

REPORTED INCIDENTS NOT RESULTING IN ENVIRONMENTAL RELEASE

BUILDING 4020

- On August 26, 1959, a personnel injury occurred at Building 4020. During routine entry into Cell #3, an employee was struck across the hands by a heavy steel ramp that dropped suddenly when the cell door opened. At the time of the injury, the employee was holding a Juno survey meter in each hand to monitor the radiation levels at the doorway. The employee was assisted to the hot change room and all protective clothing was removed. The employee was surveyed and no significant contamination was detected. The employee was taken to the plant hospital at Rocketdyne in Canoga Park. Hospital smears near the wounds also found no significant contamination. The incident report does not indicate what constitutes a significant amount of contamination (Incident Report A0002).¹
- On April 16, 1960, two employees entered Decontamination Room (Decon) #4 to perform decontamination of the cut-off saw assembly, which has been used to cut irradiated sodium reactor experiment (SRE) fuel slugs. These employees were in violation of the 300 millirem (mrem) exposure limits for one week (Incident Report A0392).²
- On April 18, 1960, an employee in Decon #3 called another employee over to the area and asked if he felt brave, then placed an unknown object in his hand. The employee holding the small cylindrical object approximately 2.5 inches long and 0.75 inches in diameter quickly saw that the object was stamped E-2, indicating a batch of SRE fuel slugs. The employee immediately tossed the SRE slug into the airlock. The slug was picked up with 6-foot tongs and placed in a can filled with lead shot. The slug measured 25 R/hr at 10 inches and 25 RAD/hr at 21 inches (Roentgens per hour is generally defined as R/hr and rads per hour is generally defined as rad/hr; units may be incorrectly presented in the source document). Another employee took the can containing the slug into Decon #4. By this time, the employees in the service gallery and connected to the operation were going to the hot change room to change out of contaminated clothing and go to lunch. The incident was reported to the health physics department (Incident Report A0003).³
- On May 12, 1961, a lead shipping cask containing 9,500 Curies (Ci) of fission products was placed on a flat rail car for transport into the airlock when it was observed that the rails to the moveable dock had not been secured to either the dock or floor of the airlock. Operating personnel were requested to hold up the operation until the rails were aligned and bolted down, but the car was already moving and it ran off the rails and tilted to one

¹ Bold, F.O. Atomics International Internal Letter, *Re: Personnel Injury at CDHC Building 20, Santa Susana*, September 29, 1959.

² Health Physics, Atomics International, *Notice of Radiological or Industrial Safety Rule Infraction*, April 22, 1960.

³ Clow, H.E., Atomics International Internal letter, *Re: Radiological Safety Incident Report, Cell #3 CDHC Bldg. #20, 4/18/60*, June 1, 1960.

side. A corner of the car caught the edge of the dock and stopped leaving the cask at a 15 degree angle. A fork lift was brought in to remove the cask from the car and place it on the ground. No radiological exposure resulted from the incident (Incident Report A0011).¹

- On May 21, 1961, two employees were transferring radioactive waste in Building 4020 when a dust was observed being generated from the transfer operation. The operation was discontinued and the men were taken to the change room for monitoring. One employee was found to have approximately 1,500 counts per minute (cpm) of beta-gamma contamination on his forehead. The other employee had approximately 1,100 cpm beta-gamma contamination on his pants. One employee had a nasal smear of 850 cpm beta-gamma contamination. A health and safety representative noted that the men were only wearing lab coats and shoe covers, not the appropriate protective clothing for operations (Incident Reports A0347 and A0505).^{2,3}
- On June 2, 1961, an employee doing routine work in Decon #3 pinched a flexible supplied air hose to his supplied air mask causing the hose to explode. The employee immediately stopped breathing and moved to the clean door where he removed his mask, put on an assault mask and waited for an additional supplied air mask and hose. A nasal smear indicated no significant contamination of mixed fission products (Incident Report A0283).⁴
- On June 19, 1961, personnel entered Decon #2 prior to entering Cell #2 to repair a balance in the cell. The door to Cell #2 was being opened when a front side operator controlling the door opening noticed two Systems for Nuclear Auxiliary Power (SNAP) Experimental Reactor (SER) fuel elements lying on the floor and ordered the door closed. An unknown radiation field from the two SER fuel elements was estimated at approximately 1,500 rads/hr at 1 foot. No first air or health physics sampling was required for the employees entering the cell. The incident report called for a more thorough examination of cells prior to entering and recommended a remote area monitoring system to monitor cells before actually entering them (Incident Report A0012).⁵
- On September 4, 1962, the repair of a copper inlet line between the fission gas sampling apparatus and Cell #3 caused high airborne activity, resulting in the contamination of personnel and the lab. A routine radiation survey taken on August 31, 1962 revealed

¹ Badger, F.N., Atomics International Internal Letter, *Re: Radiological Safety Incident Report, CDHC Bldg. 020, May 12, 1961*. May 15, 1961.

² Yarrow, A.R., Atomics International Internal Letter, *Re: Radiological Safety Incident Report, Building Number 20, 5-20-1961*, May 26, 1961. (Corrects incident date from May 20, 1961 to May 21, 1961)

³ Yarrow, A.R., Atomics International Internal Letter, *Re: Radiological Safety Incident Report, Building Number 20, 5-20-1961*, May 26, 1961. (It is unclear why this incident has two different reports and report numbers associated with it.)

⁴ Badger, F.H., Atomics International Internal Letter *Re: Radiological Safety Incident Report, CDHC Decontamination Cell #3, June 2, 1961*. June 15, 1961.

⁵ Clow, H.E., Atomics International Internal Letter, *Re: Radiological Safety Incident Report, DeCon #2 & Cell #2 at CDHC, 6-19-1961*. June 21, 1961.

excessive contamination building up inside the copper line. Radiation levels reached a maximum of 1.5 r/hr (units may be incorrectly presented in the source document). The copper line was removed and placed in a plastic bag and a new line was installed. Health and Safety was called to smear the area. During this operation, the Health and Safety representative found his hands and shoes contaminated and an air monitor recorded an increase in airborne activity from 250 curies per meter (Ci/m) to 1000 Ci/m.

Personnel were evacuated from the operating gallery and an air sample was taken with a portable sampler. Airborne activity was found to be 5.4×10^{-10} $\mu\text{C}/\text{cc}$ beta-gamma. A smear survey revealed floor contamination averaging 10,000 dpm/100 cm^2 , with a maximum of 130,000 dpm/100 cm^2 beta-gamma. Smears of desks, benches, and other horizontal surfaces revealed removable contamination of 15,000 dpm/ cm^2 beta-gamma. The floors of the office areas, rest rooms, and mock-up shop were found contaminated to a maximum level of 1,000 dpm/100 cm^2 beta-gamma, presumably as a result of tracking from the operating gallery.

Smears of the removed copper tube and its plastic bag showed contamination of 140,000 dpm/100 cm^2 beta-gamma inside the bag, 20,000 dpm/100 cm^2 beta-gamma on the tube surface, and 2,000 dpm/100 cm^2 beta-gamma on the exterior bag surface. Radiation levels of 25 rad/hr were found at the open end of the copper tube. The copper tube contained sufficient contamination to cause the levels found on the floor and other surfaces, but it was considered an unlikely source for such widespread contamination. It was also hypothesized that at the time the copper tube was being removed Cell #3 was being purged leading to contamination of the operating gallery. Operations at all cells were suspended until the complete area was decontaminated to "permissible levels." The incident report does not define "permissible levels" (Incident Report A0018).¹

- On December 15, 1962, a worker found contamination on his shoes during a visit to Building 4020. The surface dose rate on the worker's shoes was 20 mrad/hr and the activity on a smear sample was 10^5 dpm/100 cm^2 beta-gamma. Floor smear surveys were conducted in areas visited by the worker. Beta-gamma measurements were found as follows: Health and Safety Office (100 dpm/100 cm^2); Engineering Office (200 dpm/100 cm^2); Supervisors Office (90 dpm/100 cm^2); Operating Gallery (~30 to 400 dpm/100 cm^2); Cold Change Room (2,000 dpm/100 cm^2); Men's Restroom (200 dpm/100 cm^2); and hallways connecting these locations (~200 dpm/100 cm^2). Smears taken from the shoes of other personnel were found to have contamination ranging from 30 dpm/100 cm^2 to 1,200 dpm/100 cm^2 . It was not clear where the contamination originated. The entire building was monitored with a portable survey meter and no contamination levels as high as 20 mrad/hr were found (Incident Report A0020).²
- On January 25, 1963, an employee was monitoring Cell #3 and tore open his right glove with a pair of cutters. The employee found his hand and shoes contaminated. After an

¹ Hanseon, W.D., Atomics International Internal Letter, *Re: Contamination Incident at the CDHC*, October 26, 1962.

² Bergstrom, W.H., Atomics International Internal Letter, *Re: Incident Report CDHC*, January 17, 1963.

hour and a half of repeated scrubbing in the “hot shower” with scouring powder and permanganate treatment the contamination was eliminated. The employee’s shoes could not be decontaminated and read 10 mrad/hr beta-gamma when disposed (Incident Report A0021).¹

- On May 8, 1963, two janitors waxing the mock-up area floor dragged a mop through a highly contaminated trough by the side door of Cell #4 and then used the mop to wax the remainder of the floor, spreading mixed fission product contamination throughout the mock-up area. Upon departing the area, the janitors checked themselves in the hand and foot counter and found that their shoes were contaminated to as high as 1 mrad/hr beta-gamma. A hot spot of 5 mrad/hr beta-gamma was identified on the mock-up room floor near the side door of Cell #4. A smear survey of the floor revealed contamination ranging from less than 30 dpm/100 cm² to 90,000 dpm/100 cm² beta-gamma. The floor wax appeared to have semi-fixed the contamination. Personnel were notified and the mock-up area was roped off and tagged. Measurement taken two days later indicated that the floor contamination had dissipated and the area could be reclassified as non-tagged (Incident Report A0433).²
- On September 26, 1963, a fire occurred in the doorway between Decon #3 and Cell #3 during the cleaning of the fission gas rig with butyl alcohol. The fire was apparently caused by residue of NaK in the fission gas rig that reacted with the alcohol. The fire lasted 2 minutes and was extinguished with calcium carbonate. No injuries occurred and no increases in airborne contamination were found (Incident Report A0024).³
- On September 26, 1963, an employee emerged from Cell #3 after conducting cell cleanup and found his dosimeter was off scale. The contamination was thought to have been the result of contact with a drip pan in the cell. A survey of the pan showed a dose rate of 3 rad/hr at surface and 25 rad/hr at 1 ft. The employee’s film badge showed an uncorrected dose of 295 mrem (Incident Report A0025).⁴
- On October 9, 1963, it was discovered that a fire occurred in Cell #2 during the night. Investigation found the furnace in Cell #2 had been left on without any controlling thermocouples. The temperature of the furnace could have reached 2,300 degrees Fahrenheit. Approximately 100 ft² of blotter paper, which is used as a floor covering in the cell, was burned. A check of the stack monitor and the operating gallery showed no increase above normal activity for the preceding 24 hour period. Spot smears of the floor, cell face, and equipment in the operating gallery were all 30 dpm/100 cm². The incident report notes this is the third fire in the last three weeks at Building 402 0 and

¹ Bergstrom, W.H., Atomics International Internal Letter, *Re: Contamination Incident at CDHC*, February 12, 1963.

² Lane, W.B., Atomics International Internal Letter, *Re: Radiological Safety Incident Report, Mock Up, CDHC, Room 125, May 8, 1963*. May 13, 1963.

³ Lane, W.D. and D. Tworek, Atomics International Internal Letter, *Re: Radiological Safety Incident Report, CDHC, 9/26/63*. Undated.

⁴ Tworek, D. and W. Lane, Atomics International Internal Letter, *Re: Radiological Safety Incident Report, Building 020 CDHC, 9/26/63*. Undated.

suggests the lead man should make a thorough check of all equipment before leaving the facility (Incident Report A0026).¹

- On March 20, 1964, the door of Cell #4 was opened at the same time a nitrogen purge and “UC” (presumably uranium carbide) fuel cutting occurred in Cell #3, resulting in increased airborne beta-gamma activity. The maximum airborne concentration was 5×10^{-9} $\mu\text{Ci/cc}$ with no smearable detectable contamination above limits. The incident report does not note what the contamination limits were (Incident Report A0031).²
- On June 8, 1964, an employee repairing in-cell hacksaws without authorization and proper protection was contaminated. The hacksaws had a maximum of 2.5 rad/hr mixed fission product contamination. Smearable contamination on tools was as high as 2×10^{-5} dpm/100 cm^2 beta-gamma. The employee was surveyed and decontaminated in the hot shower (Incident Report A0551).³
- On June 16, 1964, a Piqua fuel element in Cell # 3 was repositioned in the cell such that the element was in line with the cell manipulator port opening and north operating gallery probe. Because there is no shielding at the port opening, excessive radiation streamed through the port. A radiation survey found contamination levels at the port opening to be 1,000 mr/hr (units may be incorrectly presented in the source document). All future operations involving the movement of high level radiation sources were to be scrutinized to prevent a recurrence of this type of incident (Incident Report A0443).⁴
- On July 10, 1964, the health physics department observed that the Decon #3 doors, the service gallery doors, and the airlock outer doors were all in the open position during loading of a cask into the airlock. This situation allows for a potential spread of contamination to clean areas. A smear survey of the outside area failed to detect any contamination. The incident report notes that this problem had occurred during similar operations in the past and is mostly due to negligence. A modification of the airlock door latching devices was expected to minimize recurrence (Incident Report A0338).⁵
- On July 23, 1964, an employee cleaning Cell #4 inadvertently contacted wet spots on the false flooring where mixed fission products up to 25 rad/hr contaminated his knees to a maximum of 0.3 mrad/hr and 270 dpm/100 cm^2 beta-gamma. Loose contamination was removed and the employee was released to the medical department for further treatment.

¹ Tworek, D.D and W. Lane, Atomics International Internal Letter, *Re: Radiological Safety Incident Report, CDHC Cell #2, 10/8/63-10/9/63*. October 17, 1963.

² Ericson, G.I. and W. Lane, Atomics International Internal Letter, *Re: Increased Airborne Activity at Building 020*. April 2, 1964.

³ Ericson, G. and W. Lane, Atomics International Internal Letter, *Re: Incident Report, Yellow Tag Manipulator Repair Room, Bldg. 20, June 8, 1964*. June 11, 1964.

⁴ Ericson G. and W. lane, Atomics International Internal Letter, *Re: Incident Report, CDHC Cell #3 and Operating Gallery, 6-16-64*. June 24, 1964.

⁵ Ericson, G. I., Atomics International Internal Letter, *Re: Incident Report, CDHC Airlock Service Gallery and Decon #3, 7-10-64*. July 20, 1964.

Recommendations include wearing knee pads during cleanup and using clean plastic sheeting on the floor where personnel are working (Incident Report A0554).¹

- On August 27, 1964, an alarm in the operating gallery went off when the air activity increased to 2.5×10^3 cpm with normal background levels at 500 cpm. The operating gallery was evacuated. Ten minutes air samples showed air activity gradually decreasing from 3.8×10^{-9} $\mu\text{Ci/cc}$ to 3.6×10^{-10} $\mu\text{Ci/cc}$. The release was attributed to loss of an airborne controller in Cell #3 used during purging of the cell. The controller was replaced (Incident Report A0354).²
- On September 3, 1964, an employee surveyed his work area in Cell #1 and found a vacuum cleaner hose was reading 25 rad/hr gamma. A front side man moved the vacuum cleaner to a far corner of the cell and the in-cell man began work. The in-cell employee later discovered that the polishing cloth he was using read 25 rad/hr gamma and the vacuum cleaner was only 10 rad/hr. The employee had failed to resurvey the work area after the vacuum cleaner was moved. The employee received 270 mrem on his dosimeter and a corrected dose of 1,145 mrem on his film badges. His ear was contaminated to 0.2 mrad/hr and less than 30 dpm /100 cm² of removable contamination (Incident Report A0415).³
- On October 15, 1964, an employee acting as the cold man on a Cell #3 entry removed his mask in the service gallery while bagging shielding blankets. Investigation found that a blanket was contaminated to 5 m rad/hr beta-gamma. A smear survey indicated maximum contamination levels of 2.7×10^5 dpm/100 cm² beta-gamma in the immediate area. The employee contaminated his leg to a maximum of 0.5 mrad/hr and a nasal swipe found 600 dpm/100 cm² beta-gamma. A new method of bagging the shielding blankets was put in effect as a result (Incident Report A0337).⁴
- On November 18, 1964, an employee working in Cell #3 found particulate contamination on his head when he conducted an exit survey. Investigation revealed a maximum of 100 mrad/hr contamination and less than 30 dpm /100 cm² beta-gamma. After five attempts, the particulate contamination was washed off the employee's head and he was found to be free of contamination (Incident Report A0574).⁵
- On December 7, 1964, an inspection of the radioactive holdup yard at Building 4020 revealed the storage of numerous unidentifiable barrels, boxes, shipping containers, and pigs in various states of disarray. Some of the items have been in state for more than 2

¹ Ericson, G.I. and W. Lane, Atomics International Internal Letter, *Re: Incident Report, CDHC Cell #4, 7-23-64*. July 28, 1964.

² Lane, W.D., Atomics International Internal Letter, *Re: Incident Report, Building 020, Operating Gallery, CDHC, 8-27-64*. September 22, 1964.

³ Lane, W.D., Atomics International Internal Letter, *Re: Incident Report, Cell #1CDHC, 9-3-64*. October 5, 1964.

⁴ Ericson, G.I., Atomics International Internal Letter, *Re: Incident Report, CDHC Service Gallery, 10-15-64*. October 20, 1964.

⁵ Ericson, G.I., Atomics International Internal Letter, *Re: Incident Report, CDHC Cell #3, 11-18-64*. December 17, 1964.

years. A radiation survey indicated a maximum of 50 mR/hr gamma at the outer perimeter of the holdup yard, a violation of 10 C.F.R. 20.105 and 20.203 (Incident Report A0034).¹

- On July 16, 1965, it was discovered that a fuel wafer had disintegrated on a vacuum filter and caused buildup of 2.2 Ci of mixed fission products. In Cell #2 an in-cell vacuum distillation cold trap was measured at 100 R/hr and the lines extending to the cell face were measured at 25 R/hr. A filter was removed from the cell and bagged, but a release occurred between the time the filter was removed and when it was bagged. Contamination had been transported through the operating gallery, cold change room, and into the service gallery. When the extent of contamination was discovered, movement was restricted and the facility underwent cleanup. No radioactive material was released outside the building (Incident Report A0037).^{2,3}
- On September 21, 1965, the constant air monitor located at the north end of the operating gallery triggered the lower alarm (~1,000 cpm). Operations personnel were decladding SNAP 8 Experimental Reactor (S8ER) fuel in Cell #3 and were purging the cell with nitrogen. All systems and possible sources were checked, but no abnormal conditions were noted. A 10 minute air sample indicated 2.5×10^{-8} $\mu\text{Ci/cc}$ beta-gamma immediate count. The constant air monitor was still climbing and indicated 7,000 cpm. Further checks of equipment were made and spot smears were taken throughout the area. Smears were normal and no problems were noted. A call to other buildings and a check of other areas of Building 4020 indicated the problem was localized. A second air sample indicated 4.2×10^{-8} $\mu\text{Ci/cc}$ beta-gamma. The constant air monitor was leveling off at 9,000 cpm. A third air sample indicated 4×10^{-10} $\mu\text{Ci/cc}$ beta-gamma. The incident report notes that no radioactive material was released to the environment and no increase in surface contamination was found. There was no apparent cause for the increase, although it was generally believed to have come from Cell #3 (Incident Report A0038).⁴
- On February 2, 1966, two employees inadvertently exposed one hand each to the radiation field from a mounted irradiated S8ER fuel metallographic sample. The estimated doses to the hands were 58,000 mrem and 2,000 mrem for the two men involved. A fixture was being transferred remotely into Cell #1 by way of the metallograph tunnel. The fixture jammed in the tunnel and an S8ER fuel sample fell off the transfer train. An employee impulsively picked up the fuel sample and placed it back in the train bucket. Realizing what he had done, the employee immediately called the health physics department. Another employee was also present and received a lesser

¹ Ericson, G.I., Atomics International Internal letter, Re: *Radioactive Materials Holdup Yard at CDHC Building 020*. December 7, 1964.

² Author Name Redacted, Atomics International Internal Letter, Re: *Contamination Spread on Friday, July 16, 1965*. July 28, 1965.

³ Sapere Consulting, Inc. and The Boeing Company, *Historical Site Assessment of Area IV Santa Susana Field Laboratory, Ventura County, California, Volume 2 – Area IV Site Summaries*. May 2005, p. AA-3.

⁴ Badger, F.H., Atomics International Internal Letter, Re: *Excessive Concentration of Airborne Radioactive Material*. September 28, 1965.

exposure. A recreation of the incident was used to determine exposure time and estimated dose (Incident Report A0039).¹

- On February 24, 1966, three men who had been working in the service gallery, Decon #3, and Cell #3 were found to have nasal contamination ranging from 450 dpm to 4,500 dpm beta-gamma and slight skin contamination. Contaminated fine powders generated during operation of an electronic discharge machine (Elox machine) settled in and around the screw holes of the machine. When one of the employees removed the screws to replace an electric motor, the powder circulated into the air. The employee replacing the motor received the greatest contamination. Another employee in the vicinity who was not wearing respiratory protection and received the second highest level of contamination. A third person removed his mask in an area of high floor contamination and received the least amount of contamination. The men were decontaminated.

A spot smear of the service gallery showed floor contamination outside Decon #3 of ~75,000 dpm beta-gamma with several areas in the direction of the change room reading ~12,000 dpm beta-gamma, indicating the spread of contamination as the men left the area. It was recommended that a low purge be on during decontamination and cleaning operations (Incident Report A0040).²

- On August 16, 1966, an electrical power failure occurred in Building 4020 and the emergency generator for equipment such as the radioactive exhaust failed to engage. Emergency power was established 15 minutes later. The constant air monitor in the operating gallery showed an increase from 2,000 cpm to 5,000 cpm. A high volume air sample was taken after power was reestablished and indicated an airborne concentration of 3×10^{-8} $\mu\text{Ci/cc}$ beta-gamma. Smear samples indicated less than 30 dpm/100 cm² and additional air samples indicated a maximum of 5×10^{-9} $\mu\text{Ci/cc}$ beta-gamma. A second high volume air sample taken approximately 45 minutes after the power failure and showed 4×10^{-10} $\mu\text{Ci/cc}$ beta-gamma. At this time the area was released. According to the incident report, no injuries, loss of equipment, or significant release of radioactive materials occurred as a result of the power failure (Incident Report A0042).³
- For the week ending December 31, 1966, personnel involved in the promethium-147 (Pm-147) heat source fabrication were found to have extremity overexposures in excess of quarterly limits as indicated by finger ring film dosimeters. However, reevaluation of the film dosimeters indicated no legal overexposure had occurred. It was known that extremity exposure would be a controlling factor in the radiologically safe fabrication of Pm-147 heat sources. Numerous problems in the fabrication operations extended the estimated time of completion from 5 days to 20 days. Project schedules and budgets were extremely tight and investigation of the incident disclosed that some procedural

¹ Badger, F.H., Atomics International Internal Letter, *Re: Accidental Excessive Exposure*. February 8, 1966.

² Mooers, A.R., Atomics International Internal Letter, *Re: Personnel Contamination Incident – February 24, 1966* A.I.H.L. March 16, 1966.

³ Badger, F.H. Atomics International Internal Letter, *Re: Power Failure at Bldg. 020, Santa Susana*. August 29, 1966.

violations occurred in an effort to accomplish the job on schedule at a minimum cost. Examples of problems encountered include: a powder volume 30 percent greater than anticipated, which required three pressings per pellet instead of two pressings; breaking or cracking of pellets; a broken fuel hopper that spilled 5,000 Ci of fuel on the floor; and unsuccessful welding of capsules. These problems and more led to increased dose rates for operators (Incident Report A0044).¹

- On January 28, 1967, an employee in the Slave Shop contaminated his coveralls by leaning across a piece of equipment. Unaware of the contamination he brushed his gloves over the coveralls, flaking the contamination onto his shoe covers. The employee then walked about the Service Gallery and Hot Shop spreading the contamination. Contamination ranged from 10^5 to 4×10^5 dpm/100 cm² beta-gamma, but was brought down to less than 500 dpm/100 cm² beta-gamma in a single cleaning with a scrubber and vacuum. No contamination was tracked outside of a controlled area (Incident Report A0607).²
- On April 6, 1967, a fire occurred in Cell #3 during the cutting of a uranium fuel sample. Hot sparks ignited the cut-off wheel coolant (isopropyl alcohol), which in turn ignited three absorbent pads. The fire was extinguished using a low volume nitrogen purge. No significant release of radiological material was detected (Incident Report A0613).³
- On May 17, 1967, a Pm-147 release occurred during transfer of wet Kimwipes into glove box B through the air lock. Maximum airborne contamination levels of 2×10^{-9} μ Ci/cc were detected by air samplers located at the glove box face. The radiation concentration guide is 1×10^{-7} μ Ci/cc. Nasal swabs of the two men working in the area revealed a maximum 1,050 dpm/100 cm² (Incident Report A0617).⁴
- On June 10, 1967, approximately 55 gallons of Pm-147 waste were removed from glove boxes A and B in Building 4020. During the procedure, which involved bagging-out the waste through the airlock, an air monitor detected high airborne activity immediately following the cutting of a bag for separation from the glove box. Filters from the air samplers indicated activity of 8×10^{-8} μ Ci/cc when averaged over 8 hours. The air concentration standard is 1×10^{-7} μ Ci/cc for 40 hours. No personnel were affected because they were all wearing supplied air at the time of release. The area was decontaminated prior to proceeding with the operation (Incident Report A0619).⁵

¹ Badger, F.H. and F.C. Schrag, Atomics International Internal Letter, *Re: Extremity Exposure Associated with Primary Encapsulation of Pm-147*. February 3, 1967.

² Alexander, R.E., Atomics International Internal Letter, *Re: Radiation Safety Weekly Newsletter for Period Ending January 28, 1967*. January 31, 1967.

³ Alexander, R.E. Atomics International Internal Letter, *Re: Radiation Safety Unit Weekly Newsletter for Period Ending April 8, 1967*. April 13, 1967.

⁴ Alexander, R.E., Atomics International Internal Letter, *Re: Radiation Safety Unit Weekly Newsletter for Period Ending May 20, 1967*. May 24, 1967.

⁵ Alexander, R.E., Atomics International Internal Letter, *Re: Radiation Safety Unit Weekly Newsletter for Week Ending June 10, 1967*. June 15, 1967.

- On October 11, 1967, an employee received an internal exposure from Pm-147 while working on glove box A in the hot shop. After transferring waste from glove box A to glove box B and cleaning glove box A, two employees followed normal procedures for leaving the area and monitoring themselves. One employee found no contamination on himself, while the other employee found a spot between his nose and lip that was contaminated to ~1,000 cpm. He removed the contamination. After showering, the employee went to the health physics office and was resurveyed. When he opened his mouth the count rate increased from 50 cpm (normal background) to 150 cpm. A smear sample taken from his mouth revealed contamination of 550 dpm. His mouth was rinsed of water until free of detectable contamination. Surface contamination of the top of glove box A was found to be as high as 4.3×10^5 dpm/100 cm². Both gloves on the left window were contaminated to 1.7×10^5 dpm/100 cm². Other smears samples and air samples in the area indicated contamination levels of less than 5,000 dpm/100 cm². The contamination was suspected to have been transferred to the top surface of glove box A by a contaminated cover plate from the left glove. The employee working at glove box A then ingested the contamination through licking of his lips (Incident Report A0047).¹
- On July 22, 1970, a small alcohol fire occurred in Cell #3 during the disassembly of a NaK-bonded SNAP 8 Development Reactor (S8DR) fuel element. The fire started when an end cap of the fuel element was placed in a pan of alcohol to dissolve the NaK accumulation from the cap. The fire was immediately suppressed by placing a lid on the pan. No damage resulted from the fire and there was no evidence of airborne or surface contamination (Incident Report A0050).²
- On October 11, 1970, an alarm activated on the constant air monitor located in the operating gallery of Building 4020. Pressure gauges were reading normal. The scale on the air monitor was switched, but the monitor did not respond immediately so it was assumed to be malfunctioning. Further investigation showed the air monitor to be working properly. A high volume air sample was taken in the vicinity of the constant air monitor and showed 5×10^{-10} μCi/cc beta. An identical high volume air sample was taken outside Building 4020 and produced the same result. A smear survey from the floors and equipment tops located in the operating gallery showed less than 30 dpm/100 cm². No problem was found in the building. It was noted that the natural airborne concentrations on October 11, 1970 were approximately five times higher than those observed in the previous two years and after 24 hours the air sample results were back to background activity levels (Incident Report A0051).³
- On September 30, 1977, in preparation for removal of old radioactive liquid waste tanks from the basement of Building 4020, employees cut into a pipes and failed to cap them, causing an unexpected drop in air pressure. A spot smear survey was taken and

¹ Lane, W.D., Atomics International Internal Letter, *Re: Pm-147 Internal Exposure Incident of October 11, 1967*. November 6, 1967.

² Klostermann, J.P., North American Rockwell Internal Letter, *Re: Small Alcohol Fire in AIHL Cell #3*. July 27, 1970.

³ Klostermann, J.P., North American Rockwell Internal Letter, *Re: Investigation of CAM Alarm – Bldg. T020*. October 13, 1970.

compared to a spot survey taken September 26, 1977. The average of the smear area was 250 dpm/100 cm² beta-gamma on September 26. The average smear on September 30 was 1,380 dpm/100 cm². No increase in airborne activity was detected (Incident Report A0060).¹

- On April 25, 1978, while attempting to change one of the 3-quart collection cans on the evaporator that contained caustic solution from the sodium digester, an employee dropped the collection can spilling radioactive solution over one fifth of his body. The employee was instructed to use the radiologically controlled drainage shower. Maximum activity detected in a quick survey was 30,000 cpm (12 mrad/hr) on the employee's right forearm. A 15 minute shower produced 100 gallons of radioactive liquid. After the shower, 500 cpm contamination remained on the employee's right knee and forearm. A bactine scrub removed contamination on the forearm, but immediate efforts to decontaminate the knee were unsuccessful and would have to be continued in the medical department. Dressings applied to sore spots were removed by the company doctor and returned to Building 4020 for disposal (Incident Report A0067).²
- On May 3, 1978, the alcohol evaporator in Decon #2 caught on fire, burning most of the insulation off the electrical wires before it was extinguished by a nitrogen purge. No personal injury, exposure, or facility damage resulted. The evaporator has been routinely filled with alcohol from the sodium digester in the morning. The evaporator was turned on and about 1.5 hours later a fire was observed. The fire was extinguished within 5 minutes. Inspection the following morning, indicated an electrical fire, but no cause for an electrical short was found. The incident report notes that the evaporator is being redesigned with an emphasis on heavier insulation and simpler loading (Incident Report A0069).³
- On February 9, 1979, alcohol from the Hallam fuel bonding sodium digester system spilled after the salt preparation and before distribution. Approximately 1 to 2 gallons containing mixed fission products spilled. The personnel involved required no first aid and nasal smears were at background levels (Incident Report A0076).⁴
- On August 21, 1981, personnel were loading bags of equipment contaminated with mixed fission product from the hot storage room into a box in the airlock. Routine personnel survey after removing protective clothing indicated nasal, facial, and hair contamination up to 4,400 dpm per nasal swipe. Personnel were decontaminated. Investigation indicated two possible sources of the contamination. One bag was cut open to remove lead bricks and facilitate lifting with a fork truck. The second possible source was a bag containing a furnace that broke open on a 5 rad/hr source. Smears of the hot storage room measured up to 200,000 dpm /100 cm² beta-gamma and smears of the airlock measured up to 57,000 dpm /100 cm² beta-gamma. Personnel were familiar with good

¹ Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Occurrence – Bldg. T020*. October 3, 1977.

² Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Occurrence – Decon 2*. April 26, 1978.

³ Badger, F.H., Rockwell International Internal Letter, *Re: Evaporator Fire*, May 15, 1978.

⁴ Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, Decon 2, RIHL (T020), 9 Feb 79*. February 12, 1979.

operating techniques, but in haste did not execute them properly (Incident Report A0088).¹

- On July 13, 1982, SEFOR fuel pin #662 was declad, crushed, and loaded into a transfer tube. The tube was crimped and leak checked. The leak check revealed the tube to be leaking grossly. The tube was returned to the crimping station in Decon #4 and re-crimped between the bad seal and the fuel. Operators were not wearing respirators and on the second try they were not wearing gloves. Apparently, the primary crimping forced contamination out of the faulty seal contaminating the crimper and in turn the hands of the operators. The health physicist took some smears and went to count the smears while operators continued to work further contaminating equipment and clothing before realizing the problem. Personnel were contaminated up to 350,000 dpm alpha on their hands, elbows, shoulders, shirts, pants, show covers, and shoes. Air monitors in the area did not immediately indicate any activity in crease. Decontamination of two employees was difficult. The SEFOR fuel contained plutonium and uranium oxide. The fines included approximately 2 μCi of mixed fission product and emitted approximately 2 μCi of alpha activity (Incident Report A0105).²
- On August 16, 1982, a radioactive alarm from Building 4020 went off. The emergency team arrived and saw a red warning light on flashing on top of Building 4478, the radioactive liquid waste building associated with Building 4020. Approximately 30 minutes after the alarm signaled, the emergency team had entered Building 4020 and 4478 and reported that normal readings. The maintenance department replaced and tested the radioactive alarm system and all areas were secured (Incident Report A0325).³
- On October 11, 1982, an employee was working at the SEFOR decladding glove box repairing some remote equipment. He removed his gloved hands from the box and as he walked to the alpha survey meter to survey his gloves he wiped sweat from his brow with the inside of his lab coat. Upon surveying, he discovered his lab coat to be contaminated to approximately 80,000 dpm alpha and his forehead to be 8,400 dpm alpha. He also contaminated his hand to 2,400 dpm alpha when removing his coat and gloves. Another employee trying to assist contaminated his shirt to 400 dpm alpha. The floor was found to have 750 dpm of alpha contamination. The SEFOR fuel contained plutonium oxide (PuO) and uranium oxide (UO^2) (powder). Personnel, clothing, equipment, and the floor were decontaminated to background. The ruptured glove box was changed out (Incident Report A0110).⁴
- On December 22, 1982, an employee was operating manipulators in the SEFOR glove box and had a seizure. The employee collapsed on the floor in Decon #4, a secondary

¹ Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T020-Hot Storage Rm. & Airlock, 08-21-81*. August 26, 1981.

² Badger, F.H., Rockwell International Internal Letter, *Re: Radiological safety Incident Report, RIHL – T020, 07-13-82*. July 15, 1982.

³ Oliver, D.E., Rockwell International Internal Letter, *Re: R.A. Alarm, Bldg. 478*. August 17, 1982.

⁴ Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T020 – Decon 4, Box, 10-11-82*, October 15, 1982.

plutonium-239 (Pu-239) containment area. The employee was taken to the hospital. All personnel were found free of contamination. Decon #4 was mopped as a precaution, but no activity was found (Incident Report A0112).¹

- On April 21-22, 1983, while fuel rods were being transferred between Building 4020 and RMHF, an error in SEFOR rod identification caused Building 4020 to exceed its established fuel transfer control criticality limit of 1,900 grams (g) of Pu overnight. When one of the rods was bagged into the glove box a check determined the rod number to be A-03 instead of 803. Rod A-03 contained an additional 213.58 g of Pu than Rod 803 and thus the transfer records and Hot Lab balances were incorrect. The additional Pu caused an exceedance of the control limit. However, all but 600 g Pu was secured in transfer casks as only one rod was out of the cask and in the glove box at any time. A handwritten note from R.J. Tuttle states that the established criticality limit of three rods was not exceeded. It was recognized that the numbers stamped or etched on fuel rods are often in poor condition and are difficult to identify. RMHF personnel had misread Rod A-03 and Rod 803. Further fuel transfers were stopped when the error was discovered. No contamination was released (Incident Report A0262).²
- On July 15, 1983, an employee was preparing to change out a leaded glove with a plastic bag in the SEFOR glove box in Decon #4 when he checked his gloved hands and detected alpha contamination. He proceeded to the Decon Room doorway to request health physics support and plastic bags to collect waste. At this point the air monitor at the glove box alarmed. Two employees and another operator decided to complete the change out operation. They donned respiratory protection and the operator also donned a hood and reentered the area. An alpha survey indicated contamination only on the glove port. The employees proceeded with the change out and during this operation the inside glove keeper rings, installed as an additional precaution because of the stiffness of the leaded glove, snapped off. A quick survey indicated gross alpha contamination (greater than 50,000 cpm) on the hood, mask, and lab coat of the operator as well as the glove port and the immediate surrounding area. They immediately evacuated. Two health physicists carefully removed contaminated articles from the operator. Activity levels between 30,000 and 50,000 cpm alpha were detected. The gross activity was removed before the operator's face respirator was removed. The operator was released to the showers. The area in front of Decon #4 was covered with plastic and the remainder of the service gallery was made a shoe cover area and secured. This area and the Decon Room were decontaminated to background levels (Incident Report A0120).³

¹ Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, Decon 4 T020, 12/22/82*. December 23, 1982.

² Allen, D.C., Rockwell International Internal Letter, *Re: Excessive Pu Balance in RIHL, Building 20, MBA-54*. May 13, 1983.

³ Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T020, Decon Room 4, Alpha Box, 07-15-83*. October 18, 1983.

- On August 8, 1983, a leaking transfer tube contaminated an employee and the decontamination room (Incident Report A0119).¹
- On October 11, 1983, an anti-siphon valve was not closed on a pump in Cell #3 used to pump distilled water into SEFOR el ectropolish acid for neutralization and solidification. When the pump was shut off, acid was siphoned back into the 5-gallon container of distilled water, contaminating the water to an activity level between 2 and 6 microcuries per milliliter ($\mu\text{Ci/ml}$). Another pump was then tested in the supposedly clean distilled water reservoir and transferred to the shop area. Water was spilled at the disconnect point, work table floor, and at the work bench in the shop. A cell operator at Cell #3 discovered the contamination and further surveys of the facility revealed contamination has been unknowingly spread throughout the building, with the exception of the Equipment Room, Generator Room, Battery Room, and their hallways.

Contamination levels ranged from 1,500 cpm ($\sim 6,000$ dpm/15 cm^2) beta-gamma to more than 100,000 cpm (450,000 dpm / 15 cm^2) beta-gamma. Ninety-five percent of the gamma emission was Cs-137 and the other 5 percent was cobalt-60 (Co-60). Only the sample from the distilled water reservoir indicated any trace of americium-241 (Am-241), and thus the presence of transuranic (TRU) contamination. The liquid spill was estimated at 25 ml. Smears of the area indicated approximately 0.1 percent alpha activity. Decontamination of the suspect low-level areas was accomplished by masslinn mops. Areas of higher contamination were hand wiped, stripped, and/or disposed of. A section of tile in front of Cell #3 had to be removed as did patches of carpeting in the front office. No contamination was found outside Building 4020 and no airborne activity was detected (Incident Report A0118).²

- On January 30, 1984, a contaminated electrode was worked on a clean grinder. Contamination was discovered on floors and on the clothing of the grinder operator. No other personnel, tools, or locations were found to be contaminated (Incident Report A0122).³
- On August 20, 1984, an employee entered Cell #3 for repair of a laser. During the course of the operation, the employee bumped his head on a metal frame causing an abrasion that drew blood. The abrasion was covered with a surgeons cap, canvas hood, and plastic hood. A survey and smear of the wound after exiting the cell did not indicate any activity (Incident Report A0125).⁴

¹ The original incident report is identified as missing from Boeing's incident files. No other details are available on this incident at this time.

² Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T020 and Cell 3 Face, 10-11-83*. October 13, 1983.

³ The original incident report is identified as missing from Boeing's incident files. No other details are available on this incident at this time.

⁴ Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T-020 – Cell 3, 8-20-84*, Undated.

- On August 21, 1984, two new employees dressed in lab coats, shoe covers, and gloves were doing general cleanup in Decon #3. They found an open bag of tools and wiped the tools down. After exiting Decon #3, a routine survey showed contamination on their pants up to 50,000 dpm beta-gamma. The employees removed their pants and were found to be clean. A survey of the tools indicated up to 1×10^6 dpm beta-gamma. All areas involved were surveyed and decontaminated. The incident report notes that a more experienced employee may have recognize the potential for release of contamination and bagged the tools before removing them from the cell (Incident Report A0126).¹
- On October 15, 1984, during remote decontamination of Cell #3, a small puddle of alcohol ignited. A nitrogen purge was started and the fire went out almost immediately. There was no nuclear fuel in the cell at the time. No increase in stack monitor activity was observed and the incident report states that there was no release to the environment (Incident Report A0127).²
- On October 26, 1984, an employee inadvertently grabbed a bag of radioactive waste in the Manipulator Repair Shop with his bare hands and contaminated his left hand to approximately 5,000 dpm and his right hand to approximately 7,500 dpm. His hands were successfully decontaminated below detection levels after three applications of soap and water (Incident Report A0128).³
- On December 6, 1984, an employee conducting routine cleanup in Cell #1 reached his arm up causing his protective clothing to separate from his taped-on surgeon gloves. The employee immediately went to the Decon Room for repair. Upon completion of his work, the employee surveyed his right forearm/wrist and found it was contaminated to 500,000 dpm beta-gamma. The contamination was from irradiated Fermi fuel fines in Cell #1. After considerable effort, the contamination level on the employee's arm was reduced to background and the employee was released (Incident Report A0129).⁴
- On December 10, 1984, an exit survey of an employee conducting cleanup in Cell #1 revealed contamination on his neck at 25,000 dpm beta-gamma and contamination on his forearm at 5,000 dpm beta-gamma. The contamination was from irradiated Fermi fuel fines in Cell #1. The employee was decontaminated to background levels (Incident Report A0130).⁵

¹ Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T-020 Decon Room 3, 8/21/84*, August 27, 1984.

² Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T020 Cell 3, 15 Oct. 84*, October 16, 1984.

³ Dickson, F.A., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, RIHL Manipulator Repair Shop, 10/26/84*, November 5, 1984.

⁴ Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T-020 Cell 1, 12/6/84*, December 11, 1984.

⁵ Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T020 Cell 1, 12/10/84*, December 13, 1984.

- On December 10, 1984, an exit survey of an employee conducting cleanup in Cell #1 revealed 1,500 dpm beta-gamma contamination on his left hand. The contamination resulted from irradiated Fermi fuel fines in Cell #1. The activity was successfully removed and the employee was released (Incident Report A0131).¹
- On December 10, 1984, an incident report was filed concerning an employee who had made two entries into Cell #1 to decontaminate the cell and remove equipment that had been used for a Fermi fuel decladding task. After the second entry found his company thermoluminescent dosimeter (TLD) finger rings indicated 11,954 mrem on his right hand and 5,927 mrem on his left hand. The employee was excluded from further radiation work and the vendor TLD finger rings were sent for emergency processing. The vendor TLDs measured 7,750 mrem for the right hand and 7,710 mrem for the left hand. These measurements exceeded the Atomic International Energy System's Group Health and Safety internal limits of 4,500 mrem per quarter. The employee was temporarily restricted from work with radiation exposure and recommendations for improved safety were made (Incident Report A0133).^{2,3}
- On January 14, 1985, an employee moved a bag of contaminated material in Decon #1 that had not been properly taped closed. A section of hose came out of the bag and contacted his right leg. The employee immediately exited the area. A survey of his pant leg showed a detectable activity of 2,500 dpm beta-gamma radiation. The pants were removed and no skin contamination was found (Incident Report A0134).⁴
- On January 15, 1985, an employee repairing radiologically contaminated master manipulators accidentally sliced his glove with a screwdriver and caused a 3/8-inch cut in the knuckle of his left hand. The employee immediately exited the area. A survey of the wound revealed no detectable activity and a smear of blood from the wound found no activity above background. A shielded high purity germanium detector found a slightly positive peak of cesium at about 100 dpm. The employee's hand was decontaminated (Incident Report A0132).⁵
- On February 20, 1985, an employee working on a gear shaft for Cell #4 door cut his finger on a sharp edge of the shaft. A 1/4-inch cut on his finger was scanned for potential

¹ Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T020 Cell 1, 12/10/84*, December 13, 1984.

² Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T-020 Cell 1, 12/7 and 12/10/84*, Undated.

³ Meyer, R.D., Rockwell International Internal Letter, *Re: Hand Exposure Incident RIHL, December 10, 1984*, December 20, 1984.

⁴ Giesler, C., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T-020 Decon #1, 1/14/85*, January 21, 1985.

⁵ Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T-020 Hot Manipulator Repair Shop, 1/15/85*, January 17, 1985.

radioactive contamination, but no detectable activity was found on finger. A smear survey of the shaft found no detectable activity (Incident Report A0135).¹

- On March 4, 1985, an employee working in Cell #1 had sharp objects pierce his clothes and two pair of plastic booties. This allowed water being used for decontamination to leak into the booties and contaminate both shoes. Attempts at decontamination were unsuccessful. A final survey showed a maximum of 25,000 dpm contamination on the shoes and they were discarded as radioactive waste. No skin contamination was found on the employee (Incident Report A0136).²
- On March 20, 1985, two employees were assisting during the removal of solidified EBR-II liquid waste from Cell #2. One of the 55-gallon drums that the waste was to be placed in contained a “5-20 pig” that was removed from Cell #1 during cleanup operations for that cell. The pig was radioactively contaminated from Fermi fuel operations in Cell #1. The pig was wrapped in three plastic bags and placed in the drum with cement added for additional shielding. When personnel pulled off the lid of the drum contaminated rust, dirt, and concrete spilled and was spread to personnel and the surrounding area. One employee’s lab coat sleeves had a reading of approximately 100,000 dpm beta-gamma and a masslinn wipe showed a maximum contamination of approximately 500,000 dpm beta-gamma in the area of the spill. The employees and area were decontaminated to below 20 dpm/100 cm² alpha and below 50 dpm/100 cm² beta-gamma (Incident Report A0137).³
- On June 6, 1985, an employee was decontaminating manipulators from Cell #3 in the Hot Manipulator Repair Shop when a radiologically contaminated solution of nitric and hydrofluoric acid seeped through his coveralls onto his left forearm. His arm was found to have 1,500 cpm beta-gamma contamination, but no alpha contamination. The employee was eventually decontaminated to background (Incident Report A0139).⁴
- On August 15, 1985, an employee packaging contaminated glass from a SNAP program hydrogen analyzer had a small splinter of glass protrude through his protective gloves. It caused a small puncture wound to his index finger. A frisk survey found no detectable beta-gamma contamination, but a blood smear from the wound showed less than 10 dpm/100 cm². An “MCA” scan of the hand showed a small amount of Cs-137 (Incident Report A0140).⁵

¹ Giesler, C.A., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T020/Shop Area*, 2/20/85, February 22, 1985.

² Giesler, C.A., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T020, 3/4/85*, March 14, 1985.

³ Giesler, C., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T020 Service Gallery*, 3/20/85. April 2, 1985.

⁴ Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T020 Hot Slave Shop, 6/6/85*, June 10, 1985.

⁵ McGinnis, R., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, SSFL/T020 Decon #1, 8/12/85*. August 15, 1985.

- On October 4, 1985, a cold em ployee was assis ting in the service gallery during the loading of radioactive contaminated materials from Cell #2 into a containm ent box. The employee was dressed in red-line coveralls, booties, gloves, and was wearing his personal clothing underneath. Upon exiting the area a personnel survey indicated the employee's shirt was contam inated with up to 2,000 dpm beta-gamma and his pants were contaminated up to 1,000 dpm beta-gamma. Decontamination was successful o n the employee's pants, but his shirt had to be di scarded as radioactive waste (Incident Report A0142).¹
- On October 17, 1985, an em ployee size reducing contaminated material in Cell #3 had sharp metal material penetrate two pairs of plastic booties and one pair of cloth booties contaminating the employee's shoes to approximately 2,500 cpm beta-gamma. The sharp metal pieces were produced from the power saw used to size reduce material b efore it was removed for disposal. Decontam ination of the em ployee's shoes was unsuccessful and the shoes were discarded as radioactive waste (Incident Report A0141).²
- On October 25, 1985, an e mployee existing Cell #3 discovered several parts of his body were contaminated. Contamination was a high as 10,000 cpm beta-gamma. The activity appeared to come from the protective cove ralls he was wearing. The incident report notes that strong evidence suggests the cont amination came from the laundry and that future laundry will be surveyed prior to acceptance (Incident Report A0147).³
- On November 4, 1985, an em ployee performing decontamination activities in Cell #3 found 10,000 cpm beta-gamma contamination on his forearm s in a routine exit survey. The contamination was reduced to 200 cpm and the employee was release. A survey taken the following day did not detect any ac tivity on his forearms. The incident report notes that the contam ination appears to have been the result of im properly laundered protective clothing even though the clothing wa s checked before use and found to be below 1 mrad (Incident Report A0148).⁴
- On November 13, 1985, an e mployee working in Cell #3 discovered that his shoes had become contaminated to 30,000 dpm/100 cm² beta-gamma. The suspected cause of fixed contamination on the shoes was leaching of contamination from red-line socks during sweating. According to the incident report, the laundry service had discovered a problem in their water cleanup system. The laundry service noted the problem was corrected and

¹ Giesler, C., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T020/Cell #2, 10/4/85*. October 29, 1985.

² Giesler, C.A., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T020/Cell #3, 10/17/85*. October 28, 1985.

³ Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T020 – Cell #3, 10/25/85*. December 9, 1985.

⁴ Badger, F.H., Rockwell International Internal Letter: *Re: Radiological Safety Incident Report, T020 Cell #3, 11/4/85*. December 10, 1985.

contaminated socks were being isolated and removed from the system (Incident Report A0145).¹

- On November 20, 1985, an employee discovered beta-gamma contamination on his left shoe after exiting Cell #4. Further investigation showed that the source of contamination was fixed contamination from his red-line socks sweating through to his shoes. It is not clear from the incident report where the original source of fixed contamination came from. The employee's shoe was contaminated to 250,000 dpm /100 cm². Decontamination attempts were unsuccessful. A note on the incident report states "[t]his is one of several incidents related to break down at vendor laundry" (Incident Report A0143).²
- On November 21, 1985, an employee working in Cell #3 discovered his shoes had become contaminated to 50,000 dpm /100 cm² beta-gamma. Investigation found the source of fixed contamination was inside his shoe from the leaching of contaminated red-line socks during sweating. Decontamination of the shoes did not work. The laundry service was contacted and it found a problem with its water cleanup system. According to the laundry service, the problem had been corrected and contaminated socks were being isolated and removed from the system (Incident Report A0144).³
- On November 22, 1985, an employee in Decon #4 discovered his shoes were contaminated to 25,000 dpm /100 cm² beta-gamma. The source of contamination was suspected to be leaching of contaminated red-line socks during sweating. The laundry service was contacted and it found a problem with its water cleanup system. According to the laundry service, the problem had been corrected and contaminated socks were being isolated and removed from the system (Incident Report A0146).⁴
- On December 10, 1985, an employee loading contaminated material into a containment box inside the Hot Storage Room got his right hand pinched between the box and a piece of equipment. He removed his outer pair of gloves and noted that his middle finger was bleeding. The inner glove was not penetrated and no detectable contamination was found through blood smears or other surveys (Incident Report A0149).⁵
- On January 14, 1986, a review of recent non-reportable incidents at Building 4020 was conducted (Incident Report A0150).⁶

¹ McGinnis, R., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, SSFL, T020, Cell #3, 11/13/85*, November 27, 1985.

² McGinnis, R., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, SSFL: Building T020; Cell #4, 11/20/85*, November 25, 1985.

³ McGinnis, R., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, SSFL, T020, Cell #3, 11/21/85*, November 27, 1985.

⁴ McGinnis, R., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, SSFL, T020, Decon #4, 11/22/85*, November 27, 1985.

⁵ Giesler, C., Rockwell International Internal Letter: *Re: Radiological Safety Incident Report, T020 Hot Storage, 12/10/85*, December 16, 1985.

⁶ The original incident report is identified as missing from Boeing's incident files. No other details are available on this incident at this time.

- On February 4, 1986, an employee working in Cell #4 was instructed to leave when the breathing air system shut down. The employee was able to breathe due to residual air still within the system. Once the employee had exited the area, a personal survey showed no detectable activity. The breathing air system was eventually reset from the control box on the west side of Building 4020 (Incident Report A0151).¹
- On February 19, 1986, an employee working in the Glove Box Room (Room No. 139) picked up the top cover of a filter bank unit and a sharp edge pierced his plastic gloves and cut his right index finger. He exited the area and a blood smear and survey were taken. No detectable activity was found (Incident Report A0152).²
- On March 4, 1986, an employee was cleaning radioactive contaminated tools in the mask cleaning area of Building 4020. He accidentally splashed the cleaning solution of Alconox and water in his eye. The employee, who was wearing safety glasses at the time, immediately left the area. A radiation survey of the eye showed no detectable activity and the employee was sent to medical to have his eye flushed. A 250 mL water sample of the cleaning mixture was collected and scanned. No detectable activity was found (Incident Report A0155).³
- On April 16, 1986, a routine inventory leak check found that a 1.5 mCi Sr-90 check source was missing. A search of Building 4020 failed to identify its location. A recent effort to remove all contaminated equipment from the Hot Storage room and decontaminate the area generated several 19a boxes of radioactive waste. It was felt with a good degree of confidence that the missing source that was wrapped in a plastic bag marked "save" was instead disposed of in one of the waste boxes (Incident Report A0156).⁴
- On October 28, 1986, sparking of Fermi fuel assembly #204 occurred, igniting zirconium saw chips during the sawing phase of disassembly operations in Cell # 4. Saw cutting operations were halted and the cell atmosphere was immediately purged with nitrogen to extinguish the ignited chips. Further disassembly operations were halted until the incident was investigated and preventive measures implemented. It was determined that the band saw got close enough to the uranium fuel during cutting of the zirconium end caps that the friction of the saw on the uranium metal sparked and ignited the zirconium chips collecting at the bottom of the saw blade. To prevent further incidents numerous action items were carried out. A drip system was installed on the saw and a wet vacuum

¹ Giesler, C.A., Rockwell International Internal Letter: *Re: Radiological Safety Incident Report, T020 Cell #4, 2/4/86*, February 17, 1986.

² Giesler, C., Rockwell International Internal Letter: *Re: Radiological Safety Incident Report, T020 Rm#139, 2/19/86*. February 19, 1986.

³ Giesler, C.A., Rockwell International Internal Letter: *Re: Radiological Safety Incident Report, T020 Service Galley, 3/4/86*. March 13, 1986.

⁴ Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T020, SSFL, 4/16/86*. April 21, 1986.

was modified for remote handling to remove saw chips after cutting each assembly (Incident Report A0165).¹

- On March 12, 1987, during a routine work in Cell #4, an employee began complaining about not feeling well. He was advised to begin exit procedures. With assistance from another hot man and a hot/cold man, the employee's outer protective clothing was removed. The employee then blacked out, but was caught and placed onto clean plastic sheeting. A Radiation & Nuclear Safety Group representative was called to help with contamination control and the remainder of the employee's protective clothing was removed. The employee regained consciousness and was dressed in a clean pair of coveralls after being found free of radiological contamination. He was taken to Rockwell's Santa Susana Field Test Laboratory Medical Station for monitoring. It was determined that the employee was suffering from heat exhaustion due to increased cell air temperature, higher than normal face mask pressure, and a difficult working position. All personnel and equipment were monitored prior to leaving the controlled area and no contamination was detected (Incident Report A0173).^{2,3}
- On July 10, 1987, an employee exiting Cell #2 was found to have approximately 20,000 dpm/beta-gamma contamination on his right wrist. The employee's wrist was successfully decontaminated using dry wipes. The incident report notes that personnel should take more precaution when tapping up prior to entries into radioactive contaminated areas (Incident Report A0174).⁴
- On July 14, 1987, an employee exiting Cell #2 found radioactive contamination up to 70,000 dpm beta-gamma on his neck. The employee's neck was successfully decontaminated using dry and wet wipes. The incident report notes that excessive sweating by personnel who are suited up sometimes causes the tape to clothing seal to come loose and if this is noticed the operation should stop and the clothing should be retaped (Incident Report A0175).⁵
- On July 20, 1987, an employee working in Cell #2 found contamination on his neck after an exit survey (Incident Report A0177).⁶

¹ Harrison, D.J., Rockwell International Internal Letter, *Re: Report on Ignition Incident during Disassembly of Assembly #204 on October 28, 1986 and Minutes of Review Committee Meeting on October 29, 1986*, October 30, 1986.

² Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, RIHL T020, Cell 4, 3/12/87*, March 20, 1987.

³ Babcock, E.L., Rockwell International Internal Letter, *Re: Cell 4 Fainting Incident*, April 24, 1987.

⁴ Giesler, C.A., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T020 Cell #2, 7/10/87*, Undated.

⁵ Giesler, C.A., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T020 Cell #2, 7/14/87*, Undated.

⁶ The original incident report is identified as missing from Boeing's incident files. No other details are available on this incident at this time.

- On October 15, 1987, an employee performing a personal survey after bagging radioactive waste from Decon #1 found the right knee of his pants was contaminated to approximately 5,000 dpm beta-gamma. The pants could not be decontaminated below 2,500 dpm beta-gamma so they were taken as radioactive waste (Incident Report A0178).¹
- On December 1, 1987, an employee caught his thumb between a forklift cross member and chain while removing a shield plug for Cell #1. Blood was noticed inside of his glove and he immediately exited the controlled area. A blood smear and survey of his thumb found no detectable contamination (Incident Report A0181).²
- On December 17, 1987, an incident occurred at a sump pump and employees entered a confined space without the proper permits or approval (Incident Report A0182).³
- On June 13, 1988, two security guards became concerned when a radiation monitor in a basement alcove of Building 4020 went off-scale and alarmed in their presence. They called the facility health physicist, who told the guards that no radiation exposures could occur in that area based on current activities in the building, but that they should put on shoe covers and survey their shoes in the lobby of Building 4020 as a precaution and call the health physicist back if there were any problems. The alarm had shorted in the past and was not trusted. The security guards requested an independent reading of their film badges to ease their fears as they were new to operations on “the hill” and didn’t know who or what to believe. Independent analysis found no radiation exposure. The radiation monitor was tested the next day and alarmed erroneously three times. It was replaced and sent for repair (Incident Report A0185).^{4,5}
- On September 30, 1988, an employee was performing a personal radiological survey upon exit from Cell #1 and found a maximum of 3,500 dpm beta-gamma on his right knee. After repeated use of wet and dry wipes the area was successfully decontaminated. The employee notes he could have become contaminated when picking up a piece of material with clear hydraulic fluid on the outside (Incident Report A0190).⁶
- On October 10, 1988, an employee was performing a personnel survey upon exit from Cell #1 and found his forearms and left knee were contaminated. A maximum of 10,000

¹ Giesler, C.A., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T020/Decon #1, 10/15/87, March 23, 1987.* (Either the incident date or the letter date are incorrect.)

² Giesler, C.A., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, T020 Operating Gallery, 12/1/87, December 21, 1987.*

³ The original incident report is identified as missing from Boeing’s incident files. No other details are available on this incident at this time.

⁴ Rowles, J.A., Rockwell International Internal Letter, *Re: June 13, 1988 Security Guard Incident at T020, July 1, 1988.*

⁵ Badger, F.H., Rockwell International Internal Letter, *Re: After Hours Alarm, June 16, 1988.*

⁶ Giesler, C.A., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, Building 20 Cell #1, 9/30/88, October 17, 1988.*

dpm beta-gamma was found on his left forearm. Repeated use of wet and dry wipes decontaminated the area (Incident Report A0191).¹

- On November 14, 1988, an employee was doing decontamination and demolition (D&D) work in the Hot Storage Room (Room #153) and when cutting wire mesh a sharp piece punctured his left glove and cut his finger. The employee immediately left the area. A blood smear and survey did not detect any radioactive contamination (Incident Report A0192).²
- On January 4, 1989, an employee performing a personnel survey upon exit from Cell #1 found that his chin was contaminated. A survey meter found approximately 3,500 dpm beta-gamma contamination. A nasal smear found a maximum of 127 dpm beta-gamma contamination. Another sample found approximately 250 dpm of Cs-137. The employee was dressed out in full face respirator with cartridge, coveralls, gloves, hood, and booties. The incident report implies the employee's tape seal came loose and he ultimately inhaled radioactive materials (Incident Report A0193).³
- On June 6, 1989, two employees conducting D&D operations in Cell #1 were found to be contaminated upon exiting the cell. The employees were removing inner cell windows that had been in place several years and had collected contamination over time. The employees had to hold the windows next to their protective coveralls and the contamination penetrated their coveralls. One employee contaminated his left inner thigh (12,000 cpm beta-gamma) and both forearms (800 cpm beta-gamma). The other employee contaminated his right knee (6,000 cpm beta-gamma). After repeated use of wet and dry wipes and decontamination in the hot shower, the employees were surveyed and found to be clean (Incident Report A0198).⁴
- On June 29, 1989, two employees became contaminated while working on electropolishing operations in Cell #2 and Decon #1. One employee received a maximum of 7,000 cpm and the other employee received a maximum of 1,000 cpm. The personnel were successfully decontaminated using wet and dry wipes and a final survey showed no skin contamination. The incident report states that the contamination was thought to come from the red-line laundry as several articles of clothing were surveyed and found to have higher than normal readings. These items were packaged and sent back to the laundry cleaning company (Incident Report A0199).⁵

¹ Giesler, C.A., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, Building 20 Cell #1, 10/10/88*, November 8, 1988.

² Giesler, C.A., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, Bldg 20 Room #153, 11/14/88*, November 21, 1988.

³ Giesler, C.A., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, Building 20 Cell #1, 1/4/89*, January 11, 1989.

⁴ Giesler, C.A., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, Building 20 Cell #1, 6/6/89*, June 29, 1989.

⁵ Giesler, C.A., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, Building 20 Cell #2 & Decon #1, 6/29/89*, July 18, 1989.

- On October 4, 1989, an employee punctured the skin on his right forearm while working in the glove box room for plutonium handling. Although Pu-239 contamination was possible, a survey found no contamination above background (Incident Report A201).¹
- On December 15, 1989, during a scabbling operation of contaminated concrete on the loading dock pad one of two absolute vacuums in use lost filtration. Concrete dust was released from the vacuum and became airborne in the airlock. Operations were stopped and both vacuums were shut down until a survey could be performed. No personnel were in the airlock at the time of the incident (Incident Report A0587).²
- On April 18, 1990, an employee working in Cell #2 cut his radial artery when a steel chip from the top of a jackhammer chisel penetrated his left wrist. The chip was contaminated to 120 pCi (Incident Report A0205).^{3,4}
- On July 17, 1990, an employee working in Cell #3 had a ladder slip out from under him and contaminated his left forearm and elbow to 300 cpm (Incident Report A0207).^{5,6}
- On October 17, 1990, employees dropped a duct section, causing elevated airborne activity (Incident Report A0210).⁷
- On December 17, 1990, employees arriving for work in the morning observed a red beacon alarm on Building 4020. The emergency response team responded and found the gamma monitor in Liquid Waste Building 468 to be reading 100 mR even though the actual gamma radiation in the area was 2 mR. The alarm set point was approximately 20 mR above background. The gamma monitor in Building 468 was disconnected and the Building 4020 alarm immediately ceased. The monitor in Building 4020 remains in service, while the Building 468 monitor was removed for repair (Incident Report A0213).⁸
- On August 26, 1991, during decontamination activities in Cell #3, three plugs used as a contamination barrier were blown out of cell ports by sandblasters into the operating gallery clean area. A small amount of dry sandblast grit from Cell #3 was discharged onto the operating gallery floor and on one wall. Initial large area masslinn wipes in the

¹ Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, Bldg. 20 Rm 139, 10/4/89*, October 30, 1989.

² Unknown Author, Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, Airlock, 15 Dec 89*, Undated.

³ Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, Cell 2 – Bldg. 020 – RIHL, 4/18/90*, Undated.

⁴ This incident report is extremely brief and cites an attachment to the report. This attachment has not been located.

⁵ Badger, F.H., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, Bldg 20 Hot Cell #3, 7/17/90*, July 31, 1990.

⁶ This incident report is brief and cites an attachment to the report. This attachment has not been located.

⁷ The original incident report is identified as missing from Boeing's incident files. No other details are available on this incident at this time.

⁸ Schrag, F.C., Rockwell International Internal Letter, *Re: Radiological Safety Incident Report, Occurrence #RD-90-4-RIHL-90-3*, December 17, 1990.

area showed a contamination of approximately 1,000 dpm/100cm² in the spill area and 300 to 500 dpm/100cm² on the entire floor of the operating gallery. The continuous air monitor was in service and did not alarm or show any increase in airborne radioactivity. Masslinn smears were taken in adjacent rooms and showed no activity above background. The operating gallery area was decontaminated using a vacuum cleaner for visible deposits and masslinn and moist towels for floors and horizontal surfaces (Incident Report A0267).^{1,2}

- On June 17, 1993, an employee became contaminated during decommissioning and decontamination operations of a radioactive exhaust duct in the Building 4020 basement. The employee was contaminated up to 2,000 cpm, and was taken to the RMHF for decontamination. All contamination was removed to less than background levels (Incident Report A0571).³
- On September 15, 1993, an employee jack hammering drain piping in Cell #3 found his dosimeter went off scale after working in this high radiation area. The work involved repeatedly jack hammering in the high radiation area then moving to a low dose waiting area and the employee became complacent with this repetitive task. Investigation of the incident revealed that worker error caused the unacceptable exposure. The employee's dose for the week (204 mrem), quarter (500 mrem), and year (650 mrem) were all below Rocketdyne's administrative limits of 300, 1,000, and 2,000 mrem respectively (Incident Report A0575).⁴
- On May 10, 1995, two operations mechanics dumped a vacuum catch drum into a waste box during repackaging operations. Vacuum catch drums were not authorized for dumping because of the light density of the material and the contamination levels. This activity had the potential to cause a loss of contamination control by release radioactivity to the air. A survey of the area found a maximum of 2,589 dpm/100 cm² beta-gamma contamination. Results found inside a respiratory protective device were 9.0×10^{-14} $\mu\text{Ci/cc}$ alpha contamination and 7.4×10^{-12} $\mu\text{Ci/cc}$ beta contamination. The area was decontaminated to less than 20 dpm/100 cm² beta within one hour of the incident. No personal contamination was discovered (Incident Report A0662).⁵
- On April 15, 1996, an employee's right shoe became contaminated with a particle from saw cutting operations of contaminated concrete. The particle read 600 net counts per minute (ncpm) by direct frisk survey. The particle was removed with tape and the

¹ Cutting, R., *U.S. Department of Energy Occurrence Report, Occurrence Report #SAN-RD-RIHL-0005*, August 27, 1991.

² Meyers, R.L., *Handwritten Notes Re Occurrence on August 26, 1991*.

³ Hickman, D.W., Rockwell International Internal Letter, *Re: Radiological Safety Report, Building 20 Basement, 6/17/93*, June 29, 1993.

⁴ Harcombe, R., Rockwell International Internal Letter, *Re: Radiological Safety Report, RIHL T020, 9/15/93*, September 16, 1993.

⁵ Harcombe, R., Rockwell Internal Letter, *Re: Radiological Incident Report, Dumping of Vacuum Catch Drum Without Notification, A0662, SSFL, Area IV, T020, Decon 3, 5/10/95*, June 13, 1995.

employee was determined free of contamination. A particle survey of the work area was conducted, but no additional particles were detected (Incident Report A0668).¹

- On August 15, 1997, a contract worker found his boot had a hole in it and the boot was wet and contaminated. A health physics technician surveyed the boot and found 1,400 ncpm on the pancake frisker. The contamination was too embedded to decontaminate. Personnel were reminded check protective clothing prior to donning and to not use worn out articles of clothing (Incident Report A0679).²
- On August 15, 1997, a health physics technician observed a worker at the step-off pad undressing improperly. The worker was removing a paper suit barehanded because he had improperly removed his glove first. The technician intervened and frisked the worker's hand finding 1,400 cpm on it. The worker's hand was decontaminated. The worker was informed of the proper undress procedure and that additional instances could result in suspension of access privileges (Incident Report A0678).³

¹ Harcombe, R., Rockwell Internal Letter, *Re: Radiological Incident Report, Contaminated Right Shoe, A0668, SSFL, Area IV, T020, Service Gallery, 4/15/96*, April 16, 1996.

² Deschamps, R., Boeing Internal Letter, *Re: Incident Report, Contamination Found on the Shoe of Contractor for Heil, A0679, T020, 8/15/97*, April 15, 1998.

³ Deschamps, R., Boeing Internal Letter, *Re: Incident Report, Radioactive Contamination Found on the Left Hand of Contractor for Heil, A0678, SSFL, T020, 8/15/97*, April 15, 1998.

BUILDING 4055

- On May 9, 1970, an employee was involved in a contamination incident while working in Glove Box #9 at Building 4055. According to the incident report, upon withdrawing his hands from the glove box, the employee discovered a hole in the glove box glove. Upon discovery of the hole, the employee left his arms in the glove box. Upon arrival of the facility's health physics representative, the alpha scintillator contamination monitor located approximately 4 feet behind the employee was "off scale." An alpha meter was brought into the area and contamination levels of 100 cpm were measured on the employee's left arm. The employee was monitored and it was found that his shirt sleeves were contaminated to 50 cpm. The shirt was disposed of as radioactive waste.

Cover plates were placed over the glove box gloves and the gloves were changed without incident. A survey of the floor and surfaces around Glove Box #9 found elevated concentrations of 60 cpm on the floor in one spot. The spot was cleaned up with "windex and a kimwipe." Contamination levels on all other surfaces were at "normal background levels." The incident report does not state what the normal background levels were in 1970 (Incident Report A0286).¹¹⁷

- On June 27, 1973, a comprehensive smear survey of the glove box room found that contamination was spread throughout the room, including the overhead pipes and ductwork. The absolute filters located adjacent to Glove Box #17A were surveyed and the Model FM-5 Alpha Survey meter indicated 10,000 cpm on Filter 5 and 9,000 cpm on Filter 6. During the survey, it was noted that a considerable amount of dust was present on the top of the boxes, cabinets, pipes, and ductwork. According to the report, it was thought the use of an absolute type vacuum cleaner could remove a majority of the contamination along with the dust. The incident report did not provide information to indicate how the glove box room was ultimately decontaminated (Incident Report A0222).¹¹⁸
- On December 21, 1977, a contaminated roll of green tape was discovered in the glove box room. A monitor of the tape read approximately 3,700 cpm. A low level of alpha activity was discovered on the bench underneath the tape and was contained. The incident report did not indicate the levels located on the bench; however, the report stated that "clear spray" was used to seal the contamination in place. No other contamination was found in the glove box room (Incident Report A0224).¹¹⁹
- On January 10, 1978, an employee became slightly contaminated while foam-decontaminating Glove Box 26 when a rubber glove failed. The process of foam-decontamination, according to the incident report, involves introducing foam into the glove box, and scrubbing all accessible areas. The rubber glove had a small puncture tear

¹¹⁷ Lane, W.D., Internal Letter *Re: Contamination Event in Building 055, A0286, May 21, 1970.*

¹¹⁸ Klostermann, J.P., Internal Letter, *Re: Glove Box Failure in Building T055, July 5, 1973.*

¹¹⁹ Owens, D.E., Internal Letter, *Re: Incident Report A0224, January 4, 1978.*

at the glove-to-box mounting ring. The incident reported noted that no liquid escaped from inside the box. The employee was found to be contaminated at his right side-burn hair area, with the Ludlum alpha meter indicating about 2,000 to 3,000 dpm activity. The hot sink at Building 4055 and mild soap were used to decontaminate the employee but residual contamination remained (630 dpm). The employee was instructed to shower at Building 4020, which resulted in no additional activity being detected on his head or body. The incident reported that there was no spread of contamination to any other area beside the glove box (Incident Report A0063).¹²⁰

- On May 10, 1978, a lost seal during the replacement of a rubber glove with a plastic bag caused loss of vacuum in Glove Box #22. Contamination of 100 dpm was subsequently discovered on the outside window area. The areas identified as being contaminated were “immediately decontaminated using standard methods and procedures.” The incident report did not indicate what the standard methods and procedures were (Incident Report A0335).¹²¹
- On June 15, 1978, an employee compacted radioactive waste in a compactor reserved for non-radioactive “suspect” waste. Although compacting radioactive waste may have generated high airborne activity, the compactor had a filter that minimized the release of such contamination to the building (Incident Report A0071).¹²²
- On July 16, 1978, a destructive electrical power surge on the main line causing damage to the main Building 4055 air sampling vacuum pump. The backup pump did not take over because of an internal leak in the water cooling jacket. This resulted in the loss of normal air sampling capability in the facility, including the stack monitors for approximately 12 hours. The incident report stated that the exhaust fans that maintained differential room pressures and glove box vacuums were not affected by the power failure. A check of each HEPA filter bank indicated no abnormal conditions or failures in the filtration system. The incident report noted that the only material that was available for release included a semi-fixed contamination on the interior surfaces of the glove box lines; however, all accountable material had previously been removed from the boxes (Incident Report A0072).¹²³
- On July 24, 1978, floor contamination was found in the waste handling area. This contamination was assumed to have been caused by leakage from a stored waste container although none of the containers had external contamination (Incident Report A0073).¹²⁴

¹²⁰ Owens, D.E., Internal Letter, *Re: Radiological Occurrence at NMDF Involving Minor Personnel Contamination, January 10, 1978, February 15, 1978.*

¹²¹ Owens, D.E., Internal Letter, *Re: Radiological Occurrence at NMDF, May 15, 1978.*

¹²² Owens, D.E., Internal Letter, *Re: Notice of Safety Rule Violation. June 15, 1978.*

¹²³ Owens, D.E., Internal Letter, *Re: Incident Report, July 24, 1978.*

¹²⁴ Owens, D.E., Internal Letter, *Re: Incident Report Room Contamination at NMDF, August 1, 1978.*

- On June 26, 1979, airborne activity was released during the maintenance of a glove box. Personnel were removing and replacing the furnace heating element of Glove Box #4 when the “short-term” release of airborne alpha activity occurred. The activity consisted of plutonium and americium particles. Smears in the immediate area of Glove Box #4 found contamination of up to 75 dpm/100 cm². The area floor was wet-mopped and the glove box furnace and immediate area was decontaminated. Following decontamination, a complete contamination survey of the building was performed with no detectable contamination found (Incident Report A0582).¹²⁵
- On May 10, 1980, the air sample vacuum pump stopped working. There was no indication of a release of contaminants (Incident Report A0081).¹²⁶
- On October 31, 1980, a health physicist was called to Building 4055 to survey four pairs of green line coveralls that were returned with the blue line laundry. One pair of green line coveralls was found to have a small ball of “tar” inside at the belt line. The “tar ball” had beta contamination of 446,000 dpm. The other three pairs of coveralls were surveyed for alpha and beta-gamma and were found to not be contaminated. The incident report did not indicate where the “tar ball” had originated from or how it was handled or disposed of following its discovery (Incident Report A0250).¹²⁷
- On May 30, 1981, the air sample vacuum pump failed, resulting in the failure of the facility air monitoring system. The system was repaired and placed back in service on May 31, 1981. According to the incident report, radiation and nuclear safety personnel were not notified of the incident at the time of occurrence; however, it was determined that no release of contaminants was suspected (Incident Report A0085).¹²⁸
- On November 7, 1981, a high airborne alarm at Building 4055 went off. When the health physicist arrived, the ALPHA III at Station “C” was alarming. Upon inspection, it was found that ALPHA III was functioning properly. A smear and direct survey of the area showed no contamination (Incident Report A0091).¹²⁹
- On March 24, 1982, trace amounts of suspected plutonium contamination resulted when an employee was compacting suspect waste into a new “sphincter can,” and a petri dish broke and cut the employee’s right hand. A health physicist performed a contamination survey of the wounded area and no contamination above background was detected. The incident report recommended that glass items that are too large to be easily placed in a shipping can could be broken in a controlled area, and then the pieces could be

¹²⁵ Meyer, R.D., Internal Letter, *Re: Radiological Safety Incident Report, July 20, 1979.*

¹²⁶ Bradbury, S.M., Internal Letter, *Re: Radiological Safety Incident Report, May 29, 1980.*

¹²⁷ Bradbury, S.M., Internal Letter, *Re: Radiological Safety Incident Report, November 25, 1980.*

¹²⁸ Badger, F.H., Internal Letter, *Re: Radiological Safety Incident Report, June 1, 1981.*

¹²⁹ Bradbury, S.M., Internal Letter, *Re: Radiological Safety Incident Report, November 12, 1981.*

transferred to the shipping can. The incident report did not note the origin of the contaminated petri dish (Incident Report A0100).¹³⁰

- On February 7, 1983, an employee was disassembling a balance in Glove Box #3A, when he jammed a small screwdriver through the box glove and surgeon's glove and inflicted a puncture wound at the base of his left index finger. A survey of the wound and finger indicated approximately 3,500 dpm alpha, and the surgeon glove indicated approximately 30,000 dpm alpha. Blood samples of his finger found contamination of 414 dpm alpha. The area was flushed with clean water and encouraged to bleed. A second blood sample taken indicated 39 dpm alpha. The process was repeated and the employee was taken to Building 4020 for an In-Vivo scan and for further decontamination. The area around the wound was decontaminated to background level and the employee underwent a 1,000 second count. The count data was found to convert to 2,300 dpm of AM-241 and the total activity in the wound was assumed to be approximately 7 nCi of plutonium plus americium. An area was set up at the SSFL First Aid Station and "debridement" of the wound site was performed. All equipment and waste were collected and the surgery area surveyed clean after the surgery was completed. Additional scans of the wound area indicated contamination of 2.8 nCi of plutonium plus americium. The employee underwent additional surgery to remove radioactive material from the wound site on March 16, 1983. A post surgery scan determined that between 90 to 100 percent of the active material was removed.

the incident report did not provide any information to indicate whether any contamination outside of the glove box occurred as a result of this incident (Incident Report A0013).^{131,132}

¹³⁰ Robinson, G.C., Internal Letter, *Re: Radiological Safety Incident Report, March 29, 1982.*

¹³¹ Moore, J.D., Internal Letter. *Re: Quarterly Review of NMDF (T055) for Radiation Safety – First Calendar Quarter, 1983, July 7, 1983.*

¹³² Badger, F.H., Internal Letter *Re: Radiological Safety Incident Report, February 8, 1983.*