



Union of Concerned Scientists

Citizens and Scientists for Environmental Solutions

October 14, 2002

Chairman Richard A. Meserve
Commissioner Nils J. Diaz
Commissioner Greta Joy Dicus
Commissioner Edward McGaffigan, Jr.
Commissioner Jeffrey S. Merrifield

**SUBJECT: 0350 PROCESS AT DC COOK & DAVIS-BESSE:
 THAT WAS THEN, THIS IS NOW**

Dear Chairman and Commissioners:

The Nuclear Regulatory Commission invoked Inspection Manual Chapter 0350 this year for the Davis-Besse Nuclear Power Station in Ohio as it did in 1998 for the D C Cook nuclear plant in Michigan. The many similarities between these cases include:

- both 0350 processes administered by NRC Region III,
- both 0350 panels chaired by John A. Grobe,
- both 0350 checklists covered equipment material condition problems as well as process inadequacies, and
- both 0350 processes invoked following a “surprise” revelation of degraded safety at a plant generally perceived to have adequate performance (i.e., neither plant was considered by NRC to have declining performance).

Important differences between the 0350 process as practiced at DC Cook and Davis-Besse include:

- o the NRC directly identified the safety degradation at DC Cook while the problem at Davis-Besse was essentially self-revealing,
- o both reactor units at DC Cook were promptly shut down after NRC staff identified the safety degradation while NRC management allowed Davis-Besse to continue operating for months after the NRC staff determined it had degraded safety margins, and
- o no Lessons Learned Task Force was created – or needed – to examine how the NRC handled DC Cook while a Lessons Learned Task Force recently issued a report containing 50-plus recommendations to correct NRC failures related to Davis-Besse.

Because of these differences, the situation at Davis-Besse remind

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UCS sees five oversight problems to be remedied before Davis-Besse can be safely restarted:

- 1) The NRC must ensure that FirstEnergy complies with its Technical Specification requirement prohibiting Reactor Coolant Pressure Boundary leakage.
- 2) The NRC must revise how it evaluates the corrective action program at Davis-Besse.
- 3) The NRC must resolve the unreviewed safety question (USQ) associated with boric acid build-up within containment caused by chronic unidentified Reactor Coolant System leakage.
- 4) The NRC must make its process for NRC management over-riding safety recommendations of the NRC staff scrutable.
- 5) The NRC must re-allocate resources to ensure that all operating nuclear power plants get at least the prescribed minimum regulatory attention.

DC Cook Background

An NRC inspection team arrived at DC Cook in August 1997 to evaluate the adequacy of the plant's original design and subsequent modifications to that design. The NRC inspectors identified a number of problems including analytical errors that over-estimated the amount of cooling water available for cooling the reactor following an accident and holes in containment sump covers having been improperly sealed, thus reducing the net positive suction head for safety pumps following an accident.¹

The NRC discoveries prompted both reactors at DC Cook to be shut down in September 1997. While the reactors were shut down, NRC inspectors uncovered problems with the plant's containment system.² Collectively, NRC inspectors identified more than two dozen serious violations of federal safety requirements at DC Cook.³

As the plant prepared to restart, UCS made the following presentation to you:

“The most important difference between June 1998 and today is the change in the NRC’s regulatory oversight process. We opposed the Millstone restart because we felt that the NRC staff lacked the ability to take appropriate, timely actions for operating nuclear plants with performance problems. The revised reactor oversight process is precisely the type of “adequate protection standard” that we felt needed to be in place before Millstone Unit 3 was restarted.”⁴

Our presentation referred to these remarks made to you eighteen months earlier as the Millstone nuclear plant in Connecticut prepared to restart:

¹ Letter dated November 28, 1997, from Stuart A. Richards, Chief - Events Assessment, Generic Communications, and Special Inspection Branch, Nuclear Regulatory Commission, to E. E. Fitzpatrick, Vice President - Nuclear, American Electric Power Company, “Donald C. Cook, Units 1 & 2 Design Inspection (NRC Inspection Report Nos. 50-315,316/97-201).”

² Letter dated April 10, 1998, from John A. Grobe, Director – Division of Reactor Safety, Nuclear Regulatory Commission, to E. E. Fitzpatrick, Executive Vice President – Nuclear Generation Group, American Electric Power Company, “NRC Inspection Report No. 50-315/98005(DRS); 50-316/98005(DRS).”

³ Letter dated May 28, 1998, from John A. Grobe, Director – Division of Reactor Safety, Nuclear Regulatory Commission, to John Sampson, Site Vice President, American Electric Power Company, “NRC Predecisional Enforcement Conference Summary.”

⁴ Presentation on January 10, 2000, by David Lochbaum, Union of Concerned Scientists, to Chairman and Commissioners, Nuclear Regulatory Commission, “Restart of Donald C. Cook Nuclear Plant.”

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“UCS respectfully urges you not to allow restart of Millstone Unit 3 until you, and the public in New England, have reasonable confidence that the NRC staff can and will step in and stop declining performance at a troubled nuclear plant.”⁵

Davis-Besse Foreground

UCS has maintained a consistent position from Millstone to DC Cook to Davis-Besse; namely, that a troubled nuclear plant should not be restarted until all applicable problems at the plant, of the plant’s owner, and of the regulator are remedied. In a perfect world, ALL of the recommendations made by the NRC’s Davis-Besse Lessons Learned Task Force would be resolved prior to the restart of Davis-Besse. We harbor no illusion that you might compel such timely corrections. UCS believes that as an absolute minimum, the following five problems must be resolved prior to restart.

Enforce Zero Reactor Coolant Pressure Boundary Leakage Requirements (5.2.0 T3 (v))

2.0.2 (m)Tj 8.412 0.2 (m)Tj

2.0.2 (m)Tj 8.412 0.2 (m)Tj

2.0 Td 4n

2r0 Td 0(v)Tj 5.2 0 T3 (

24r0 Td56Td (v)Tj 5.2 0 T3 (v)Tj

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“The industry and NRC assumption that operating for a cycle with an undetected VHP [vessel head penetration] nozzle leak would not result in a significant safety issue did not appear to appropriately consider that boric acid-induced corrosion rates in the range of 4 inches per year could occur.”⁹

Even if the practice had suitable justification, it was still unlawful as implemented by plant owners and the NRC. If checking for RCPB leakage every 18 to 24 months during refueling had acceptable justification, the proper and legal process would have been to revise the operating licenses to replace the ban on RCPB leakage and its associated six-hour shut down requirement with a formal requirement to check for RCPB leakage every refueling outage. Instead, the NRC violated the Administrative Procedures Act by essentially eliminating a portion of the operating license for Davis-Besse without formal review or opportunity for public comment.

The NRC’s Davis-Besse Lessons Learned Task Force recognized this contributing factor to the near-miss and recommended:

“The NRC should improve the requirements pertaining to RCS [reactor coolant system] unidentified leakage and RCPB leakage to ensure that they are sufficient to: (1) provide the ability to discriminate between RCS unidentified leakage and RCPB leakage; and (2) provide reasonable assurance that plants are not operated at power with RCPB leakage.”¹⁰

Company officials and NRC staffers have repeatedly stated that while they strongly suspected there was RCPB leakage during 2001, they did not know for sure until March 2002. That may be true, but it is an unacceptable excuse. A motorist cannot evade a ticket by removing the speedometer from his car and telling the judge that he did not know he was traveling above the posted speed limit. Likewise, a nuclear power plant owner cannot evade responsibilities under the law by refusing to monitor RCPB leakage.

FirstEnergy’s root cause team and the NRC’s Davis-Besse Lessons Learned Task Force each criticized plant workers and NRC inspectors for not piecing together all the warning signs to deduce the reactor pressure vessel head was being degraded by CRDM nozzle leakage. This censure may be valid, but it is a red herring. It masks the real problem: reactor coolant pressure boundary leakage is not being monitored as required by regulation. Police officers don’t infer the speed of a swiftly moving vehicle by how far roadside debris is carried by the disturbed air. They use radar guns. They directly monitor the parameter at issue. Likewise, FirstEnergy and the NRC should directly monitor reactor coolant pressure boundary leakage instead of trying to divine the situation from second-hand indications.

It is totally unreasonable to only look for RCPB leakage during refueling outages every 18 to 24 months. The action to be taken upon discovery of RCPB leakage is to shut the reactor down within six hours. This action time demonstrates the inadequacy of infrequent checks performed when the reactor is already shut down.

FirstEnergy could install sensitive leak detection equipment to monitor for RCPB leakage during operation of Davis-Besse. The French have installed such equipment at their nuclear power plants. Alternatively, FirstEnergy could conservatively assume that unidentified reactor coolant system leakage includes some RCPB leakage and shut down Davis-Besse within six hours. FirstEnergy must not be permitted to violate the Davis-Besse operating license as it has for so many years in the past.

⁹ Report dated September 30, 2002, by A. Howell, E. Hackett, J. Donoghue, R. Haag, R. Bywater, P. Castleman, T. Koshy, R. Lloyd, and J. Starefos, Nuclear Regulatory Commission, “Degradation of the Davis-Besse Nuclear Power Station Reactor Pressure Vessel Head Lessons-Learned Report.”

¹⁰ Report dated September 30, 2002, by A. Howell, E. Hackett, J. Donoghue, R. Haag, R. Bywater, P. Castleman, T. Koshy, R. Lloyd, and J. Starefos, Nuclear Regulatory Commission, “Degradation of the Davis-Besse Nuclear Power Station Reactor Pressure Vessel Head Lessons-Learned Report.”

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The NRC must not allow Davis-Besse to restart absent reasonable assurance that FirstEnergy will comply with Technical Specification 3.4.6.2.a and that NRC will enforce it.

Revise Corrective Action Program Inspection Procedure

In response to an NRC requirement specified in the Confirmatory Action Letter, FirstEnergy assembled a team to diagnose the root cause for the many warning signs of problems at Davis-Besse being overlooked. The root cause team determined:

“The overall conclusion is that Management ineffectively implemented processes and thus failed to detect and address plant problems as opportunities arose.”

and

“Davis-Besse in general identified and documented the nonconforming conditions involving the boric acid on the RPV head and other boric acid related issues. However, personnel at all levels of the organization did not effectively implement other elements of the corrective action process.”

and

“There were a number of problems related to the adequacy of corrective actions. On a number of occasions, the plant was restarted without taking corrective action for identified problems, including restarting the plant in 10RFO, 11RFO, and 12RFO without fully removing the boric acid from the RPV head. In other cases, corrective action was not taken for identified adverse conditions. In still other cases, corrective action documents were closed by means of reference to actions specified in other documents that were still open, but the referenced action was never taken. In other cases, corrective actions were not effective in correcting the problem.”¹¹

The problems with the corrective action program at Davis-Besse caused it to be specifically included as a line item (No. 3.a) in the NRC’s 0350 Process Checklist.¹² Consequently, NRC inspectors will audit the revamped corrective action program at Davis-Besse before the plant restarts.

But these NRC inspectors will be using a procedure they previously used at Davis-Besse without success. In early 2001, an NRC inspection team arrived at Davis-Besse to audit the corrective action program using the Problem Identification and Resolution (PI&R) procedure. This team reported:

“This inspection was an examination of activities conducted under your license as they relate to the identification and resolution of problems, compliance with the Commission’s rule and regulations, and with the conditions of your operating license. ... On the basis of the samples selected for review, there were no findings of significance identified during this inspection. The team concluded that problems were properly identified, evaluated, and resolved within the problem identification and resolution programs.”¹³

¹¹ Letter dated August 21, 2002, from Lew W. Myers, Chief Operating Officer, FirstEnergy Nuclear Operating Company, to J. E. Dyer, Administrator, Nuclear Regulatory Commission, “Confirmatory Action Letter Response – Management and Human Performance Root Cause Analysis Report on Failure to Identify Reactor Pressure Vessel Head Degradation.”

¹² Letter dated August 16, 2002, from J. E. Dyer, Regional Administrator, Nuclear Regulatory Commission, to Lew Myers, Chief Operating Officer, FirstEnergy Nuclear Operating Company, “Transmittal of NRC Inspection Manual Chapter 0350 Panel Restart Checklist.”

¹³ Letter dated March 27, 2001, from Thomas J. Kozak, Chief – Projects Branch 4, Nuclear Regulatory Commission, to Guy G. Campbell, Vice President – Nuclear, FirstEnergy Nuclear Operating Company, “Davis-Besse Nuclear Power Station / NRC Inspection Report No. 50-346/01-05(DRP).”

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Thus, the NRC team could not detect even one of the many significant problems with the corrective action program at Davis-Besse using the PI&R audit procedure. The NRC's Davis-Besse Lessons Learned Task Force identified the need to revise the PI&R audit procedure:

“The NRC should revise the overall PI&R inspection approach such that issues similar to those experienced at DBNPS [Davis-Besse Nuclear Power Station] are reviewed and assessed. The NRC should enhance the guidance for these inspections to prescribe the format of information that is screened when determining which specific problems will be reviewed.”¹⁴

The PI&R audit procedure must be revised before it is used to assess whether FirstEnergy has adequately fixed its corrective action program at Davis-Besse. After all, the existing procedure could not distinguish between an acceptable program and an inadequate one. This procedure is equally ill-equipped to now distinguish between a fixed program and a different but still inadequate one.

The NRC must not permit Davis-Besse to restart until after it has audited the revamped corrective action program using a revised inspection procedure.

Resolve Unreviewed Safety Question on Boric Acid Build-up in Containment

As a direct consequence of operating for many years with unidentified reactor coolant system leakage below the one gallon per minute Technical Specification limit and with reactor coolant pressure boundary leakage above the zero gallon per minute Technical Specification limit, a lot of boric acid was deposited within reactor containment at Davis-Besse. The boric acid degraded the reactor pressure vessel head, the containment air coolers, and other equipment inside containment.

The large inventory of boric acid also represented a significant challenge to the plant's ability to cope with an accident. Davis-Besse placed trisodium phosphate dodecahydrate (TSP) inside containment to control the pH of the water spilled during an accident. This pH control is necessary because the boron concentration of the makeup water sources can produce high acidic water particularly when some of the water flashes to steam or evaporates. But the minimum TSP inventory required by Technical Specifications is based upon the amount of boron in the reactor coolant system water and in the makeup water. It fails to account for pre-existing boric acid within containment resulting from sustained operation with reactor coolant system and/or reactor coolant pressure boundary leakage.

The minimum TSP inventory may be insufficient to properly control the pH level following an accident. This is an unreviewed safety question. The NRC must not permit Davis-Besse to restart until this unreviewed safety question is resolved.

Make NRC Decision-making Process Scrutable

Last fall, the NRC staff determined that conditions at Davis-Besse warranted a shut down by December 31, 2001, for an inspection of the CRDM nozzles. They compiled a voluminous record supporting their evaluation and conclusion. But NRC management over-ruled its staff and opted not to order Davis-Besse to be shut down. Setting aside for the moment whether NRC management was right or wrong, the fact remains that they failed to document the basis for this important safety decision:

“The basis for the NRC's decision to accept the licensee's justification to perform VHP [vessel head penetration] nozzle inspections following the cessation of power operations on February 16, 2002, was not well documented. There was a lack of specific guidance

¹⁴ Report dated September 30, 2002, by A. Howell, E. Hackett, J. Donoghue, R. Haag, R. Bywater, P. Castleman, T. Koshy, R. Lloyd, and J. Starefos, Nuclear Regulatory Commission, “Degradation of the Davis-Besse Nuclear Power Station Reactor Pressure Vessel Head Lessons-Learned Report.”

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for documenting the basis for this decision, and the available, although more general guidance, was not used.”¹⁵

Consider the hypothetical case of workers at Davis-Besse identifying a potential safety problem and compiling a similar mountain of documents justifying their recommendation to FirstEnergy management that the plant be immediately shut down. If FirstEnergy management over-ruled their workers, the NRC would insist upon seeing the well-documented basis for that decision. The NRC would be royally upset if FirstEnergy’s management produced the skimpy paperwork that NRC’s management provided.

This is not the first time that NRC senior management over-ruled its staff without any documented basis. The NRC staff recommended around 1998 that a Severity Level I violation – the most severe – be issued to the owner of the Millstone nuclear power plant. NRC over-ruled its staff and issued nothing, not even a slap on the wrist. When challenged, NRC management couldn’t even figure out who made the decision, yet alone produce its documented basis.

The NRC must correct this problem before Davis-Besse restarts. The public deserves some assurance that if in the future the NRC staff concludes conditions warrant Davis-Besse’s shut down, that decision will not be over-ruled by NRC management without a well-documented basis. Accountability is as important for the NRC as it is for its licensees.

Ensure All Nuclear Plants Receive at Least Minimum Regulatory Attention

The NRC’s Davis-Besse Lessons Learned Task Force reported:

“The NRC viewed DBNPS as a good performer. This view was shared by nearly all Region III interviewees, the NRR PMs[Project Managers in the NRC’s Office of Nuclear Reactor Regulation] and resident inspectors.”¹⁶

UCS wonders how the NRC reached this conclusion given the fact that its oversight of the plant was far below its own minimum standards. According to the NRC’s Lessons Learned Task Force report:

“In the late 1990s, the NRC did not maintain the normal staffing levels within the regional branch that had regulatory oversight for DBNPS.”

and

“The annual number of Region III inspection hours for DBNPS was less than the RIII average for single unit sites for eight of nine years during the period from 1993 to 2001. Only 1422 inspection hours were expended at DBNPS in 1999. The region’s single site annual average was 2558 hours for that year.”

and

“Travel and site dosimetry records indicated that no senior managers visited the site in 1998. Also, for the period from July 1999 to February 2002, no DRP senior managers visited DBNPS. Inspection Manual Chapter 0102, “Oversight and Objectivity of Inspectors and Examiners at Reactor Facilities,” Paragraph 04.05(b) states that DRP division director or deputy should make every effort to visit each site at least once every two years.”

and

¹⁵ Report dated September 30, 2002, by A. Howell, E. Hackett, J. Donoghue, R. Haag, R. Bywater, P. Castleman, T. Koshy, R. Lloyd, and J. Starefos, Nuclear Regulatory Commission, “Degradation of the Davis-Besse Nuclear Power Station Reactor Pressure Vessel Head Lessons-Learned Report.”

¹⁶ Report dated September 30, 2002, by A. Howell, E. Hackett, J. Donoghue, R. Haag, R. Bywater, P. Castleman, T. Koshy, R. Lloyd, and J. Starefos, Nuclear Regulatory Commission, “Degradation of the Davis-Besse Nuclear Power Station Reactor Pressure Vessel Head Lessons-Learned Report.”

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“The current resident inspector and the former SRI (who was the resident inspector when first assigned to DBNPS) were not certified as reactor operations inspectors when they were initially assigned to DBNPS.”

and

“For the period from 1990 through 2001, nine different licensing PMs were assigned to DBNPS. This rate of turnover may account, in part, for the lack of awareness among the PMs (with on notable exception) of the RCS leakage symptoms and indications. The guidance for PMS contained in the Operating Reactor Project Manager’s Handbook (the PM Handbook) indicates the desired duration of a PM assignment as 3 to 5 years. The Handbook indicates that shorter assignments can be made to meet agency needs, but that the minimum duration is specified to maximize productivity and consistency.”

and

“In addition to the PM turnover rate, infrequent PM site visits may have contributed to the lack of awareness among the PMs of the RCS leakage symptoms and indications. Until recently, none of the three PMs assigned to DBNPS since 1999, including the supervisor, had visited DBNPS.”

and

“The PM Handbook, Section 2.4.2, “Interactions with the Regional Office,” suggests that PMs make frequent trips to their sites, and states that these visits should be conducted as least quarterly. ... The task force determined that, in recent years, this was not emphasized. NRC managers placed increased emphasis on the PM’s role in headquarters licensing activities. Interviews of cognizant NRC managers revealed that they supported the view that a higher priority has been placed on licensing activities rather than in conducting frequent site visits.”

and

“The licensee’s letter to the NRC, dated November 15, 2000, provided the periodic Commitment Change Summary Report. It documented two items involving the CACs [containment air coolers]. Commitment Nos. 014438 and 007319 were related to CAC air flow problems caused by maintenance errors (i.e., not by fouling from boric acid or corrosion deposits). The PMs for DBNPS did not recall reviewing the report.”

and

“The NRC did not review the DBNPS ISI [in-service inspection] summary report of Operating Cycle 12 and RFO 12.”¹⁷

Thus, the NRC apparently based its conclusion that Davis-Besse was a good performer largely on a few inspections performed by inexperienced resident inspectors under-supervised by regional management and under-supported by “part-time” headquarters staff. The people of Ohio deserved better protection from the NRC than they got.

As disturbing as the lack of regulatory attention is by itself, it gets worse when the reasons are considered. NRC Project Managers failed to visit Davis-Besse from 1999 through discovery of the problem in March 2002 because NRC management directed them to focus on processing business requests made by FirstEnergy. In June 1998, the Appropriations Committee of the United States Senate threatened to slash the NRC’s budget. To forestall that action, the NRC committed to place the business of the nuclear industry at the top of its priority list. For example, the NRC pledged to approve 95 percent of license amendment requests (for purposes such as reducing the testing frequency for safety equipment

¹⁷ Report dated September 30, 2002, by A. Howell, E. Hackett, J. Donoghue, R. Haag, R. Bywater, P. Castleman, T. Koshy, R. Lloyd, and J. Starefos, Nuclear Regulatory Commission, “Degradation of the Davis-Besse Nuclear Power Station Reactor Pressure Vessel Head Lessons-Learned Report.”

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and increasing the time period that safety equipment can remain out of service while the reactor is operating) within one year and 100 percent of such requests within two years.¹⁸

The Project Manager in the NRC's Office of Nuclear Reactor Regulation is the key individual coordinating the review and approval of license amendment requests. The NRC might not satisfy its promises to Congress if its Project Managers were traipsing around the country wasting precious time on nuclear power plant safety oversight chores. So, the business goals have been met by sacrificing safety oversight. In other words, the NRC placed production ahead of safety, much as FirstEnergy has confessed doing. Once again, the people of Ohio deserve much better from the agency.

The NRC's Davis-Besse Lessons Learned Task Force did not cover it, but it is also worth mentioning the disparity between the Commission's attention to Davis-Besse and its prior attention to Salem, Millstone, and DC Cook. The Commission conducted periodic briefings on Salem, Millstone, and DC Cook where it heard presentations from its staff, plant owners, and others on the status of actions taken to restart the plants. The Commission hasn't repeated this practice for Davis-Besse. Perhaps you have been preoccupied with the nuclear renaissance, license renewal, fighting efforts by Congress to upgrade nuclear plant security, and other NEI business.

The NRC must ensure that Davis-Besse gets at least the minimum regulatory oversight specified by agency policy and procedures, even if it means that the business goals are occasionally missed.

Additional Point

As documented in Appendix F of the NRC's Davis-Besse Lessons Learned Task Force, the NRC undertook comparable lessons learned efforts in the year 2000 following an accident at Indian Point, in 1997 following the regulatory debacle at Millstone, and in 1995 following the regulatory distress at South Texas Project. Four major regulatory breakdowns in less than eight years. It is a pattern reminiscent of the eight-year period preceding the shut down of both Salem reactors or all four Northeast Utilities reactors in the mid-1990s. The NRC harshly criticized those plant owners for tolerating rather than fixing less than adequate performance. Why is the NRC content with lower performance on its part than it accepts from its licensees?

UCS will continue to closely monitor Davis-Besse to determine if it matches the DC Cook or Millstone precedent. At this time, Davis-Besse is not even up to the Millstone standard. We hope that you take the steps necessary for it to reach or exceed the DC Cook standard.

Sincerely,

David Lochbaum
Nuclear Safety Engineer
Washington Office

¹⁸ Letter dated March 22, 2002, from Chairman Richard A. Meserve, Nuclear Regulatory Commission, to Chairman Harry Reid, Subcommittee on Transportation, Infrastructure, and Nuclear Safety, Committee on Environment and Public Works, United States Senate.