



Union of Concerned Scientists

Citizens and Scientists for Environmental Solutions

“*Work performed without deviations.*” Andrew Siemaszko wrote these words on Work Order No. 00-001846-000 and signed his name on April 25, 2000. Nearly five years later, the Nuclear Regulatory Commission (NRC) cited these four words in its Order banning Siemaszko from working in the nuclear industry. The NRC’s Order stated that Siemaszko’s four words misled the agency into believing the reactor vessel head at the Davis-Besse nuclear plant in Ohio had been completely cleaned during the refueling outage in April 2000 and inspected to show no signs of damage. As this rebuttal will clearly prove, the facts indisputably show that contrary to the NRC’s baseless charge, Andrew Siemaszko did not falsify this work order and an associated condition report. The NRC was as wrong in its April 21, 2005, Order against Siemaszko as it was in its November 28, 2001, decision to shelf the Order it had drafted to require Davis-Besse to be shut down for a safety inspection and allow the reactor to continue operating. The NRC seems to have recurring judgment lapses when it comes to Davis-Besse. The NRC’s April 2005 sanction against Andrew Siemaszko is baseless, unfair, and deplorable. It is a regulatory travesty. But don’t rely on our analysis. Follow the paper trail – the path not taken by the NRC – and see for yourself the terrible injustice perpetrated against Andrew Siemaszko.

THE WORK ORDER

Work Order No. 00-001846-00 was initiated during the spring 2000 refueling outage at the Davis-Besse nuclear plant to have the reactor vessel head cleaned. FirstEnergy Nuclear Operating Company (FENOC) used work orders to manage tasks performed at Davis-Besse. Work orders documented what was to be done, how it was to be done, and the results from the work. In this case, the work order described the problem as follows: “*Large boron accumulation was noted on the top of the rx [reactor] head and on top of the insulation. Boric acid corrosion may occur.*” The task to be performed under the work order was described as follows: “*Clean boron accumulation from top of reactor head and on top of insulation. See Andrew Siemaszko (Plant Engineering), Ext 7341 for additional details.*”

Page 2 of the work order defined three steps to be performed. Step 1 was assigned to the Radiation Test craft and specified “*Clean boron accumulation from top of reactor head and on top of insulation. See Andrew Siemaszko (Plant Engineering), Ext 7341 for additional details.*” Step 1 was NOT signed by Siemaszko but by another worker.

Step 2 was assigned to the Mechanical section and specified “*Remove and replace Lexan covers on reactor vessel head to facilitate cleaning.*” Step 2 was signed by Andrew Siemaszko on April 25, 2000.

Step 3 was assigned to the Maintenance Services section and specified “*If necessary manufacture replacement Lexan covers.*” Step 3 was signed by Andrew Siemaszko on April 25, 2000.

Page 3 of the work order provided ample room to describe the work performed. The only entry on page 3 was “*Work performed without deviations*” by Andrew Siemaszko on April 25, 2000. Per procedure, the worker responsible for Step 1 was supposed to record results on page 3, but that worker violated this procedural requirement and failed to document any results.

Page 5 of the work order continued an overview of the cleaning effort that had begun on page 4. Page 5 contained this discussion:

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After initial cleaning a video inspection will be performed by the Framatome Technologies. Should additional cleaning be required the process will be repeated until most boric acid deposits are removed or as directed by HP [Health Physics].

THE CONDITION REPORT

Condition Report (CR) No. 2000-1037 was initiated by Andrew Siemaszko on April 17, 2000. The condition was described as follows: “*Inspection of the Reactor Head indicated accumulation of boron in the area of the CRD nozzle penetrations through the head.*”

Page 5 of the condition report stated:

Nuclear Regulatory Commission (NRC) issued Generic Letter 97-01 to holders of operating licenses for pressurized water reactors (PWRs). The letter requires licensee to maintain a program for ensuring a timely inspection of the control rod drive mechanism (CRDM) and other vessel closure head penetrations. The program is required due to degradation of the CRDM nozzles caused by Primary Water Stress Corrosion Cracking process. In order to perform required inspections the nozzles as well as the penetrations must be free of boron deposits. Once the head is free from the boron, new boric acid deposits may be easily noted and remedial actions taken.

During the closeout of the condition report, the Remedial Actions were recorded on page 6 as follows:

Accumulated boron deposited between the reactor head and the thermal insulation was removed during the cleaning process performed under W.O. 00-001846-000. No boric acid induced damage to the head surface was noted during the subsequent inspection.

THE NRC’S ORDER

On the 6th page of the Order issued by NRC banning Siemaszko from working in the nuclear industry, the NRC stated:

Review of documents and videotapes concerning the inspection of the RPV head during 12RFO, that ended on May 18, 2000, and the inspections of the RPV head during Refueling Outage 13, that began on February 16, 2002, indicated that boric acid deposits remained on the RPV head following 12RFO. This is contrary to information Mr. Siemaszko documented in:

- (1) Work Order No. 00-001846-000 that work was performed without deviation; and*
- (2) CR No. 2000-1037 that the accumulated boron deposited between the reactor head and the thermal insulation was removed during the cleaning process and no boric acid induced damage to the head surface was noted during the subsequent inspection.*

and

The information provided by Mr. Siemaszko in CR No. 2000-1037 and Work Order No. 00-0018460999 was material to the NRC because the presence of boric acid deposits on the RPV head is a significant condition adverse to quality that went uncorrected, in part, due to Mr. Siemaszko’s incomplete and inaccurate description of the work activities and corrective actions.

The NRC is flat-out wrong for the following reasons:

1. Andrew Siemaszko was **NOT** responsible for completing the reactor head cleaning task specified in Step 1 of Work Order No. 00-001846-000. Recall that Step 1 contained text stating, “*See Andrew Siemaszko (Plant Engineering), Ext 7341 for additional details.*” If Siemaszko was responsible for Step 1, guidance for him to see himself would be ridiculous.

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2. Andrew Siemaszko was responsible for installing Lexan covers on the reactor vessel head in Step 2 of the work order. Siemaszko commented on the installation of the Lexan covers in the work description section on page 3 of the work order: “Work performed without deviations.” Thus, Siemaszko merely recorded that the Lexan covers were installed as specified in the work order. Note that Step 2 did NOT contain guidance to see Andrew Siemaszko for additional details.
3. Andrew Siemaszko did NOT record that the cleaning task of Step 1 was performed without deviation because he was not responsible for that step. In fact, the reactor head cleaning activity under Step 1 was not even performed until three days later, on April 28, 2000.
4. Even if Andrew Siemaszko had been responsible for performing the head cleaning under Step 1 and his description on page 3 of the work order that “Work performed without deviations” had actually applied to head cleaning instead of Lexan cover installation, that would NOT have been a false or inaccurate statement. Page 5 of the work order clearly stated “*Should additional cleaning be required [after the initial cleaning and subsequent video inspection] the process will be repeated until most boric acid deposits are removed or as directed by HP.*” This is where the NRC and logic part company. It would not have been a deviation from the requirements contained in the work order, therefore, to complete Step 1 without removing all of the boric acid from the reactor head.
5. Andrew Siemaszko did not record incomplete and inaccurate information on Condition Report No. 2000-1037. This condition report stated that boric acid on the reactor head was removed per the cleaning process described in Work Order No. 00-001846-000. For the reasons articulated above, Andrew Siemaszko did not provide incomplete and inaccurate information on Condition Report No. 2000-1037 with this reference.

The record is clear that neither FENOC nor NRC believed in 2001 that Andrew, or any other person, had fully cleaned and inspected the reactor vessel head at Davis-Besse during the spring 2000 refueling outage or that the reactor head was even required to be fully cleaned and inspected prior to restarting from that refueling outage. Whereas the NRC and logic parted company regarding the work order, the NRC and logic became adversaries regarding the NRC’s assertion that Andrew’s information was a material factor in their decision to allow Davis-Besse to operate past the December 31, 2001, deadline. And that record is longer than it is clear, so an abridged sampling of that voluminous record is provided below to illustrate the point:

- In slides prepared for a September 25, 2001, briefing of the NRC’s Executive Team, the NRC staff provided a table showing key parameters for nuclear plants in bin 1 (cracking/leakage history) and bin 2 (high susceptibility). Davis-Besse was among the nuclear plants listed on this table. The NRC staff indicated the last inspection of the reactor head at Davis-Besse was conducted in March 2000. The method of inspection was specified as “*Visual – Partial.*” Other plants on the list, HB Robinson for example, had an inspection method of “*Eff. Visual – 100%.*”
- In slides prepared the an October 3, 2001, briefing of the NRC Commissioners’ Technical Assistants, the NRC staff provided a table showing key parameters for nuclear plants in bin 1 (cracking/leakage history) and bin 2 (high susceptibility). Davis-Besse was among the nuclear plants listed on this table. The NRC staff indicated the last inspection of the reactor head at Davis-Besse was conducted in March 2000. The method of inspection was specified as “*Visual – Partial.*” Other plants on the list, Three Mile Island Unit 1 for example, had an inspection method of “*Eff. Visual – 100%.*”

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- In slides prepared for an October 11, 2001, briefing of the NRC’s Committee to Review Generic Requirements, the NRC staff provided a table showing key parameters for nuclear plants in bin 1 (cracking/leakage history) and bin 2 (high susceptibility). Davis-Besse was among the nuclear plants listed on this table. The NRC staff indicated the last inspection of the reactor head at Davis-Besse was conducted in March 2000. The method of inspection was specified as “*Visual – Partial.*” Other plants on the list, HB Robinson for example, had an inspection method of “*Eff. Visual – 100%.*”
- In a public meeting conducted at NRC’s headquarters on October 24, 2001, FENOC presented slides addressing conditions at Davis-Besse. On slide 7 (below), FENOC informed the NRC staff that “*And all but 24 penetrations were inspected in 2000.*”



Analyses

DBNPS’s evaluation is based on our visual inspections performed in 10, 11, and 12 RFO (May 1996, April 1998, and April 2000 respectively)

The inspection results afford us assurance that all but 4 nozzle penetrations were inspected in 1996. All but 19 penetrations were inspected in 1998. And all but 24 penetrations were inspected in 2000.

The limiting nozzle population is those nozzles that could not be inspected in 1998 or 2000.

It is conservatively assumed that for these penetrations, an axial through weld flaw occurs immediately upon startup from 10 RFO (May 1996)

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- An attachment to an e-mail message sent by NRC staffer Allen Hiser to NRC staffers Andrea Lee and Bill Bateman was a three-page report titled, “Current Status of High Susceptibility Plants That May Receive Orders,” prepared by NRC staffer Jacob Zimmermann. That report contained a summary (below) of the October 24, 2001, meeting between the NRC staff and FENOC representatives. According to this NRC summary, “*the scope of the prior visual inspection [of the reactor vessel head at Davis-Besse] did not cover 100% of the VHP [vessel head penetrations] nozzles due to boric acid deposits from other sources.*”

On October 18, 2001, the staff issued a request for additional information (RAI) via e-mail to FENOC regarding the April 2000 Davis Besse nozzle inspection, the finite element analysis of CRDM penetrations, and the Framatome risk assessment. The licensee met with the NRC staff on October 24, 2001, at NRC headquarters. The Project Manager informed the licensee that the RAIs were being finalized for formal issuance. In the Bulletin 2001-01 response, the licensee characterized their prior inspections as a qualified visual inspection. However, four nozzles could not be demonstrated to have annular gaps in the licensee’s finite element analysis. In addition, the scope of the prior visual inspection did not cover 100% of the VHP nozzles due to boric acid deposits from other sources (e.g., canopy seal and Conoseal leaks). The licensee plans to perform a qualified visual examination at the next refueling outage scheduled for April 2002. The prior inspection, even if qualified, was more than 18 months from the planned inspection in April 2002. The staff’s technical assessment provides the justification for the maximum of 18 months between prior and planned inspections.

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- By letter dated October 30, 2001, FENOC followed up on the commitment they made to the NRC staff during the October 24, 2001, meeting to provide *“pictorial documentation of the visual examinations of the reactor pressure vessel head performed during the DBNPS 10th, 11th and 12th refueling outages.”* FENOC stated (below) to the NRC that *“During the 12RFO inspection, 24 of the 69 nozzles were obscured by boric acid crystal deposits.”* Not only did FENOC inform the NRC that the reactor vessel head had not been fully cleaned and inspected during the spring 2000 refueling outage, they submitted pictures of the boric acid covered head and CRDM nozzles to the NRC.

The affected areas of accumulated boric acid crystal deposits were video taped, and have subsequently been reviewed with specific focus on boric acid crystal deposits with reference to the CRDM nozzle penetration leakage as previously observed at the Oconee Nuclear Station, Unit 3 (ONS-3) and at Arkansas Nuclear One, Unit 1 (ANO-1). During the 12RFO inspection, 24 of the 69 nozzles were obscured by boric acid crystal deposits that were clearly attributable to leaking motor tube flanges from the center CRDMs. A further subsequent review of the video tapes has been conducted and the results of this review did not identify any boric acid crystal deposits that would have been attributed to leakage from the CRDM nozzle penetrations, but were indicative of CRDM flange leakage.

The aforementioned video taped images of areas of accumulated boric acid crystal deposits have been converted to photographic images and are contained in the attached report.

- In an e-mail dated November 3, 2001, NRC staffer Allen Hiser commented to NRC manager Jack Strosnider on the order drafted by the NRC staff to require FENOC to shut down Davis-Besse by December 31, 2001, for inspection of the CRDM nozzles. Attached to the e-mail was the draft shut down order. In the draft order (right), the NRC staff wrote, *“In its Bulletin response, and supplemental information provided by letter dated October 30, 2001, the licensee stated that the nozzles that were not examined in the recent examinations were obscured by boric acid leakage from other sources, such as control rod drive mechanism motor tube flanges.”*

As a part of its basis for delaying the recommended inspection beyond December 31, 2001, the licensee cited a history of reactor vessel head visual examinations at the Davis-Besse plant using a remote camera in Spring 2000, Spring 1998, and Spring 1996. Davis Besse has a total of 69 CRDMs. In 1996, 94 percent of the nozzles (e.g., 65) were visually examined (four were not examined). In 1998, 72 percent of the nozzles (e.g., 50) were visually examined (19 were not examined), and in 2000, 65 percent of the nozzles (e.g., 45) were visually examined (24 were not examined). As a consequence, 24 nozzles have not been inspected since 1998, 19 nozzles have not been inspected since 1996, and 4 nozzles have never been inspected. In its Bulletin response, and supplemental information provided by letter dated October 30, 2001, the licensee stated that the nozzles that were not examined in the recent examinations were obscured by boric acid leakage from other sources, such as control rod drive mechanism motor tube flanges. In addition the licensee stated that, for the four nozzles not examined in 1996, it could not demonstrate the presence of a gap between the nozzles and the reactor pressure vessel head, which is not consistent with one of the characteristics of a qualified visual examination identified in the Bulletin. Therefore, Davis Besse has not performed a visual examination of 100 percent of the nozzles.

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- In slides prepared for a November 5, 2001, briefing of the NRC’s Executive Director for Operations, the NRC staff summarized key facts for Davis-Besse. The NRC staff informed the EDO (below) that during the spring 2000 refueling outage, only 45 of 69 CRDM nozzles were examined and that “24 Obscured by boric acid and Not Examined.”

DAVIS BESSE

- **Previous Inspections**

10th RFO 1996 - Visual Examination of 65 out of 69 CRDMs (94%)

- **4 CRDMs (center head) not examined since licensee evaluation showed insufficient interference gap**

11th RFO 1998 - Visual Examination of 50 out of 69 CRDMs (72%)

- **19 Obscured by boric acid from leaking motor tube flanges and Not Examined (includes 4 CRDMs with insufficient gap and 15 new nozzles obscured)**

12th RFO 2000 - Visual Examination of 45 out of 69 CRDMs (65%)

- **24 Obscured by boric acid and Not Examined (includes 4 CRDMs with insufficient gap and 15 obscured in 1998)**

- By letter dated December 3, 2002 – a full year AFTER the NRC allowed FENOC to operate Davis-Besse past December 31, 2001, and AFTER the pineapple-sized hole had been discovered in the reactor vessel head, the NRC staff wrote to FENOC with the reasons for the deferral decision. The NRC staff, with benefit of hindsight, wrote (below), “*the NRC staff concluded that, while the 1996 inspection was a fairly complete visual inspection of the RPV head, the inspection conducted in 1998 was more limited in scope and quality because of the presence of boric acid deposits. ... The inspection conducted in 2000 was considered to be less effective.*”

The NRC staff’s evaluation of FENOC’s response to Bulletin 2001-01 included information on the quality of past CRDM nozzle inspections at Davis-Besse. The licensee provided information regarding visual inspections performed in 1996 and 1998. These inspections were performed under the insulation installed on the RPV head and, therefore, exceeded the requirements of the ASME Code. Their inspectors attested to the completeness and effectiveness of the inspections. In each of those two outages and in an inspection in 2000, a large fraction of the VHP nozzles were inspected, but no single inspection looked at all of the VHP nozzles. The licensee stated that results showed no evidence attributable to CRDM nozzle leakage. The licensee did not report any other degraded condition of the RPV head, and stated that the RPV head had been cleaned during previous outages.

Upon review of the licensee’s presentations, and after viewing videotapes provided by the licensee from the prior inspections in 1996 and 1998, the NRC staff concluded that, while the 1996 inspection was a fairly complete visual inspection of the RPV head, the inspection conducted in 1998 was more limited in scope and quality because of the presence of boric acid deposits. The licensee indicated that those deposits were due to CRDM flange leaks and not through-wall leakage of the CRDM nozzles. The inspection conducted in 2000 was considered to be less effective.

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- In that same December 3, 2002, letter, the NRC conceded that neither FENOC nor Andrew Siemaszko was required to fully clean and inspect the reactor vessel head during the spring 2000 refueling outage. The NRC staff wrote, “*The question before the NRC staff was whether the existing CRDM inspection methods and internals provided reasonable assurance of adequate protection of the public health and safety. NRC regulations allowed licensees to conduct the inspections using techniques defined in ASME Code without removing insulation or other impediments [emphasis added].*” Hence, the boric acid that FENOC and the NRC staff knew in fall 2001 had remained on top of the reactor vessel head constituted an impediment that the ASME code did not require to be removed for the inspection. The NRC issued Bulletin 2001-01 in August 2001 to require licensees to conduct visual inspections of the reactor vessel head over and above the requirements contained in the ASME Code.

The question before the NRC staff was whether the existing CRDM inspection methods and intervals provided reasonable assurance of adequate protection of the public health and safety. NRC regulations allowed licensees to conduct the inspections using techniques defined in ASME Code without removing insulation or other impediments. In light of inspection findings at Oconee Unit 3 in the spring of 2001, it was clear that such inspections would not be effective in detecting the very small amounts of boric acid that were expected to be deposited by CRDM nozzle leaks.

Quite simply, if Andrew Siemaszko misled FENOC and/or the NRC about the reactor vessel head having been completely cleaned and inspected during the spring 2000 refueling outage, why do the NRC documents cited above (and literally dozens of NRC documents like them) prepared AFTER that outage repeatedly and consistently indicate that the head was not fully cleaned and inspected? Clearly, FENOC and NRC shared the common understanding in fall 2001 that the reactor vessel head had not been completely cleaned and inspected. Clearly, FENOC and NRC shared the common understanding in fall 2001 that boric acid accumulation on the reactor vessel head prevented the inspection of 24 of the 69 penetrations through the reactor vessel head. Clearly, the NRC’s regulations in effect during the spring 2000 refueling outage did not require impediments to be removed for reactor vessel head inspections.

In its Order to Andrew Siemaszko, the NRC staff had the unmitigated gall to state “*the presence of boric acid deposits on the RPV head is a significant condition adverse to quality that went uncorrected, in part, due to Mr. Siemaszko’s incomplete and inaccurate description of the work activities and corrective actions.*” The NRC staff knew, beyond any doubt, in fall 2001 that boric acid deposits remained on the Davis-Besse reactor vessel head when the reactor restarted in May 2000. They knew it. And they knew it because Andrew Siemaszko DID NOT FALSIFY THE WORK ORDER AND THE CONDITION REPORT. Had Siemaszko done so, they would not have known that boric acid obscured the inspection of 24 of the 69 penetrations.

If it was “*a significant condition adverse to quality that went uncorrected*” in spring 2000, then it remained “*a significant condition adverse to quality that went uncorrected*” in fall 2001 – the only difference being that it was the NRC staff who allowed it to remain uncorrected rather than Andrew Siemaszko. It is patently absurd and absolutely unfair for the NRC staff to seek to sanction Andrew Siemaszko for behavior in spring 2000 that the NRC staff replicated in fall 2001.

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THE BOTTOM LYING

Who did Andrew Siemaszko mislead with his allegedly incomplete and inaccurate entries on Work Order No. 00-001846-000 and Condition Report No. 2000-1037? No one. Not a soul.

Andrew Siemaszko did not provide incomplete and inaccurate information on Work Order No. 00-001846-000.

Andrew Siemaszko did not provide incomplete and inaccurate information on Condition Report No. 2000-1037.

Andrew Siemaszko did not misled FENOC or the NRC into thinking that the Davis-Besse reactor vessel head had been completely cleaned and inspected during the spring 2000 refueling outage.

Andrew Siemaszko did not violate in spring 2000 a requirement imposed by the NRC in August 2001 to remove all impediments for full inspections of the reactor vessel head.

Andrew Siemaszko did not get justice from the NRC.

The scurrilous Order issued by the NRC on April 21, 2005, to Andrew Siemaszko is insulting. It, not Work Order No. 00-001846-000, is inaccurate. It, not Condition Report No. 2000-1037, is inaccurate. The perpetrators of it, not Andrew Siemaszko, should be sanctioned.

The NRC must rescind its heinous Order and formally apologize to Andrew Siemaszko.



David Lochbaum
Director, Nuclear Safety Project
Union of Concerned Scientists