Human Performance Operating Experience

Date: November 8, 2006

Location: Palo Verde Nuclear Generating Station, Unit 1

Plant Status: 100% power

Abstract: Senior reactor operator mistakenly entered incorrect information into a plant computer during a maintenance operation, and subsequently attempted to cover up the mistake by falsifying the record.

Details: Following maintenance, the crew was tasked with restoring piping associated with the Steam Generator Blowdown heat exchanger. This would require realigning the blowdown flowpath. Following the required alignment, a Senior Reactor Operator (SRO #1) performing Control Operator (CO) duties, made an error in pulling the Steam Generator blowdown constant number off of the operator aid (multiple column/multiple rowed 3" x 4" card) taped to the side of the computer screen and inputted this wrong number into the computers. He also logged this same incorrect number into the constant change log book. The other Senior Reactor Operator (SRO #2) standing Reactor Operator (RO) duties that night failed to identify the mistake while performing the independent verification (IV) of the action.

Later in that same shift when SRO #1 was performing the IV for subsequent blowdown realignments on the same Steam Generator, he noticed that the number he had used over an hour earlier didn't line up with the number that SRO #2 had retrieved off of the same operator aid. Realizing that he had made an error, SRO #1 did not promptly inform the on-duty Control Room Supervisor (CRS). Approximately 2 hours later, SRO #1 falsified the constant change log book by lining out and initialing the incorrect entry and writing in the correct number. The computers were not updated.

Human Performance Error Traps that were contributors to the Event:

- **First Shift/Late Shift** – during the early hours of the morning, the mental alertness of those involved can be greatly diminished. This diminished thought process can lead to incorrect or inappropriate actions.
- **Change/Off Normal** – The crew that night was made up of operators and supervisors from three different crews due to personnel vacation and outage coverage for a sister unit at the same site. A newly promoted Control Room Supervisor (CRS), Senior Reactor Operators (SROs) doing Reactor Operator (RO) duties, and a Shift Manager (SM) from another unit all contributed to the crew makeup that night. People were not used to working with each other or the roles that each was to perform.
- **Overconfidence** – The least experienced SRO had 15 years of service at the facility. Between the four SRO licensed crew members that night, over 100 years of combined nuclear plant experience was present. Swapping of Steam Generator blowdown was a routine evolution that was performed weekly. All of the crew members had years of doing this successfully and knew that they could do it again, even while at minimum control room manning levels. This “Get ‘er Done” attitude may have contributed to the attentiveness level.
- **Assumptions** – The independent verifier assumed that SRO #1 had performed the task correctly. His check only consisted of verifying that the log book matched the value inputted into the computer. He did not check either number against the standard, that being the number provided by Engineering. This assumption lead to the error going undetected for well over an hour. Accurate indication of plant power is essential to plant safety.
- **Peer Pressure/Time Pressure** – No one likes to “look bad” in front of peers. At the time of the event, further advancements to the CRS position from the SRO ranks were being considered. The desire to perform well for others may have

tainted attention to detail. Perceived time pressure was being applied by management. The Shift Manager (SM) wanted to have the task completed several hours before end of shift, so the crew had to get the job done and systems stable before 4:00 o'clock in the morning. His expectation was voiced to the CRS several times during the first part of the shift, and it was passed down to SRO #1 each time. These pressures added a mental stress factor that contributed to the lack of Self-Checking on SRO #1's part in identifying and using the correct blowdown constant.

Human Performance Tools, that if used properly, could have prevented the Event:

- **Prejob Brief** – While a prejob brief was held with all of the crew members involved, it failed to go into adequate detail. If they had discussed which exact flowpaths they would be using, they would have been more attentive to that aspect of the evolution. Also, better use of all crew members in the monitoring of the evolution would have had positive effects. Having the SM or the Shift Technical Advisor (STA) identified during the brief as the individuals providing the needed big-picture oversight would have ensured additional personnel monitoring for success.
- **Questioning Attitude** – No one really questioned the outcome. None of the crew thought about what specific constant they would be using. If they had questioned which one of the three different constants they needed, or if one of them had questioned the flowpath, perhaps that would have prompted them to verify the correct constant/flowpath combination. SRO# 1 failed to question why the number he wrote in the constant change log was different than previously performed re-alignments. Having to answer that question could have identified the error.

- **Verification Practices** – An adequate and thorough independent verification would have caught this error immediately. The verification has to be one that isn't tainted by assumptions as to the first person's skill or past performance. It must not only verify that the number or parameter is correct, but must also check it against the identified standard for expectance.
- **Self-Checking (STAR)** – This is the tool that should have prevented the mistake from ever occurring. If SRO #1 had stopped and thought about which one of the three blowdown constant numbers his finger was pointing at, he would have identified the missing piece of information – that of the flowpath he had just lined up back on the control board. If he had stopped long enough to get his thoughts re-focused on the job and not on distractions, another error-free blowdown swap would have occurred. STAR isn't just for field evolutions. It is not just for main control board manipulations. It is for all tasks that operators perform, even that of identifying and entering a correct number into a computer.

Available Preventative Measures/Programs:

- **Company Sponsored Employee's Assistance Program** – This program is not just for substance abuse problems and issues. It can provide counseling and advice for stress management and emotional issues. It can provide guidance for employment options. Even experienced operators who haven't made a personal error in years may need this kind of assistance. There is no weakness in self-referral to a program that will help performance. It is not vindictive for a supervisor to suggest this avenue to employees.
- **Stress and pressures are a part of your job** – There has been, currently is, and probably will be in the future, stress and pressures at work. Doing more with less while maintaining safety and production can cause a buildup of chronic mental stress. Changes in behavior that are talked about in Employee Behavioral Observation training – such as changes in attitudes and performance levels, may

be precursors to future events. Supervisors, who recognize issues with their employees, should take positive action to address them. Increased breaks or varying assignments, additional peer checking and/or concurrent verifications are tools that can be used to mitigate possible events.

- **Strong Safety Culture -** It is extremely important that supervision be informed if an error is made. Plant management and supervision must build and promote a strong safety culture at the facility. If a strong safety culture, one that includes a feeling of trust and confidence between front line employees and management exists, employees will feel empowered to come forward when mistakes are made.

Summary: When multiple human performance error traps exist, multiple human performance tools must be implemented to combat them. Crews must first recognizing that the traps exist in order to implement tools to mitigate them. Using the tools, as individuals and as crews, can prevent otherwise good, steady operators from making career altering decisions based on momentary personal weaknesses.

Further Information: For further information regarding this event, contact Mark Sharp (SRO #1) at the following:

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