iridium (Ir) used for industrial radiography.

7: THE RADIOLOGICAL ACCIDENT IN YANANGO INTERNATIONAL ATOMIC ENERGY AGENCY | eBay

The Radiological Accident in Yanango. In February a serious radiological accident occurred in Yanango, Peru, when a welder picked up an Ir industrial radiography source and put it in his pocket for several hours. This action resulted in his receiving a high radiation dose that necessitated the amputation of one leg.

8: The radiological accident in Yanango - International Atomic Energy Agency - Google Books

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