

CHRONOLOGY OF PROBLEMS: PEACH BOTTOM UNITS 2 & 3

Philadelphia Electric's (PECO) applied for a license to operate the Peach Bottom Atomic Power Station in late-July, 1960. The application was approved by the Atomic Energy Commission. Peach Bottom was a 40 megawatt, High Temperature Graphite Moderated reactor that operated from 1966-1974.

Peach Bottom 2 & 3 , are 1,065 megawatt Boiling Water Reactor designed by General Electric and engineered by Bechtel. Both reactors began operation in July, 1974, but had their licenses extended by the Nuclear Regulatory Commission (NRC) and are expected to operate though 2034.

The Nuclear Regulatory Commission (NRC) and the Institute for Nuclear Power Operations (INPO) have clearly demonstrated that Philadelphia Electric's (PECO), renamed Exelon in 2000, performance has historically been lackadaisical and sub-par. In order to put Peach Bottom's operating history into perspective, it is necessary to review PECO's plant legacy.

According to Eric Epstein, Chairman, TMI-Alert: "Managerial problems further aggravate and compound the inherent flaws with Peach Bottom's reactor and containment structure." The reactors at Peach Bottom are General Electric (GE) Boiling Water Reactors (BWR). Epstein noted, "The GE-BWR is an obsolete design no longer built or constructed. Many in the industry feel it is inferior to Pressurized Water Reactors. Obviously the age of the reactors, and the subsequent embrittlement that ensues, further erode the margin of safety."

Peach Bottom's Mark 1 containment structure has been demonstrated by Sandia Laboratories to be vulnerable during a core melt accident. Epstein explained: "The containment is likely to fail during a core melt accident [like Three Mile Island] allowing radiation to escape directly into the environment." Nuclear industry officials say the problem with the Mark 1 is that it is too small and wasn't designed to withstand the high pressure it is supposed to resist.

- 1974 - Peach Bottom came on line at a cost of \$375 per kilowatt.

- March, 1983 - A spill of 25,000 gallons of radioactive water was reported at the plant.

- June 1983 - PECO was fined \$40,000 by the NRC for a valve violation.

- July 1983 - Philadelphia Electric identified cracks in their cooling pipes.

- 1983 -1987 - PE was issued a number of violation notices that cost the utility \$485,000 in civil penalties. All the violations involved failure of personnel to follow procedures.

Examples of violations include: workers entering high radiation areas without required radiation protection; improperly controlling access keys to the plant's high radiation areas; discrepancies in workers' radiation work permits; improper packing of low level radioactive wastes; leaving air lines open while the reactor was producing power between August 12 and September 10, 1982. With these lines open the containment could not be sealed against radiation escape in the event of an accident; allowing excessive leakage from the containment building; improperly setting instrument valves which made the plant incapable of providing back-up signals to automatically shut the reactor down in the event of an accident (Lancaster Independent Press, April, 1988).

Ronald Haynes, the NRC's regional administrator, stated, "**These violations demonstrate the need for improvements in the control of operational activity.**"

- June 19, 1984 - The NRC cited PECO for five alleged violations of technical specifications at Units 2 and 3. The NRC also proposed a \$30,000 fine.

Three of the alleged violations "involved exceeding the maximum allowable reactor heatup rate, allowing pressure in the reactor to go beyond the limit specified for a given temperature and failing to recognize that a control rod was inserted into the reactor at a rate slower than required."

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The other two violations "involved changes to facility procedures in 1977-1979 that were not properly reviewed and three instances in 1980 and 1983 of failures to follow procedures." These violations were identified by an inspector between January 5 and 20, 1984 (United States Nuclear Regulatory Commission, Office of Public Affairs Region I, June 19, 1984).

- December 1984 - An Institute of Nuclear Power Operations (INPO) evaluation found "**clear evidence of declining performance**". In addition, the report claimed that these problems were "longstanding."

- 1985 - An NRC inspector observed a Peach Bottom operator **dozing** at the controls. No safety violation was charged.

- June 1985 - The plant was shut down due to mechanical problems.

- July 26, 1985 - PECO was accused of **pressuring the United Way** to deny eligibility to Del-AWARE Unlimited, Inc., "a group that is lobbying against the water-diversion project that would supply the utility's Limerick power plant...I wouldn't go as far as to use the word *threatened*, but the message was clear. PE would stop funding if Del-AWARE were made eligible under the donor-option program." (The Philadelphia Inquirer, Front Page, Friday, July 26, 1985.)

- October 1985 - **A emergency evacuation drill turned into a serious incident when Unit-2 reactor's water level dropped.**

- October 1985 - PECO is fined by the Occupational Safety and Health Administration (**OSHA**) **for safety violations leading to the death of an employee.**

- December 1985 - An INPO study (as reported by The Nuclear Monitor) concluded that PECO's performance continued to decline. A subsequent letter written in January by Zack Pate, President of INPO, to PECO Chairman John Everett, said "standards of performance at the station are unacceptably low."

Problems were identified in operations and maintenance, radiological protection, material condition and housekeeping. INPO also identified several non-licensed operators reading unauthorized materials. A total of 431 shortfalls were identified; 141 involved personnel performance. Pate noted, "and "we ... have considerable concern that the station's substandard radiological control practices may lead to the spread of contamination off-site, or some other serious radiological event.

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Pate concluded, "From my assessment, this pattern will not change, and personnel performance at Peach Bottom will not improve, until you personally acknowledge the need and communicate the need, for real change to your organization."

- February 1, 1986 to May 31, 1987 - The SALP for this period indicated PECO's performance was "**unacceptable**" because of the operators' inattentiveness and management's "inability to identify and correct operator conduct in other areas."

Among the incidents cited by the NRC: **security guards were overworked, and one guard was found asleep** on the job; **36,000 gallons of "mildly radioactive water" leaked into the Susquehanna River**; PECO mislaid data on radioactive waste classification causing misclassification of a waste shipment; at the turbine building on March 4, 1987, Unit 3 a major fire occurred at the maintenance cage.

- March 1986 - A checking system was bypassed and automatic backups were bypassed by a supervisor during an inappropriate withdrawal of a control rod from the reactor core.

- April 1986 - An **explosion and fire occurred** at the plant's substation for emergency power.

- June 1986 - **The NRC's annual report concluded that Peach Bottom was "operated by well qualified individuals with a positive attitude toward their positions for nuclear safety."**

- June 1986 - Unit-2 was shut down when a cooling system pipe sprang a leak.

- June 11, 1986 - **A \$200,000 fine** for failing to pay attention to detail was issued. The incident involved the withdrawal of control rods. A high-level, NRC administrator noted that these violations indicated a continued "pattern of inattention to detail" and "a general complacent attitude." The original fine was set at a \$100,000, but doubled because of PE's history. In addition, the NRC reported 17 violations.

- July 16, 1986 - While testifying before Congressman Markey's Committee, the NRC revealed that Peach Bottom was one of the **10 most hazardous plants in the country**. The underlying reason appeared to be that PECO's attention was focused on the construction and startup of Limerick, rather than the safe operation of Peach Bottom.

- August 1986 - The NRC reported that there were 26 cracks in Peach Bottom's two operating reactors (Units 2 and 3).

- December, 1986 - The NRC reported that a health physicist was illegally fired for **whistleblowing**.

- February 18, 1987 - **An NRC study said Peach Bottom's reactors were more likely to release radiation in the event of a core-melt accident.**

- March 4, 1987 - At the turbine building at Unit 3 a major fire occurred at the maintenance cage.

The NRC identified several **precursor** problems with fire protection on the following dates: April 10, May 30 and November 1, 1985. Another related problem was documented on January 19, 1990.

- March 15, 1987 - The NRC levied a **\$50,000** against PECO for illegally dismissing a worker who was **exposed to radioactive gas**.

- March 31, 1987 - **Peach Bottom was indefinitely shutdown. Operators were found sleeping on the job, playing video games, engaging in rubber band and paper ball fights, and reading unauthorized material.**

- May 1987 - The NRC reported that areas of high radioactivity were not properly marked.

- May 1987 - An NRC inspection report revealed 33 operator errors in the past two years as well as cases of operator inattention and poor reaction.

- July 15, 1987 - Senior Health Physics Technician, George Fields, filed a lawsuit against PECO for **exposing him to dangerous levels of radioactive gas**.

- September 1987 - An INPO evaluation ranked the plant in the **lowest** category.

- September 30, 1987 - A contractor employee attempted to enter a protected site while **intoxicated**. Later cocaine was found in the parking lot and in the guard's bathroom.

- October 1987 - An INPO visit (as reported by The Nuclear Monitor) found that since shutdown, **"little clearly demonstrable action has been taken regarding corporate management's accountability for conditions at the station."**

"Control of drawings, procedures, and other documents used by operations personnel was identified as a problem at Peach Bottom ... in 1980. During the recent plant evaluation, 22 of 23 drawings reviewed in the radwaste control room were out of date by as many as 15 revisions. Outdated or unapproved drawings and procedures were also noted at various locations in the turbine building and the auxiliary room."

"[T] here were more than 6,000 open maintenance requests, 300 outstanding money tickets (minor maintenance requests), and 1,200 additional items requiring maintenance on various lists ... 586 preventive maintenance activities ... have been outstanding since June 1986."

- October 5, 1987 - A loss of Power at Unit-3 resulted in a containment isolation and a loss of shutdown cooling.

- October 8, 1987 - The NRC deferred a review of PECO's reorganization plan because of their failure to address corporate weaknesses.

- October 9, 1987 - Philadelphia Electric announced a corporate reorganization plan.

- October 29, 1987 - The forced shutdown is costing Philadelphia Electric an additional \$5 million a month for replacement electricity. ("Patriot News".)

- November, 1987 - **A report published by Public Citizen revealed that \$400 million was spent on repairs at Peach Bottom between 1981 and 1985. This amount was the highest expended at any of the nation's nuclear power plants.**

- November, 1987 - The **FBI discovered a drug distribution ring** at Peach Bottom.(For more details see: January 8, 1988; February, 1988; May 2, 1988; November, 1989; and, May 10, 1999.)

- January 8, 1988 - A maintenance sub-foreman pleaded guilty to involvement in a **conspiracy to distribute methamphetamine**. He is one of six who were indicted last year in a conspiracy to distribute methamphetamine. (For more details see: November, 1987; May 2, 1988; and November, 1989.)

- January 11, 1988 - **INPO President Zack Pate strongly criticized Philadelphia Electric's management and their revised reorganization plan.**

Pate noted that, "The fundamental approach to nuclear operational management at Philadelphia Electric Company has not changed and is unlikely to change noticeably in the foreseeable future." He added, "success ultimately depends on the individual managers in key line positions. Since for the most part, the same managers who have been ineffective in this area for years are in the key line positions in the new organization, substantial improvement is unlikely." Pate concluded, "Major changes in the corporate culture at PECO are required. The recently announced reorganization plan will not achieve this" (The Nuclear Monitor, February 22, 1988, pp.1-2).

- January 26, 1988 - Governor Robert P. Casey formally petitioned the NRC for public hearings on PECO's management.

- January 27, 1988 - PECO reportedly lost \$58 million due to the NRC's shutdown of Peach Bottom. Earnings per share were shaved from \$2.60 a share in 1986 to \$2.33.

- February 3, 1988 - John H. Austin resigned as president of PE after a unusually critical report by the Institute of Nuclear Power Operations (INPO) was published. The report asserted that Peach Bottom "**was an embarrassment to the industry and to the nation.**" Zack T. Pate, president of INPO, added, "**The grossly unprofessional behavior by a wide range of shift personnel ... reflects a major breakdown in the management of a nuclear facility.**"

- February, 1988 - The PUC ordered PE to reduce rates by a \$37 million a year until Peach Bottom is allowed to restart.

- February, 1988 - Four PECO employees were indicted for allegedly **distributing drugs** at Peach Bottom. PECO maintained that the workers were not working in areas affecting safety. (For more details see: November, 1987; January 8, 1988; May 2, 1988; November, 1989; and, May 10, 1999)

- February 9, 1988 - In a editorial, The Patriot News concluded: "PECO's management failed in that basic responsibility to the company's stockholders, to the federal regulations they are required to abide by and the public that was put at risk by this slipshod performance."

- March 17, 1988 - PE officials acknowledged that the plant will not be ready for restart until the "...fall frame time." This prediction would mean that the plant would be shut down for "at least 18 months, costing the company \$125 million, based on its current rate of expenditures for replacement power and a penalty imposed by the state Public Utility Commission" (The Patriot News, March 17, 1988, p.B-9).

- March 29, 1988 - The Public Citizen's Critical Mass Energy Project rated Peach Bottom as one of the poorest rated plants in the country based on the following criteria: "average lifetime operating efficiency; 1987 operating efficiency; average operating and maintenance costs during 1985 and 1986; average capital additions costs from 1982 to 1986; most recent SALP ratings; number of scrams during 1985 and 1986; average annual fines from 1985 to 1987; worker exposures from 1984 through 1986; LERs in 1985 and 1986; potential accident consequences derived through the CRAC-2 computer code" (The Nuclear Monitor, May 2, 1988, p.6).

An NRC's evaluation of the plant's management performance rated Peach Bottom as the ***eighth worst in the country***.

- April 7, 1988 - The Janny Montgomery Scott basic report on Philadelphia Electric noted that PE still faces many hurdles, including: "...further intense scrutiny from the regulatory commissions, and the uncertainty of future rate relief. Accordingly, the stock remains suitable primarily for investors willing to assume above-average risk." And, "Certainly, the extensive nature of the management reorganization will require time to evolve, but many deep-rooted problems such as those initially developed at Peach Bottom are corrected now."

- April 13, 1988 - J. Lee Everett "retired" as Chairman and Chief Executive Officer of Philadelphia Electric as a direct result of the harsh criticism from a January 12, 1988 report released by the Institute of Nuclear Power Operations (Refer to February 3, 1988).

- May, 1988 - Bessie Howard filed a complaint with the United States Department of Labor alleging that she was **fired "in retaliation for her identification of safety problems relating to security** at Peach Bottom." Beginning on January 24, 1988, Mrs. Howard reported that another security guard was sleeping on the job. She continued to report the matter until she was fired On March 16, 1988, by Burns Security, the security contractor for Peach Bottom. She was classified "status nine" and prohibited from working at other nuclear power plants or government facilities.

- A report issued by the NRC indicated "**that security personnel were forced to work excessively long hours, sometimes up to 12 hour shifts; were not given meal breaks, and were required to remain at posts for extended periods of time without being rotated to other posts**, a violation of NRC regulations" (York Daily Record, May 1988).

- May 2, 1988 - Four Peach Bottom employees were **charged with conspiracy to distribute methamphetamine** at the plant and elsewhere. Thirteen people, most of whom work at Peach Bottom, have been charged with drug-trafficking as a result of an FBI investigation. (For more details see: November, 1987; January 8, 1988; February, 1988; November, 1989; and May 10, 1999.)

- Spring 1988 - **A cot for sleeping on the job** was removed from an area located near the control room, and the NRC acknowledged knowing of its presence prior to its removal.

- June 6, 1988 - The NRC warned that the "**effort to make sure the Peach Bottom nuclear power plant is run safely is by no means a sure thing**" (Centre Daily News, June 1, 1988, A-6).

- June 16, 1988 - The General Counsel to the Governor of Pennsylvania submitted comments on the Revised Plan for Restart of Peach Bottom Atomic Power Station and the Actions of Philadelphia Electric Company Leading Up to and Succeeding the March 31, 1987 Shutdown Order of the Nuclear Regulatory Commission.

Counsel noted, "**The plan on the whole remains too general to permit proper evaluation.** Some of the most crucial areas, for example, the responsibility for individual operators and those managers who are retained for previous misconduct and the justifications for their retention, remain undisclosed. Certain basic problems, such as drug abuse and previous sanctions against **whistleblowers**, are either not addressed at all or are insufficiently addressed. Independent assessment organizations need even greater independence and must satisfactorily demonstrate reanalysis of problem reports (such as Significant Operating Events and vendor reports) that may have triggered inadequate responses over the last few years. Finally, and most importantly, the reforms generally proposed must be reduced to specific, clear, verifiable commitments and proper avenues outlined for verification."

- July 27, 1988 - Public Service Enterprise Group Incorporated and its subsidiary Public Service Electric and Gas Company filed an action in the United States District Court to **recover damages resulting for the NRC's shutdown of Peach Bottom**. On the same day in the same court, Atlantic City Electric Company and Delmarva Power and Light Company filed similar suits against Philadelphia Electric. The suits allege that PECO breached its contract under the Owners Agreement. Several tort claims were also filed, however no dollar amounts were specified. (Based on information from Philadelphia Electric Company's "Report to Shareholders Third Quarter 1988.") (See April 4, 1992 for settlement agreement.)

- August, 1988 - Peach Bottom's **security contractor was replaced due to incompetence**.

- August 11, 1988 - The NRC proposed fining PECO **\$1.25 million** for "management problems that resulted in a **forced shutdown** of the company's Peach Bottom nuclear plant." In addition, the NRC proposed fining **33 reactor operators** for **sleeping on the job, playing video games, engaging in spit ball battles, and other unprofessional activities**. Fines of \$500 to \$1,000 were recommended. PECO spokesperson Williams Jones disclosed that the company "has lost more than \$90 million since the NRC ordered Peach Bottom shutdown..." (Patriot News, August 12, 1988).

- August 17, 1988 - Joseph Rhodes, Jr., a member of the Pennsylvania Public Utility Commission, suggested that a **deal** between PECO and the NRC might have been made in order to get Peach Bottom back on line. In letters to NRC Chairman Lando Zech and PECO CEO Joseph Paquette, Jr., Rhodes stated, "One could draw the conclusion that by announcing these fines, the NRC has cleared the way for PECO to receive expedited approval of its Peach Bottom restart plan"(Patriot News, August 17, 1988).

- September 2, 1988 - An electrician, working in the low-level radioactive area, "... fell from scaffolding into a puddle of radioactive water...suffering slight contamination..." (The Patriot News, September 2, 1988).

- September 15, 1988 - NRC Chairman Lando Zech told senior management officials of PECO, "**I'm not going to accept what you say today and be anywhere near ready to authorize this plant.**" Zech noted, "Your operators certainly made mistakes, no question about that. Your corporate management problems are just as serious." Zech added, "The fact that we have a situation like this existing at any plant in the country is very serious. We're responsible to the American people. We can't have plants with this much inattentiveness to anything."

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William Russell, regional administrator, told plant officials that **unacceptable levels of contamination exist** in three pump rooms that are part of Peach Bottom's water cleanup system. He said the radiation in those locations is "some of the worst I've seen" (The Evening News, September 15, 1988, B 3.)

- September 23, 1988 - The Board of Directors voted to take no action to prevent the progress of shareholder lawsuits against former chairman and CEO, James L. Everett, III, and former President and CEO, John H. Austin, Jr., "for claims alleging mismanagement which resulted in the shutdown..." of Peach Bottom (Philadelphia Electric Company, Report to the Shareholders, Fourth Quarter, 1988.)

- September 26, 1988 - Governor Casey, through the Pennsylvania Department of Environmental Resources (Pa DER), ordered PECO and INPO to release files on recent investigations of the plant. Governor Casey noted, "We made it clear there were certain kinds of information we needed to evaluate our concerns, but after months of being unable to persuade PECO to provide us with that information on its own, we had to go ahead and issue these orders." (Philadelphia Inquirer, September 27, 1988.)

- September 27, 1988 - **A jury awarded \$130,000 to four pipe fitters who claimed they have health problems as a result of being exposed to asbestos** at several construction sites including Peach Bottom, Three Mile Island and Glatfelter paper mill.

- September 28, 1988 - Senator William Lincoln of Fayette announced that hearings should be required before a Peach Bottom restart.

- October 14, 1988 - PE appealed the Pa DER order to give the Casey administration access to internal documents relating to restarting Peach Bottom.

- October 19, 1988 - INPO "provided observations on its corporate evaluation conducted in October and on its plant evaluation conducted in September" (Philadelphia Electric Company, Report to the Shareholders, Fourth Quarter, 1988.)

INPO noted "that the operators needed additional simulator training to properly respond to some plant events, that management and shift supervision must take more effective action to correct significant operational and administrative problems, that administrative provisions must be upgraded to better help control room operators readily and accurately determine plant status, and that improvements are needed in communicating and assessing performance standards."

- October 21, 1988 - PECO announced a revision in their restart schedule. The projected date for restart was pushed back to the second quarter in 1989.

- October 27, 1988 - A recent safety evaluation conducted by the NRC was favorable for restart, according to PECO spokesman Neil McDermott. "What it [the report] is saying is that our plan addresses the problems which led to the shutdown, and that actions laid out in the plan are appropriate to correct those root causes." He added, "Now, of course, the NRC will continue to monitor the effectiveness of the implementation" (The Patriot News, October 22, 1988, B 9.)

- November 17, 1988 - **The NRC fined PECO \$50,000 because security guards were found sleeping on the job, inattentive duty and improperly posted.** The NRC also noted that "a **key** that could have unlocked doors to a security area was issued to a unauthorized employee, couldn't be found and officials didn't do anything about it once they discovered it was missing." William T. Russell, NRC regional administrator, noted, "The improvements made to date were not effective in precluding the occurrence of the violations" (The Patriot News, November 17, 1988, B 2.)

- January 1989 - The state of Maryland published a report of **radioactive contamination of the Chesapeake Bay** due to to emissions from Peach Bottom. (Note: The city of Baltimore gets 250,000 gallons of drinking water per day from the Susquehanna River.)

- January 12, 1989 - Admiral James D. Watkins, a member of Philadelphia Electric's Board of Directors, was **nominated for the post of Secretary of the Department of Energy.**

- February 1, 1989 - The NRC staff recommended that nuclear power plants that utilize the Mark 1 containment shell, **modify the structure to reduce the risk of failure during a serious accident.** PECO said it would make the \$2 to \$5 million changes only if the Nuclear Regulatory Commission makes the modifications a requirement. This is the second time in two years that the NRC staff has advised the Commission to make changes to the Mark 1 containment structure.

- February 8, 1989 - **The NRC announced that despite improvements at Peach Bottom, a restart vote will not take place until April, 1989.**

- February 18, 1989 - The NRC's Integrated Assessment Team's Inspection announced that PECO was close to restarting Peach Bottom.

- February 28, 1989 - The Commonwealth of Pennsylvania and Philadelphia Electric concluded an agreement that would give the Commonwealth access to confidential material and allow the state to monitor PECO's operation of Peach Bottom. The agreement was not an endorsement for restarting Peach Bottom.

- February 28, 1989 - The Lancaster New Era declared in an editorial on restart that, "While the company claims it sincerely has reformed, we have the overriding impression that reopening the plant, not safety, is the bottom line for the plant operator, Philadelphia Electric Co."

- April 21, 1989 - By a 3-0 vote, the NRC approved the restart of Peach Bottom. PECO spokesman Bill Jones calculated that the shutdown cost Philadelphia Electric \$300 million. (Patriot News, April 21, 1989, B-3.)

"**Whistleblower**" W. Allan Young, who was fired from Peach Bottom after raising concerns about workers being **exposed to high levels of radiation**, said in an open letter to the NRC, that the same people who fired him and prevented his rehiring at the plant, are still there. Young told WITF-TV, "They have idiots running that plant."

- April 27, 1989 - "An unplanned shutdown was made to repair three malfunctioning intermediate range monitors (IRM) during reactor startup" (SALP 50-277/88-99; 278/88-99.)

- April 28, 1989 - Peach Bottom began its ascent towards full power.

- May 11, 1989 - "An unplanned shutdown was made to replace a malfunctioning safety relief valve (SRV) which was slow to reclose" (SALP 50-277/88-99; 278/88-99.)

- May 14, 1989 - The reactor was taken to subcriticality due to problems with the the electro-hydraulic control (EHC) system (SALP 50-277/88-99; 278/88-99.)

- May 19, 1989 - Peach Bottom was shut down due to mechanical problems. Unit 2 "automatically scrammed from 20% power. The cause of the scram was a failed 'three element/single element control switch in the feedwater system" (SALP 50-277/88- 99; 278/88-99.)

- May 22, 1989 - "A malfunction in the offgas recombiner system caused the licensee to shutdown the turbine generator and reduce power to 5%" (SALP 50-277/88-99; 278/88-99.)

- May 31, 1989 - Peach Bottom was ranked the **third worst nuclear power plant in the nation** according to a report released by the consumer group Public Citizen. The report, "Nuclear Lemons: An Assessment of America's Worst Commercial Reactors," was based on information obtained from the government and nuclear industry.

- June, 1989 - Although the NRC revised its list of troubled reactors, Philadelphia Electric's Peach Bottom reactors remained on the list.

- June 21, 1989 - The NRC released a report on Mark 1 containment buildings entitled "**Severe Accident Risks: An Assessment for Five U.S. Nuclear Plants.**" The NRC's six-member panel were evenly divided as to whether the Mark 1 containment would be breached during a serious accident. Accordingly, "The NRC decided not to order immediate changes in the Mark 1 containment". (The Patriot News, July 21, 1989, B3.) Yet half of the panel stated "with near certainty" the Peach Bottom's containment structure would fail during a core melt accident.

- July 21, 1989 - At Peach Bottom 2: "An automatic reactor scram on main steam isolation valve (MSIV) closure occurred when troubleshooting activities in an electro-hydraulic control cabinet caused a false indication of high reactor pressure"(NRC SALP 50-277/89-99; 278/89-99,p.3.)

- August, 1989 - PECO "operated Unit 2 at power for about 32 hours with the emergency service water system inoperable." PECO was cited and paid a civil penalty on August 15, 1990.(See February, 1990 for related incident.) (NRC IR 50-277/92-09 and 50-278/92-09.)

- August 5, 1989 - PECO reached an agreement with the Public Utility Commission "not to charge customers for \$24.3 million in costs incurred by the company when the Peach Bottom nuclear power plant was shut down under a federal order" (Patriot-News, August 4, 1989, B-6.) However, PECO is seeking to "recover" \$107 million from its customers through a rate increase.

- September, 1989- The NRC released a SALP report indicating weaknesses "...in the performance of and support for some engineering projects, corporate technical assessment activities and management support for health physics training programs and technical facilities" (Annual Report 1989, p.13.)

- September 15, 1989 - **The Pennsylvania Superior Court reversed a lower court's decision dismissing charges by George Field against the Philadelphia Electric Company.** Field, a health- physics technician, alleged that PECO directly released radiation on him to avoid shutting the plant down. The three judge panel concluded:

We can visualize no conduct more outrageous in character, so extreme in degree, that went beyond all possible bounds of decency and to be regarded as atrocious and utterly intolerable in a civilized community, than to vent highly radioactive steam upon an employee. Furthermore, this was an intentional act. They elected to do this to him and then attempted to conceal the resulting situation

The three judge panel remanded the case back to York County Common Pleas Court. **Field is seeking \$5.2 million in damages.**

(The Philadelphia Inquirer, September 15, 1989, 3-B.)

- September 19, 1989 - In a report entitled Nuclear Legacy: An Overview of the Places, Problems and Politics of Radioactive Waste in the United States, (Public Citizen September 1989), **Peach Bottom was identified as hosting one the largest irradiated fuel pool inventories in the nation.** (Peach Bottom-2 was ranked seventh and Peach Bottom-3 was ranked eighth.) The combined volume of irradiated fuel being stored at Peach Bottom is 299.8 cubic meters. The material stored in these pools is classified as high-level reactor waste.

- October 5, 1989 - **The NRC lifted its shutdown order on Peach Bottom.** (The order was enacted on March 31, 1987.) This action allows Unit-3 to restart immediately. (Unit-2 has been operating since April, 1989, while the shutdown order was in effect.) The order also reduces the "strict" monitoring presence of the NRC at Peach Bottom. "The total cost of the shutdown was about \$250,000 million, including \$168 million for replacement power and a \$46 million fine imposed by the state and Public Utility Commission" (Patriot News, October 6, 1989, B-6.)

- October 5, 1989 - An automatic scram occurred at Unit 2 due to equipment failure. The plant was at 100% power when "... an outboard MSIV closed during surveillance testing, causing a pressure spike and a high high flux reactor scram" (NRC SALP 50-277/89-99;278/89-89, p.4.)

- October 5-10, 1989 - Peach Bottom shut down due to mechanical problems.

- November, 1989 - A former PECO employee was **convicted by a federal jury of possessing methamphetamine** at Peach Bottom in 1985 and 1986. (For more details see: November, 1987; January 8, 1988; February, 1988; and, May 2, 1988.)

- November 26, 1989 - An unplanned shutdown at Unit 2 resulted from equipment failure and design weakness. The plant was operating at full power when "an unplanned shutdown was made to repair an unisolable steam leak outside containment emanating from the RCIC injection check valve hinge pin picking" (NRC SALP 50-277/89-99; 278/89-99, p.4.)

Precursor RCIC problems were identified by the NRC on the following dates: December 10, 1982, March 8 and June 28, 1984, and August 14, 1985.

- December 11, 1989 - **PECO restarted Unit-3 which was shutdown by the NRC on March 31, 1987.** The company has estimated the total cost of the shutdown now exceeds \$214 million, including monies spent for replacement power and a rate penalty levied by the Pennsylvania Public Utility Commission (Patriot News, December 13, 1989.)

- December 20, 1989 - Unit-2 experienced an "unusual event" and was shutdown. The plant was automatically shutdown from 100% power "after a technician tested a power monitor, according to officials of Philadelphia Electric Co." (Patriot News, December 21, 1989.)

- December 27, 1989 - **Peach Bottom 2 restarted after shutdown.**

- January 8, 1990 - The Patriot News reported, "Philadelphia Electric Co. conducted **psychological screenings** of control-room operators at its Peach Bottom nuclear power plant to determine how many could be retrained after the plant was closed down by the Nuclear Regulatory Commission in 1987" (Patriot News, January 8, 1990, C3.)

The behavior-modification and rehabilitation program, "People: The Foundation of Excellence," was conducted by the psychologists' firm of Rohrer, Hibler & Replogle. Twenty-four out of the 36 control-room operators at the time of the shutdown entered the program. In addition, "10 of the remaining 12 were demoted and reassigned. Of the other two, one retired and one resigned. None of the five shift supervisors were considered for retraining, and were among the group demoted and reassigned" "Patriot,C3)

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In a memo from Julius J. Persensky, a section chief in the NRC's Human Factors Assessment Branch, Mr. Persensky noted the program was of limited value and operators still believe "that their previous behavior was safe." Persensky's memo also noted that Rohrer, Hibler & Replogle found the operators to be: a depressed, powerless, angry, humiliated and victimized group who didn't think they were doing wrong; practical as opposed to theoretical; open, candid and forthright; sheltered, narrow, parochial and naive; and, loyal to the organization, their profession and the company. According to Rohrer, Hibler & Replogle, up to ten people in may have to retake the program. (Patriot, C3.)

- January 27, 1990 - Unit 2 was shutdown again due to equipment failure and design weakness. The plant was shutdown to "repair an unisolable leak outside containment on a "B" reactor feedwater pump discharge flow instrument line" (see November 26, 1989 for a related incident) (NRC SALP 50-277/89-99;278/89-99, p.4.)

- January 28, 1990 - Unit 3 was forced into, "A fast power reduction and manual reactor scram were initiated when an electro-hydraulic control system fluid leak developed. The leak was caused by a failed sealing "O" ring (NRC SALP 50-277/89-99; 278/89-99, p.4.) The plant was operating at 100% power.

- February, 1990 - The emergency service water system "became inoperable due to improper restoration from maintenance activities." (See August 1989 for related incident.) (NRC IR 50-277/92-09 and 50-278/92-09.)

- March 6, 1990 - Unit 3 was shut down due to a "mechanical problem with the system's generator, officials said. Unit 2 had been shut down last week for maintenance" (York Daily Record, March 7, 1990.) However, an inspection report compiled by the NRC stated that "equipment failure complicated by inadequate surveillance procedures" resulted in an automatic scram. The event was caused when "the main turbine tripped at a reactor power of 35% due to A loss of main generating stator cooling" (NRC SALP, 50-279/89-99;278/88-99, p.5.)

- March 31, 1990 - In PECO's Report to Shareholders First Quarter 1990, the "Company reported a loss of \$84 million, equivalent to 40 cents per share, compared with earnings of \$118.9 million or 57 cents per share for the same period a year ago when 2.6 percent fewer shares were outstanding."

- April 11, 1990 - Peach Bottom's Unit 2 and Unit 3 reactors were rated ***third and fourth worst*** in the nation in terms of worker exposures, according to a report released by Public Citizen's energy policy group. The report was based on data obtained from the NRC.

- April 21, 1990 - Peach Bottom 2 was "taken off line due to vibrations in the unit's generator exciter" (York Daily Record, May 1, 1990.) Personnel error, procedure weakness and equipment failure contributed to the shutdown.

- April 23, 1990 - In a letter to Philadelphia Electric Shareholders, Joseph Paquette, Chairman and CEO, announced, "... the Company's Board of Directors voted to reduce the Company's quarterly dividend from \$.55 per share to \$.30 per share per share effective with the payment for the second quarter of 1990 to be made June 29, 1990." This action was linked to a rate request regarding the costs of operating and owning Limerick.

- In the Report to Shareholders for the *Third Quarter 1990*, Philadelphia Electric reported reaching a settlement "in the shareholders' derivative suit brought by certain shareholders against the Company's former Chairman and former President in connection with the events leading to the shutdown....Under the terms of a settlement agreement, two of the Company's director and Officer liability insurance carriers paid approximately \$34.5 million. The settlement became final on October 30, 1990. The plaintiffs' recovery, less \$6.5 million for their attorneys' fees and expenses were paid to the Company on November 1."

However, In PECO's annual statement, the company admitted, "The penalties associated with the [Peach Bottom's] shutdown for 1989 amounted to 23 cents per share, compared to 25 cents per share for 1988" (Annual Report 1989, p.14).

In addition, "The Company did not request recovery of any Peach Bottom replacement power costs incurred solely as a result of the NRC's shutdown order. In 1989, replacement power costs attributable to the shutdown order were approximately \$57 million , representing a reduction in common stock earnings of 17 cents per share" (Annual Report, p.21.)

- May 11, 1990 - "...instrument and controls technicians replacing a voltmeter on the '3B' battery charger caused a DC electrical system voltage transient" (NRC IR 50-277/92-09 and 50-278/92-09.)

- June 15, 1990 - The Public Utility Commission (PUC) ruled that Philadelphia Electric had to **refund** to its customers \$15 million. "The PUC ruled that PECO kept sloppy records, did not use enough competitive bidding and did not bid projects frequently enough" (Patriot News, June 15, 1990.)

- June 26, 1990 - The Pennsylvania Public Utilities Commission (PUC) released its twelfth annual report on utility consumer complaints to the PUC's Bureau of Consumer Services. The report noted that PECO was one of the companies whose overall performance "**was worse than that of other companies**" and "would benefit both from a critical review of their own operations and from attempting to emulate the operations of the companies which performed best."

- July 18, 1990 - The NRC fined PECO **\$75,000 for violations of technical specifications** involving the "plant's emergency service water system, a support system designed to cool safety equipment, other than the reactors, at Peach Bottom's Units 2 and 3" (The Patriot, July 18, 1990, B 5.)

- July 28, 1990 - Philadelphia Electric declared an unusual event from "5:38 am to 6 am because of a momentary increase in radiation levels in an internal gas-filtering system" (Patriot News, July 28, 1990, A 3.) Radioactive gas was released into the environment for ten minutes.

- August 15, 1990 - **PECO paid a civil fine** to the NRC for an August, 1989 incident involving the emergency service water system. (Also see February, 1990.)

- August 16, 1990 - In NRC inspections from July 1, 1989 to May 31, 1990, Peach Bottom 2 "experienced six unplanned shutdowns because of personnel errors or equipment failures, while the Unit 3 reactor had two shutdowns " (Philadelphia Inquirer August 16, 1990, 17 D).

- September 11, 1990 - PECO "discovered that indications derived from Unit 3 reactor water level transmitters...were abnormally high when compared to actual reactor water level" (NRC IR 50-277/92-13 and 50-278/92-13.) (See March 26 and 27, 1992 and July 26, 1992 for related incidents.)

- December 1, 1990 - In Philadelphia Electric's Report to Shareholders Third Quarter 1990, PECO announced: "For the three months ended September 30, 1990, the Company reported a loss of \$8 million, or 4 cents per share ...Earnings for the twelve months ended September 30, 1990 were 53 cents per share, \$1.68 under the earnings of the previous twelve month period."

- February 1, 1991 - In PECO's Annual Report 1990, the company noted that earnings per share plummeted by a \$1.78. Operating and maintenance costs rose by \$406 million or 38%.

- February 11, 1991 - "A contractor working inside the dormant Unit 2...took an 8-foot fall and was **flown to York Hospital** with slight contamination to his forehead." Neil McDermott, a company spokesman for PECO, said: "They resolved it by, (the contamination), well, soap and water" (Patriot, February 11, 1991.)

- February 12, 1991 - A, "Unit 2 primary containment isolation system (PCIS) and standby gas treatment system (SGTS) initiated (9:10 am) due to an electrical ground. "The event was not detected by the plant operators until about 10:00 am, because related annunciators had been removed from service for outage work" (NRC inspection reports 50-277/91-08; 50-278/91-08, p.2.)

- February 20, 1991 - At about 1:10 pm, a full Unit 2 reactor scram occurred due to inadequate blocking. "The unit was in refueling at the time with all control rods inserted" (See related incident on February 21, 1991)(NRC inspections 50-277/91-08;50-278/91-08, p.2.)

- February 21, 1991 - Inadequate blocking caused a loss of shutdown cooling. The "isolation occurred when an auxiliary operator (AO) inadvertently grounded a lead in the control room panel while applying a blocking permit" (See related incident on February 20, 1991) (NRC inspections 50-277/91-08;50-278/91-08, p.3.)

- February 21, 1991 - At 10:00 pm at Unit 2, fuel bundles were misplaced during a core reload. "An investigation revealed that the bundle had been erroneously loaded ...at 1:47 of the same day" (See related incidents on February 21-22, 1991)(NRC inspections 50-277/91-08; 50-278/91-08, p.4.)

- February 22, 1991 - A fuel bundle at Unit 2, at a separate location from the previous day's error, was "incorrectly loaded" at 1:15 pm. The error was not found until 6:00 am on February 24, 1991. Contributing to this error Poor CCTAS legibility" and "less than adequate communications."

On the same day a third and fourth error occurred!

"The third error was identified at about 3:00 pm....Fuel movement was suspended and the core and spent fuel pool (SFP) were inspected, leading to the discovery of fourth error" (See February 21 1991 for a related incident) (NRC inspections 50-277/-91-08; 50-278/91-08.)

- February 23, 1991 - The refueling moderator temperature was exceeded. "The lower moderator's temperature results in the addition of positive reactivity, and a decrease in shutdown margin....Fuel reload was halted..." (NRC inspection reports 50-277/91-08;50-278/91-08, p.6.)

- February 25, 1991 - Unit was at 100% power when "a high pressure coolant injection (HPCI) was declared inoperable when the mechanical overspeed trip (MOTD) did not operate as designed during performance of a routine surveillance test" (NRC inspection reports 50-279/1-08/50-278/91-08, p.3.) (For related events see: May 18 and 21, 1991; July 15-19, 1991; August 25, 1991; and, October 16, 1991.)

- March 21, 1991 - PECO "found four normally locked open unit 2 valves unlocked. Two of these valves were also closed" (NRC inspection reports 50-277/91-13;50-278/91-13, p.11.)

- April 1-5, 1991 - The NRC issued a Notice of Violation. "The violation is of concern because of the possible incompatibility of the insulation with materials it is in contact with and the fact that it may compromise fire loadings and propagation potentials" (NRC inspections 50-277/91-14 and 50-278/91-14.)

- April 7, 1991 - The Chief Reactor Operator discovered that the Technical Specifications surveillance requirement to log Unit 2's reactor vessel heat up rate had not been performed . (NRC inspections 50-277/91-13;50-278/91-13, pp. 2-3.)

- April 10-11, 1991 - The Unit 3 high pressure coolant injection system failed several times.

- April 15, 1991 - During maintenance testing it was discovered that "valves were reinstalled in the wrong direction following the current valve refurbishment" (NRC inspection reports 50-277/91-13/50-278/91-13, p. 5.)

- April 22, 1991 - "...a fault developed in one of the conductors connecting the secondary side of the # 2 Emergency Auxiliary (2EA) transfer to the safety and non-safety related 4 KV busses" (NRC inspection reports 50-277/91-13;50-278/91-13, p.7.)

- April 23, 1991 - At Unit 2 "reactor power was decreased, the mode switch was placed in startup and power was held at 5% to replace cable on an emergency transformer when its insulation was found to be shorted" (NRC inspection reports 50-277/91-16 and 50-278/91-16, Details.)

- April 25, 1991 - Peach Bottom 2 was rated the **third worst nuclear reactor in the county**. Peach Bottom 2 and 3 were tied for seventh worst rate of worker exposure to radiation. (Public Citizen, Nuclear Lemons: An Assessment of America's Worst Commercial Nuclear Power Plants.)

- May 2, 1991 - "Due to further degradation of emergency transformer cable insulation the unit (2) was shut down on may 2 to replace the cables" (NRC inspection reports 50-277/91-16 and 50-278/91-16, Details.)(See July 4, 1992 for a related incident.)

- May 9, 1991 - The Unit 3 reactor experienced "an unexpected isolation of the reactor water cleanup (RWCU) system occurred when technicians placed a jumper in an incorrect location" (NRC inspections 50-277/91-16 and 50-278/91-16, p.2.)

- May 13-20, 1991 - An NRC inspection noted that: "During the 1991 Unit 2 refueling outage, leaks in the Unit 3 Offgas System allowed noble gas to be released to many areas of the plant"(NRC inspection reports 50-277/91-17 and 50-278/91-17, p.3.)

- May 15, 1991 - During the performance of a surveillance test at Unit 2, "system engineers incorrectly removed fuse DD-29 from panel 20C15 instead of the specified fuse DD-28. Pulling the fuse removed power from the primary containment isolation system (PCIS) group III inboard isolation logic, causing the associated components to isolate" (NRC inspection reports 50-277/91-16 and 50-278/91-16, p.3.)

- May 18, 1991 - The Unit 2 high pressure coolant injection (HPCI) system was made inoperable during fire protection system surveillance testing. (NRC inspections 50-277/91-16 and 50-278/91-16.) (For related event see: February 25, 1991; May 21, 1991; June 19, 1991; July 15-19; August 27, 1991; and, October 16, 1991.)

- May 20, 1991 - At Unit 3, "the residual heat removal (RHR) pump automatically started when technicians incorrectly removed a switch from the 'test position'" (NRC inspection reports 50-277/91-16 and 50-278/91-16, p.4.)

- May 21, 1991 - During a routine surveillance procedure at Unit 2, "an unexpected isolation of the HPCI system steam line" occurred (NRC inspection reports 50-277/91-16 and 50-278/91-16, p.4.) (For related events see: February 25, 1991; May 18, 1991; June 19, 1991; July 15-19; August 25, 1991; and, October 16, 1991.)

- May 21, 1991 - Both units were affected by the inoperability of the emergency diesel generator due to unqualified relays. (NRC inspection reports 50-277/91-16 and 50-278/91-16, pp.5-6.)

- May 23, 1991 - Units 2 and 3 were shutdown "due to a belief that the 4 station Emergency Diesel generators (EDG's) could potentially be rendered inoperable during design basic events" (Licensee Event Report 50-277 and 50-278.)

- May 29, 1991 - Both standby liquid control (SLC) pumps at Unit 3 were rendered inoperable due to high tank temperatures. (NRC inspection reports 50-277/91-16 and 50-278/91-16.)

- June 7, 1991 - Unit 2 was shutdown (tripped) due to inadequate recirculation pump seal cooling. (NRC inspections 50-277/91-16 and 50-278/91-16.)

- June 15, 1991 - An NRC inspector "found a security guard **asleep** on the Unit 2 refuel floor...The guard had been assigned to watch a cask which had not been opened and searched" (Inspection reports 50-277/91-20 and 50-278/91-20.)

- June 19, 1991 - A Notice of Violation was issued for an incident which involved the high pressure coolant injection system on May 21, 1991. (See February 25, 1991; May 18 and 21, 1991; and, July 15-19, 1991 for related incidents.)

- June 24, 1991 - Unit 2 pressure transmitters were identified as not being seismically supported. "The support for the PT's was mounted on non seismic floor grating and only one of four anchor bolts was installed" (Inspection reports 50-277/91-20 and 50-278/91-20.)

- June 24-28, 1991 - A Notice of Violation was issued for the following: "Two instances were identified in which corrective actions taken by your staff had not adequately resolved deficiencies related to quality classification of safety-related equipment (Q-List), and control of measuring and test equipment" (NRC inspection 50-277/91-20 and 50-278/91-20.)

- June 24-28, 1991 - An NRC radiological safety inspection observed, "Audit findings indicated that, at times, management had provided poor oversight of program activities. For example, individuals who failed to perform radiologically sound work were not always held accountable for their work. Examples of poor quality were observed for individuals both internal and external to the HP organization" (NRC inspections 50-277/91-22 and 50-278/91-22)

- June 27, 1991 - An unplanned manual scram occurred at Unit 2 due to low condenser vacuum.(NRC inspection reports 50-277/91-20 and 50-278/91-20.)

- July 7, 1991 - Unit 3 was scrammed following a trip of the main generator output breakers. (NRC inspections 50-277/91-20 and 50-278/91-20.)

- July 8-12, 1991 - The NRC staff "...identified several instances of failure to take effective corrective action in response to previously identified problems in the surveillance testing area. We are concerned with this matter because of the time which has elapsed since these problems were first identified. Management has not developed detailed plans or goals to improve performance in this area" (NRC inspections 50-277/91-23 and 50-278/91-23.)

- July 10, 1991 - At Unit 3, "licensee technicians inadvertently caused a trip of the "B" reactor protection system (RPS) motor generator (MG) set." The secondary containment was also isolated during troubleshooting. (NRC inspections 50-277/91-21 and 50-278/91-21.)

- July 16-17, 1991 - The licensee determined that there was low emergency water flow to Unit 2's Emergency Diesel Generators and residual heat removal pumps. "As a result, the Unit 2 RCIC and 'B' loop of low pressure coolant injection (LPCI) were declared inoperable on July 16 and 17" (NRC inspections 50-277/91-21 and 50-278/91-21.)

- July 15-19, 1991 - During an inspection the NRC observed: "...one of your activities related to the operability of the high pressure coolant injection (HPCI) system appears to be in violation of NRC requirements..." (NRC inspections 50-277/91-24 and 50-278/91-24.) (For related events see: February 25, 1991; May 18 and May 21, 1991; June 19,1991; August 25, 1991, and, October 16, 1991.)

- July 18, 1991 - The Unit 2 high pressure coolant injection system isolated during surveillance testing. (NRC inspections 50-277/91-21 and 50-278/91-21.)

- July 24, 1991 - An initiation of a Unit 3 plant shutdown occurred due to an inoperable DG Auto-start logic. (NRC inspections 50-277/91-21 and 50-278/91-21.)

- July 27, 1991 - There was a partial containment isolation at Unit 3 following the failure of a 500 KV disconnect switch.

- July 24, 1991 - A letter from the Assistant Associate Director of FEMA noted: "Twenty-two Areas Requiring Corrective Action were identified during the [emergency preparedness practice on February 7, 1990] exercise. FEMA's Region III staff will monitor the status of the corrective actions" (Letter to the NRC from Dennis H. Kwitatoski.)

- July 30- August 1,8 and 22, 1991 - The NRC conducted safety inspections of emergency preparedness exercises and found: "While no violations were noted during the inspection, one exercise weakness was identified. This weakness concerned a significant breakdown in the communication, distribution, and tracking of scenario data" (NRC inspections 50-277/91-25 and 50-278/91-25.)

- July 31, 1991 - A Notice of Violation was issued for an "event at the Peach Bottom facility during which you [PECO] overheated the Unit 3 standby liquid control (SLC) solution storage tank" (See May 29, 1991 for more details) (NRC inspections 50-277/91-16 and 50-278/91-16.)

- August 5, 1991 - Unit 2 scrambled at 98% power. "The main turbine tripped due to high level in the 'D' moisture separator drain tank (MSDT)" (NRC inspections 50-277/91-27 and 50-278/91-27.)

- August 12, 1991 - The NRC revealed that they did not have current copies of Peach Bottom's Emergency Operating Procedures.

- August 25, 1991 - Unit 3 was shutdown due to inoperable room coolers. PECO "found that both the high pressure coolant injection (HPCI) and the reactor core isolation cooling (RCIC) system pump component coolers were inoperable" (NRC inspections 50-277/91-27 and 50-278/91-27.) (For related incidents see: February 25, 1991; May 18 and 21, 1991; July 15-19, 1991; and, October 16, 1991.)

- August 27, 1991 - Both units were "shutdown following discovery that two of the four emergency diesel generators (EDG) were inoperable" (NRC inspections 50-277/91-27 and 50-278/91-27.)

- September 8, 1991 - Philadelphia Electric "discovered that the "A" CAD sample line from the torus was plugged" (NRC inspection 50-277/91-27 and 50-278/91-27.)

- September 12, 1991 - An unusual event was declared when jet pump components dropped into the spent fuel pool" (NRC inspections 50-277/91-27 and 50-278/91-27.)

- September 17, 18 and 24, 1991 - The control room emergency ventilation system isolated and transferred to the emergency ventilation mode" (Another occurrence was reported on October 25, 1991.) (NRC inspections 50-277/91-27 and 50-278/91-27.)

- September 19-20 and 23-24, 1991 - A Notice of Violation was issued by the NRC. The staff reported: "Of concern to us associated with the work on RWCU Pump 3B was the failure of your staff to perform an assessment of the radiological hazards associated with pump components and subsequent failure to establish appropriate radiological controls for the work. Surveys for beta radiation hazard of the pump impeller and internal components were not made prior to allowing work to commence on them. After the work was completed contact beta radiation dose rates were determined to be as high as 1,100 Rads per hour. While performing the work without accurate knowledge of the beta radiation dose rate did not lead to an overexposure, it may have resulted in unnecessary exposure" (NRC inspections 50-277/91-28 and 50-278/91-28.)

- September 24, 1991 - PECO determined that there was "induced fuel failure" at Unit 3. "The licensee visually inspected the six bundles and identified that one of the bundles had experienced failure caused by a malfunctioning defect, while the other five bundles had experienced debris induced failure. The debris appeared to be small metal chips" (NRC inspections 50-277/91-33 and 50-278/91-33.)

- September 27 through November 4, 1991 - During this inspection period the NRC found "certain" of PECO's activities to be in "violation." A Notice of Violation was issued. "Inadequate initial and independent verification of a valve position resulted in an emergency core cooling pump being inoperable for about seven days. The consistency and quality of worker and independent verification of safety-related operations, maintenance and test activities is a recurring weakness" (NRC inspections 50-277/91-30 and 50-278/91-30.)

- October, 1991 - Employees using the **wrong shutdown manual** caused an overheating of the plant's boron injection water. Larry Doerflein of the NRC commented: "By and large, there has been little overall progress. We're still seeing the same problems we saw a year ago" ("Atoms & Waste," October, 1991.)

- October 2, 1991 - The NRC issued a violation "associated with inadequate radiation surveys during work on highly radioactive components" (NRC IR50-277/92-80 50-278/92-80.)

- October 16, 1991 - Unit 2 was shut down at 73% power due to the inoperability of the high pressure coolant injection. A steam isolation valve packing leak had been detected.(NRC inspections 50-277/91-30 and 50-278/91-30.) (For related incidents see: February 24, 1991; May 18 and 21, 1991; July 15-19, 1991; and, August 25, 1991.)

- October 21-25, 1991 - "One non-cited violation was noted involving radioactive material receipt practices (NRC inspections 50-277/91-32 and 50-278/91-32.)

- October 22, 1991 - A fire in the Unit 3 condenser bay occurred from 10:23 p.m. to 10:37 p.m. (NRC inspections 50-277/91-30 and 50-278/91-30.)

- October 25, 1991 - "The main control ventilation system automatically isolated and transferred the emergency ventilation mode..." (This type of actuation also occurred on September 17, 18 and 24, 1991.) (NRC inspections 50-277/91-30 and 50-278/91-30.)

- October 26, 1991 - An unusual event was declared when a "potentially contaminated individual" was transported offsite.(NRC inspections 50-277/91-30 and 50-278/91-30.) (See December 8, 1991 for related incident.)

- October 27, 1991 - Nuclear Maintenance Division "found the fuel bundle at spent fuel pool location Z-31 to be oriented improperly" (50-277/91-30 and 50-278/91-30.)

- October 28, 1991 - "Smoke was detected coming from the Unit 2 "B" Low Pressure Coolant Injection (LPCI) swing bus. Further examination revealed that the power monitoring relay for the bus had burned up" (NRC inspections 50-277/91-30 and 50-278/91-30.)

- October 28, 1991 - The "B" auxiliary boiler was contaminated with radioactive iodine-131. The boiler was isolated and radioactive liquid was drained to the radwaste system. (See December 23, 1991 and February 24, 1992 for related incidents.)

- November 4, 1991 - "The Unit 2 'B' reactor protection system (RPS) motor generator (MG) set unexpectedly tripped" (NRC inspections 50-277/91-30 and 50-278/91-30.)

- November 8, 1991 - PECO "determined that the automatic depressurization system (ADS) had been inoperable from shortly after the plant startup in December 1989 to shutdown for the refueling outage on September 14, 1991. The licensee concluded that the environmental qualification (EQ) of the solenoid operated valves (SOV), electrical cables and splices, to the five ADS safety related valves (SRV) had expired shortly after startup. The thermal insulation over all 11 SRVs, including the 5 SRVs dedicated to ADS, had been installed backwards during the last refueling outage" (NRC inspections 50-277/91-33 and 50-278/91-33.)

- December 1, 1991 -In PECO's "Report to Shareholders, Third Quarter, 1991,"it was revealed that a management audit was conducted from July, 1989 to May, 1990. The audit was completed by Ernst & Young and released in August, 1991. Philadelphia Electric admitted that the audit "details a significant number of opportunities for the Company to improve in almost every aspect of operations, and we have submitted a detailed implementation plan to the PUC addressing each of the recommendations for improvement."

- December 5, 1991 - Unit 2 was forced to shutdown due to excessive leakage past the residual heat removal system injection check valve. (NRC inspections 50-277/91-33 and 50-278/91-33.)

- December 5, 1991 - A reactor core isolation occurred at Unit 2. (NRC inspections 50-277/91-33 and 50-278/91-33.)

- December 8, 1991 - An unusual event was declared when a potentially contaminated individual was transported off site. (NRC inspections 50-277/91-33 and 50-278/91-33.) (See October 26, 1991 for related incident.)

- December 16, 1991 - At Unit 3, "an unexpected primary containment isolation occurred..." during instrument line-up (NRC inspections 50-277/91-43 and 50-278/91-34.)(See March 10, 1992 for related incident.)

- December 18, 1991 - A shutdown cooling isolation occurred at Unit 3 "when a PCIS logic fuse blew" (NRC inspections 50-277/91-43 and 50-278/91-34.) (See January 4, 1992 for related incident.)

- December 23, 1991 - Low-level iodine-131 contamination was reported at the "B" and "C" auxiliary boilers. (See October 28, 1991 and February 24, 1992 for related incidents.)

- December 24, 1991 - In a letter to Mr. D.M.Smith, Senior Vice President-Nuclear, the NRC identified two problems at Peach Bottom. "The first problem concerns the degradation, and potential extended inoperability, of the Unit 3 automatic depressurization system due to the incorrect installation of the valve thermal insulation. In addition, your immediate corrective actions following discovery of this problem were not completely effective. A similar problem on one Unit 2 valve was not identified and corrected until raised by the inspector. Based on our review of the issues, two apparent violations of NRC requirements were identified and are being considered for escalated enforcement action..." (Charles W. Hehl, Director, Division of Reactor Projects.)

- January 4, 1992 - Due to valve fuse failure, PECO "determined that containment integrity could not be assured for the reactor core isolation cooling suppression pool suction line" (NRC inspections 50-277/91-34 and 50-278/91-34.) (See December 18, 1991 for related incident.)

- January 17, 1992 - High oxygen concentration levels were recorded in the Unit 3 control room.

- February 24, 1992 - The NRC reviewed PECO's efforts to desludge the flood drain waste storage tank and found several problems: "...The radiation protection technician who wrote the permit was unaware that personnel would be walking in radioactive sludge measuring up to 350 millirem per hour (mr/hr) on contact...The radiation protection supervisor who signed the RWP was not aware that workers would be working in sludge...the planning process did not evaluate the collective radiation exposure that would result from desludging all tanks over the life of the PM process... The work activity was not reviewed by the ALARA group, which precluded in-depth evaluation of all exposure reduction methods, including the use of state-of-the-art cleaning techniques or design changes to tanks to provide for ease of future cleaning that would reduce aggregate exposure...The filter clogged and resulted in additional personnel exposure...the licensee contacted no other stations to identify state-of-the-art methods to perform tank desludging" (NRC IR 50-277/92-80 and 50-278/92-80.)

- February 24, 1992 - Low-levels of iodine-131 contamination in the "A" auxiliary boiler were reported. (See October 28 and December 23, 1991 for related events.)

- February 24 through March 13, 1992 - The NRC's Integrated Performance Assessment Team (IPAT) issued its findings and "concluded that several weaknesses merit near-term corrective actions to reduce the potential for future safety problems...the team observed weaknesses in licensee evaluation of degraded or inoperable control room instrumentation and permanently installed plant instrumentation. Weaknesses were also identified in the lack of interim corrective actions for self-assessment findings and in the control of documents related to modifications and temporary plant and procedure changes" (NRC Region I IPAT IR 50-277/92-80 and 50-278/92-80.)

- February 25, 1992 - Philadelphia Electric agreed to pay **\$285,000 in fines for the improper insulation of safety system relief valves at Unit 3.** Company spokesman Neil McDermott admitted there is "absolutely no question and we readily admit that the insulation was improperly installed" (Patriot News, February 25, 1992.)

- March 6, 1992 - The NRC observed: "Several weaknesses were noted in the training program during the conduct of the examinations. Differences between Peach Bottom and Limerick had a negative impact on some LSRO lesson plans in that the lesson plans did not track actual plant practice. LSRO responsibilities were not well defined at Limerick and differ from those at Peach Bottom. Training was not always given as described in the task to training matrix or the qualification manual. In general, the candidates' knowledge of the site and plant at which they were not normally stationed was weak." (Lee H. Bettenhausen, Chief, Operations Branch, Division of Reactor Safety.)

- March 10, 1992 - PECO "concluded" that Units 2 & 3 had deficiencies in their primary containment isolation systems.(NRC inspections 50-277/92-07 and 50-278/92-07.) (See December 16, 1991 for related incident.)

- March 10, 1992 - The NRC's Integrated Performance Assessment Team (IPAT) observed, "an operator exit the fourth floor administration building radiological control point...without properly surveying personal articles being removed from the radiological control area" (NRC Region I IPAT 50-277/92-80 and 50-278/92-80.)

- March 13, 1992 - Philadelphia Electric "discovered" Unit 2 residual heat removal equipment valves were not installed."With the check valves on the discharge of the sump pumps for the 'B' and 'D' RHR rooms not installed, this design basis can not be met. Specifically, during a loss of coolant accident, concurrent with a loss of off-site power, the reactor building sump pumps would not be available due to the loss of off-site power" (NRC inspections 50-277/92-07 and 50-278/92-07.)

- March 16, 1992 - Due to a turbine exhaust drain line valve failure, the Unit 2 high pressure coolant injection system was rendered inoperable.(NRC inspections 50-277/92-07 and 50-278/92-07.) (See March 23, 1992 for related incident.)

- March 23, 1992 - PECO "declared the HPCI system inoperable when the turbine overspeed trip device did not reset during testing" (NRC inspections 50-277/92-07 and 50-278/92-07.) (See March 16, 1992 for related incident.)

- March 26, 1992 - PECO "declared all Unit 2 reactor water level instrumentation associated with the 2B reactor water level reference leg condensing chamber inoperable" (NRC IR 50-277/92-13 and 50-278/92-13.) (See September 11, 1990, March 27, 1992 and July 26, 1992 for related incidents.)

- March 27, 1992 - Unit 2 was shutdown due to inoperable reactor level instrumentation. (See September 11, 1990, March 26, 1992 and July 26, 1992 for related incidents.)

- April 2, 1992 - A settlement was announced on the two lawsuits brought against PECO by Peach Bottom's co-owners: Public Service Electric and Gas Company, Delmarva Power and Light Company and Atlantic City Electric Company. The suits were related to the NRC shutdown of Peach Bottom on March 31, 1987."**As part of the settlement, Philadelphia Electric will pay \$130,985,000 on October 1, 1992 to resolve all pending litigation.**" (Joseph Paquette, April 8, 1982.) (See July 27, 1988 for background material.)

- April 7, 1992 - PECO began a planned shutdown for Unit 2 from about 100% power. "The shutdown was required because a one inch vent line failed at a welded connection on the condensate supply herder to the offgas recombiner condenser...A reactor scram and primary containment isolation system (PCIS) group II and III occurred" (NRC IR 50-277/92-09 and 50-278/92-09.)

- April 17, 1992 - The NRC issued a Notice of Violation for the following infractions: "Contrary to the above requirements, the ODCM [Offsite Dose Calculation Manual] specified composite water sampler at the intake had been inoperable during the period August 30, 1991 to March 19, 1992, and the specified composite water sampler at the discharge had been inoperable since August 8, 1991 and remains inoperable at the time this inspection [was] conducted March 23-27, 1992. The licensee's efforts to complete corrective action prior to the next sampling period were ineffective" (NRC inspections 50-277/92-08 and 50-278/92-08.)

- April 29, 1992 - A Health Physics technician was **contaminated** in the de-watering facility when "contamination controls were compromised. According to the licensee's investigation, a defective latch and hinge on the fill-head access door allowed contamination to escape from the liner to the room during processing. Contamination levels on near-by radwaste equipment were as high as 200 mrad/hour. The general area surfaces in the truck bay were contaminated up to 30,000 dpm/100cm (2)" (NRC IR 50-277/92-12 and 50-278/92-12.)

- May 4, 1992 - Philadelphia Electric "initiated a planned shutdown [at Unit 3] in order to repair a large steam leak through a manway on the 'F' moisture separator tank" (NRC inspections 50-277/92-11 and 50-278/92-11.)

- May 12, 1992 - Unit 3 recirculation pump trip occurred at 80% power.(See June 27, July 23, July 26 and July 27, 1992 for related incidents.)

- May 15, 1992 - PECO initiated a shutdown of Unit 2 "due to inoperability of the high pressure coolant injection and the reactor core isolation cooling systems" (NRC inspections 50-277/92-11 and 50-278/92-11.) (See June 25, 1992 for related incident.)

- May 20, 1992 - Unit 2 experienced a reactor scram and turbine trip due to a malfunctioning combined intermediate valve.

- May 22, 1992 - The motor for the Unit 3 residual heat removal pump failed and was declared inoperable.

- June 1, 1992 - "Common stock earnings for the first quarter of 1992 were \$0.33 per share, \$0.25 lower than the \$0.58 per share earnings for the corresponding period last year. The reduction in earnings was primarily the result of the previously reported settlement of litigation by the co-owners of Peach Bottom Atomic Power Station which reduced first quarter earnings by approximately \$0.27 per share" (J.F. Paquette, Jr., Chairman of the Board and Chief Executive Officer, Report to Shareholders First Quarter, 1992).

- June 25, 1992 - The Unit 3 high pressure coolant injection system was declared inoperable "due to excessive water buildup in the turbine casing" (NRC IR 50-277/92-13 and 50-278/92-13.) (See May 15, 1992 for a related incident.)

- June 27, 1992 - The 'A' recirculation pump tripped at Unit 2.(See May 12, July 23, July 26 and 27, 1992 for related incidents.)

- July 4, 1992 - An Alert was declared at Peach Bottom due an explosion at the #1 transformer station. Units 2 and 3 were operating at at, or around, 95 % power. As a result of the explosion, Unit 3 scrambled and there were several emergency safeguard actuations.(See May 2, 1991 for a related incident.)

- July 14, 1992 - "Unit 3 was manually scrambled from 63% power due to a decreasing main condenser vacuum" (NRC IR50-277/92-13 and 50-278/92-13.)

- July 17, 1992 - Unit 2 experienced a turbine trip and reactor scram at 95% power during a severe lightning storm.

- July 23, 1992 - The Unit 3 recirculation pump tripped at 95% power.(See May 12, June 27, July 26 and July 27, 1992 for related incidents.)

- July 25, 1992 - "Unit 2 was shutdown due to a safety relief valve bellows rupture alarm" (NRC IR 50-277/92-13 and 50-278/92-13.)

- July 26, 1992 - The 'A' recirculation pump tripped at Unit 2. (See May 12, June 27, July 23 and July 27, 1992 for related incidents.)

- July 26, 1992 - A safety device used at Peach Bottom and 35 other American nuclear reactors may be defective according to the NRC. "Engineers are concerned that in a serious accident involving the rapid loss of coolant and pressure from the reactor, the device would give a false reading, indicating the reactor core was still covered with water when it actually was not and therefore in danger of melting down" (Sunday Patriot News, July 26, 1992 A3.) (See September 11, 1990 and March 26 and 27, 1992 for related incidents.)

Peach Bottom has had a history of problems in this area.

" In August 1990, the licensee identified that the Unit 2 level instrumentation served by the 2B condensing chamber and reference leg was indicating values about 11 inches higher than similar instruments served by the 2A condensing chamber...They [PECO] concluded that the actuation set points for several safety systems would be exceeded during transients or accidents, declared the instruments inoperable and completed a plant shutdown. Following the 1990 event, the licensee revised the channel check procedures to provide better monitoring and evaluation of the instruments...A second level offset event, again

Continued on the next page...

involving the Unit 2B condensing chamber, occurred in March 1992. The improved surveillance procedures helped the licensee identify the offset before it had exceeded 3 inches. In response, the licensee established a 4 1/2 inch offset operability limit, and closely monitored the instrumentation..." (NRC IR 50-277/92-16 and 50-278/92-16.) (For related incidents see September 11, 1990 and March 26-27, 1992.)

-July 27, 1992 - The 'A' recirculation pump tripped at Unit 2.

(See May 12, June 27, July 23 and July 26, 1992 for related incidents.)

- July 27, 1992 - Peach Bottom and 86 other suspected nuclear reactors **"depend on a defective and dangerous fire-barrier system to protect electrical cables used for a safe shutdown during a fire/accident."** (Nuclear Information and Resource Service (NIRS), July 27, 1992.) The company who produces the Thermo-Lag 330 system is Thermal Science, Inc. (TSI), St. Louis, Missouri. Among the problems with Thermo-Lag are: combustibility, toxicity, seismic qualification, vulnerability to water, incomplete installation and ampacity calculation errors.

In an IR issued on September 10, 1992, PECO requested a temporary waiver of technical specification compliance for certain fire barriers. The NRC observed: "...the licensee could not post the required fire watch for residual heat removal system cables running through the Unit 3 offgas pipe tunnel because it is a high radiation area".

(NRC IR 5 277/92\16 and 50-278/92-16.)

- August 6, 1992 - The NRC issued a violation "for operation of the reactor cleanup system in a mode not established in approved operating procedures, is of concern because it represents a weakness in your control of operating activities" (NRC IR 50-277/92-13 and 50-278/92-13.)

- August 10, 1992 - PECO entered a seven day maintenance outage on the E-4 emergency diesel generator.

- August 17, 1992 - A generator lock-out and reactor scram occurred at Unit 2 due to improper blocking. PECO "determined that the generator lock-out occurred because the permit being applied in the South Substation was incorrect" (NRC IR 50-277/92-16 and 50-278/92-16.)

- August 20, 1992 - The Unit 3 Emergency Core Coolant System power supply failed. The root cause was a failed topaz inverter.

- September 14, 1992 - A licensed operator tested positive for marijuana use.

- October 6, 1992 - During an NRC inspection relating to plant security, one unresolved Fitness-for-Duty(FFD) item was identified. The NRC also cautioned that "... additional attention is warranted on the effectiveness of routine security patrols since we identified certain deficiencies during this inspection that should have been identified by your officers on patrol" (NRC IR 50-277/92-20 and 50-278/92-20.)

- October 15, 1992 - Unit 3 scrammed and the high pressure coolant injection (HPCI) system initiated: "... Unit 3 experienced a primary containment isolation system (PCIS) group I isolation on main steam line (MSL) low pressure. This resulted in closure of the MSIVs and a reactor scram. During the post-scram pressure and level transient, vessel water decreased to the ECCS Lo Level initiation setpoint. The high pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) systems initiated and injected into the reactor vessel. The alternate rod insertion and reactor recirculation point trip logic also actuated. Three main steam safety relief valves (SRV) opened automatically for a short period to control pressure, and later re-closed. The licensee declared an unusual event (UE) at about 9:25 p.m. due to the initiation and ejection of an ECCS system in response to a valid signal...At about 11:16 p.m., while proceeding with the plant cooldown, reactor vessel level increased above the normal operating band and caused a HPCI and RCIC high reactor vessel water level turbine trip. Due to the temporary loss of HPCI as a means of pressure control, reactor pressure increased to the high pressure scram setpoint. the operators manually operated an SRV to reduce pressure, and restarted HPCI and RCIC. the licensee also reported this second scram signal to the NRC via the ENS. All systems responded as expected following the PCIS group I isolation and reactor scram, and the subsequent high reactor pressure scram" (NRC IR 50-277/92-27 and 50-278/92-27.)

PECO management decided to shut the plant for five days.

After reviewing the events the NRC issued a Notice of Violation and criticized, "The control room staff did not effectively monitor developing reactor coolant stratification following the Unit 3 automatic scram, and certain Technical Specification reactor pressure/temperature limits were exceeded. Adequate controls were not in place to ensure that the transient was appropriately evaluated before plant restart. Also, operators did not record required pressure data used to evaluate compliance with pressure/temperature limits following a Unit 2 shut-down." (E. Wenzinger, Chief, Projects Branch 2, Division of Reactor Projects, November 16, 1992.)

- October 16, 1992 - The NRC found one potential problem with senior reactor operators (SRO) examinations: "Since SRO Upgrades are currently licensed individuals at your facility, we are concerned that your training program may not be emphasizing a high level of performance among reactor operators in referring to and using procedures" (NRC IR 50-277/92-18 and 50-278/92-18.)

- October 16, 1992 - The NRC identified a programmatic weakness during this inspection: "... in many cases SMs [System Manager program] lacked specific system experience and knowledge. Workload management and prioritization did not allow for the accomplishment of the tasks established in the licensee's Administrative Guidelines, such as formal system walkdowns, monitoring and trending" (NRC IR 50-277/92-26 and 50-278/92-26.)

- November 16, 1992 - The NRC noted: "An industrial safety concern, which involved the potential for loss of power in the drywell, and which was identified by your staff during previous outages, was reviewed. The issue had not yet been resolved and warrants your attention" (NRC IR 50-277/92-30 and 50-278/92-30.)