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The Reactor Oversight Process

David Lochbaum
Nuclear Safety Engineer
dlochbaum@ucsusa.org
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Looking for a Yardstick

1st Try: NRC's Four Objectives

- Maintain safety
- Increase effectiveness and efficiency
- Increase public confidence
- Reduce unnecessary regulatory burden

Dilemma: Is objective met when one or more examples suggest that thing is <u>not</u> being maintained, increased, increased, or reduced?

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Looking for a Yardstick

2nd Try: IIEP's Objectives

- Is it maintaining safety?
- Is it increasing effectiveness and efficiency?
- Is it increasing public confidence?
- Is it reducing unnecessary regulatory burden?
- Is it objective?
- Is it risk-informed?
- Is it predictable?
- Is it understandable?

Same dilemma

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Looking for a Yardstick

3rd Try: ROP Performance Metrics (10/12/2000)

- Provide timely indication of declining safety performance
- Findings and conclusions in Inspection Reports are based on facts documented in the reports
- Inspection findings are related to risk
- The SDP results are accurate and complete

Better, but too much work

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Looking for a Yardstick

4th Try: *Federal Register* Solicitation (01/2001)

- Is the SDP process usable and does it provide consistent and accurate results?
- Does the ROP assessment program provide timely, consistent, and relevant assessment information?
- Are there areas of unnecessary overlap between the inspection program and the performance indicators?

Back to the dilemma

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Settling on a Yardstick

5th Try: UCS Hybrid

- Is the inspection program under the ROP better than the inspection program under SALP et al?
- Is the assessment program under the ROP better than the assessment program under SALP et al?
- Is the enforcement program under the ROP better than the enforcement program under SALP et al?

EBSS - easy but somewhat subjective

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Inspection Program

What we like:

- ☺ Inspection findings posted on web with links to Inspection Reports (not ADAMS!!!)
- ☺ Inspection finding summary on the web (not ADAMS!!!)
- ☺ Inspection reports indicate that NRC is spending more time on higher risk areas than under the prior program
- ☺ Bases for inspection findings sometimes is exemplary.* Examples:
  - FitzPatrick IR 2000-07: "The issue was considered to have low risk significance (GREEN) using the Significance Determination Process (SDP) phase 1 evaluation, because with four coolers still operable in the area there was no impact on the operability of the ECCS components served by the 'F' cooler. Additionally, the cooler has been mechanically cleaned and performance tested since the December 1999 test failure."

* - Bases was in IR. No such bases was posted on web.

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Inspection Program

What we like: (continued)

- ☺Bases for inspection findings sometimes is exemplary. Examples: (continued)
  - Grand Gulf IR 2000-10: "The relay that caused the high pressure core spray diesel generator outside air fan to automatically switch the fan from low to high speed was found to be inoperable since May 2000. ... Using the Significance Determination Process, the inspectors determined that the issue was of very low safety significance because the diesel was able to perform it's safety function with the fan in slow speed and because, once the room temperature exceeded 120 F (a temperature measured every shift), operators would have the opportunity to identify that the outside air fan had not automatically shifted and would manually shift the fan to high speed."

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Inspection Program

What we don't like:

- ☹ ADAMS
- ☹ Bases for inspection findings sometimes fails to explain why the GREEN crayon was used. Examples:
  - Beaver Valley 1 IR 2000-09: "The risk associated with the failure of the refueling water storage tank (RWST) level transmitters had been determined to be very low safety significance, based on the results of the phase 3 analyses."
  - Calvert Cliffs IR 2000-07: "Green. The NRC identified that a violation of NRC requirements occurred in the area of offsite siren testing in that the quarterly offsite siren growl tests for identifying mechanical problems were inadequately conducted. This violation is being treated as a non-cited violation and was entered into the licensee's corrective action system (Section 1EP2)."

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Inspection Program

What we don't like: (continued)

- ☹ Bases for inspection findings sometimes fails to explain why the GREEN crayon was used. Examples: (continued)
  - Browns Ferry IT 2000-03: "A non-cited violation of Technical Specification 5.4.1 was identified for an inadequate procedure utilized for the compensatory measures taken upon loss of both Unit 2 shutdown board room coolers which required actions that would cause a loss of function of the control room emergency ventilation (CREV) system and could degrade the radiation barrier designed to protect the control room operators during a design basis accident. The finding had very low safety significance because it represented a degradation of the radiological barrier function provided for the control room only." Operators are people, too!

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Inspection Program

What we don't like: (continued)

☹ Bases for inspection findings sometimes fails to explain why the GREEN crayon was used. Examples: (continued)

↳ Harris IR 2000-04: "10CFR50, Appendix B, Criterion 16 requires, in part, that conditions adverse to quality be corrected. Following an investigation into the causes of multiple trips of the "A" Emergency Services Chilled Water chiller, the licensee's corrective actions did not correct the condition, in that the corrective actions themselves rendered the chiller inoperable, as described in AR 24123."*

* Clicking on the IR link yielded: "The requested object does not exist on this server. The link you followed is either outdated, inaccurate, or the server has been instructed not to let you have it. Please inform the site administrator of the referring page."

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Inspection Program

What we don't like: (continued)

☹ Bases for inspection findings sometimes appears more like "shell game" than regulation. Examples:

↳ Beaver Valley 1 IR 2000-04: "Inadequate maintenance on an auxiliary steam pressure control valve resulted in failure of the valve and a subsequent Unit 1 manual reactor trip due to degraded condenser vacuum. The finding was determined to have very low safety significance because mitigating equipment was not affected by the event and condenser vacuum was restored shortly after the reactor trip."

↳ Beaver Valley IR 2000-07: "This failure to implement a planning standard was during an exercise, not an actual event, and, therefore, it is not a violation of NRC requirements. Also, this issue was evaluated by the NRC using the Emergency SPD. It was determined to be a safety issue of very low significance because the licensee identified the failure during an exercise."

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Inspection Program

What we don't like: (continued)

- ☹Inspection findings sometimes placed in wrong bin. Examples:
  - Sequoyah IR 2000-02 Finding in MS instead of IE: "Unit 1 experienced an automatic turbine trip and subsequent reactor trip while returning to full power following the Unit 1 Cycle 10 refueling outage. The reactor trip was caused by an erroneous "main generator loss-of-excitation field" protective signal. The erroneous protective signal was the result of errors in a design change specifications package which caused the protective circuitry to be incorrectly wired and tested. The finding represented a low risk significance because, although the design change errors contributed to the likelihood of a reactor trip, they did not affect the availability of any mitigating systems."

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Assessment Program

What we like:

- ☺PI summary and PI thresholds (except Alert & Notification System scope and containment omission)
- ☺Plant owner and NRC response time is improved -- neither has to wait until SALP roll-up or mid-cycle performance review to know about a problem area (PI or finding) and react to it
- ☺Action Matrix -- like it so much that we wish the NRC would abide by it
- ☺Senior Management Meetings are replaced by regional mid-cycle performance reviews
- ☺Line between acceptable and unacceptable performance is finally drawn

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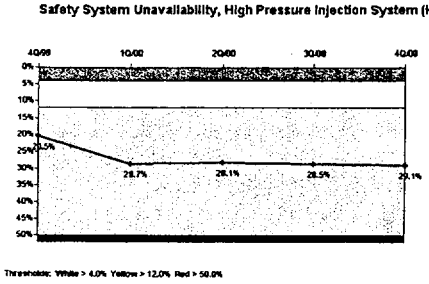
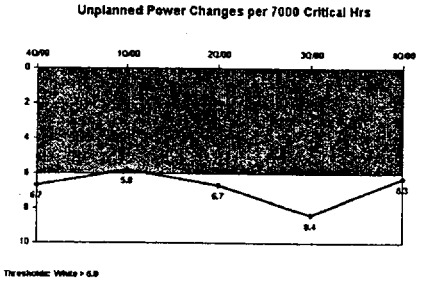
Assessment Program

What we like:

☺PI trending and data tables provide more complete insight into non-GREEN PIs





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Assessment Program

What we don't like: [redacted] or [redacted]

☹ADAMS [redacted]

☹NRC issued a RED finding to IP2, but allowed the plant to restart without responding to it because the company's "current engagement in unit restart and power ascension activities was the basis for the extension request." Did the NRC focus on safety? Or on production? Correct Answer: (b)

☹NRC opted not to issue any finding on the Quad Cities security failure -- rather than deviate from the Action Matrix, they chose not to even play the game

☹Voluntary submission of PI data; hence, the petition for rulemaking to make data submission mandatory

☹SDP is based exclusively on core damage frequency -- findings for spent fuel storage or radwaste systems are illogically forced to be GREEN or no color

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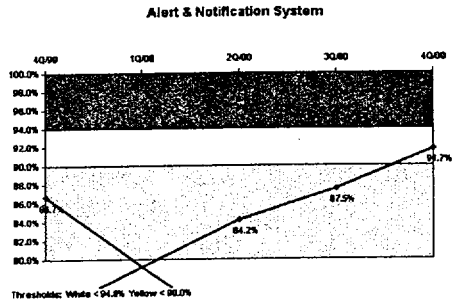
Assessment Program

What we don't like: (continued)

- ☹ Alert and Notification System PI is based on test failures and unjustly excludes all other failures
- ☹ Alert and Notification System PI GREEN to WHITE threshold is at 94%, but ASLBP in the Harris case applied a 95% criterion (see 07/10/86 letter from Paris & Shon to Zech et al)



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Assessment Program

What we don't like: (continued)

- ☹ Concept for Action Matrix summary is good, but its present incarnation is bad. Shortening the frame to less than 10 feet would be a wonderful thing. Suggested format:

	Licensee Response	Regulatory Response	Degraded Cornerstone	Multiple Degraded Cornerstone	Unacceptable Performance
Plant A					
Plant B					
Plant C					
:					
Plant Z					

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Assessment Program

What we don't like: (continued)

- ☹Casual observer is saturated with information on website. Suggest a brief quarterly report along the lines of the monthly reports prepared by Ontario Power Corporation.
- ☹The NRC response to FAQ 174. FAQ 174 asked if missed tests of the Alert and Notification System counted as failures. The NRC said "No" even for tests that are intentionally skipped.
- ☹SDP Phase 3 relies on plant-specific risk assessment information that is not publicly available -- "secret" negotiations between NRC and industry are not fair!

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Assessment Program

What we don't like: (continued)

- ☹With apologies to Mr. Lieberman, cross-cutting issues are not being handled properly. Example:
  - ↳River Bend IR 2000-14: "No Color. The inspectors identified a declining human performance trend with failure of personnel to adhere to plant procedural requirements or to maintain a questioning attitude as common elements. Approximately 27 findings, which were documented as violations of NRC requirements during the previous 12 months, had a direct or credible impact on safety. This adverse performance trend is considered a cross-cutting finding not captured in individual findings."
- ☹ROP lacks criteria to determine how many human performance failures, how many problem identification and resolution failures, and how many fill in the blank failures warrant escalation.
- ☹The containment is a barrier that mitigates accidents, but is not covered under the Barrier Integrity or Mitigating Systems PI.

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Assessment Program

What we don't like: (continued) <new>

- **SECY-00-0053, February 29, 2000, on human performance:**
  - **"Of the 48 recent (1992-1997) events having CCDPs > 1.0E-05, 38 (79%) involved human performance issues."**
  - **"In 35 out of the 48 (73%) events, deficient human performance caused one or more risk significant equipment failures."**
  - **"In total, the staff identified 63 instances of equipment failures induced by human performance in the 48 ASP events." [average of 1.3 failures per event -- so much for the single failure concept]**
  - **"One important insight that stemmed from the study is that control room personnel only contributed to a small fraction (6 of 63) of the equipment failures."**

NRC needs better assessment of human performance trends at individual nuclear plants with some pre-defined response thresholds.

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Assessment Program

What we don't like: (continued)

- ☹The distraction imposed by the SDP Phase II and III exercises. The stated intent of the ROP is to focus NRC and industry attention and resources on risk significant items
- ☹SDP for non-GREEN findings is just too slow: NRC response time is inversely proportional to the risk significance of the issue (and thus inversely proportional to common sense)
- ☹The SDP is broken and should not be used. Example: ConEd steadfastly believes that the SGTR event was WHITE or perhaps light YELLOW. NRC determined that the event was RED. If industry and NRC cannot look at an event and come to the same answer, then another tool is needed.

  How can the public have confidence in a game when the only two players seldom agree on non-GREEN findings?

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Enforcement Program

What we like:

- ☺Enforcement page on the NRC website (anything that lets us avoid ADAMS is a good friend of ours)
- ☺Protracted debates over severity levels and associated civil penalty amounts are replaced y discussions on resolutions

What we don't like:

- ☹ADAMS
- ☹D C Cook getting a GREEN finding for intentionally (and illegally) suspending its Maintenance Rule monitoring efforts
- 😐Enforcement actions taken (and not taken) against individuals that are disproportionate to their risk significance. Example: Mrs. Gail C. VanCleave and her three-year ban vs. any other sanction

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Reactor Oversight Program

What we like:

☺Quarterly performance results for all plants available on the NRC website (not ADAMS!!!)

What we don't like:

☹ADAMS

☹D C Cook restarted under the MC 0350 process; IP2 restarted under the ROP -- MC 0350 should have been used at IP2 too

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Reactor Oversight Program

What we don't like: (continued)

☹Results from ROP are not "user friendly." Examples:

- Cornerstone descriptions on website beg for English translations --> the RHR System PI is described as "The average of the individual train unavailabilities. Train unavailability is the ratio of the hours the train is unavailable to the number of hours the train is required to be able to perform its intended safety function." Very high glaze factor!
- ROP/Plant Assessment pages do not (or at least I could not find it) indicate that there's an open public comment period for the process. If public input was really desired, seems like people clicking through Assessment-land should be alerted to it.

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Using the Yardstick

Is the inspection program under the ROP better than the inspection program under SALP et al?

YES. The revised inspection program redirects more attention to risk significant areas. Equally important, the revised assessment program provides more timely and objective inspections above baselines.

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Using the Yardstick

Is the assessment program under the ROP better than the assessment program under SALP et al?

YES. Despite the fact that the SDP is fundamentally flawed, the revised assessment program raises more timely and objective warning flags. The GREEN-to-WHITE thresholds identify problems and enable them to be fixed in parallel with the negotiations over which part of the palette to use.

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Using the Yardstick

Is the enforcement program under the ROP better than the enforcement program under SALP et al?

YES, with the exception of enforcement actions taken against individuals (which is a tie). Debates over severity levels have been replaced by discussions over corrective measures.

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Conclusions

Reactor Oversight Program has both benefits and shortcomings

Despite all its flaws, the Reactor Oversight Program is much better than its predecessor

An effective oversight program is the public's best protection. NRC staff must not stop at "better" but constantly seek to improve the effectiveness of the ROP.

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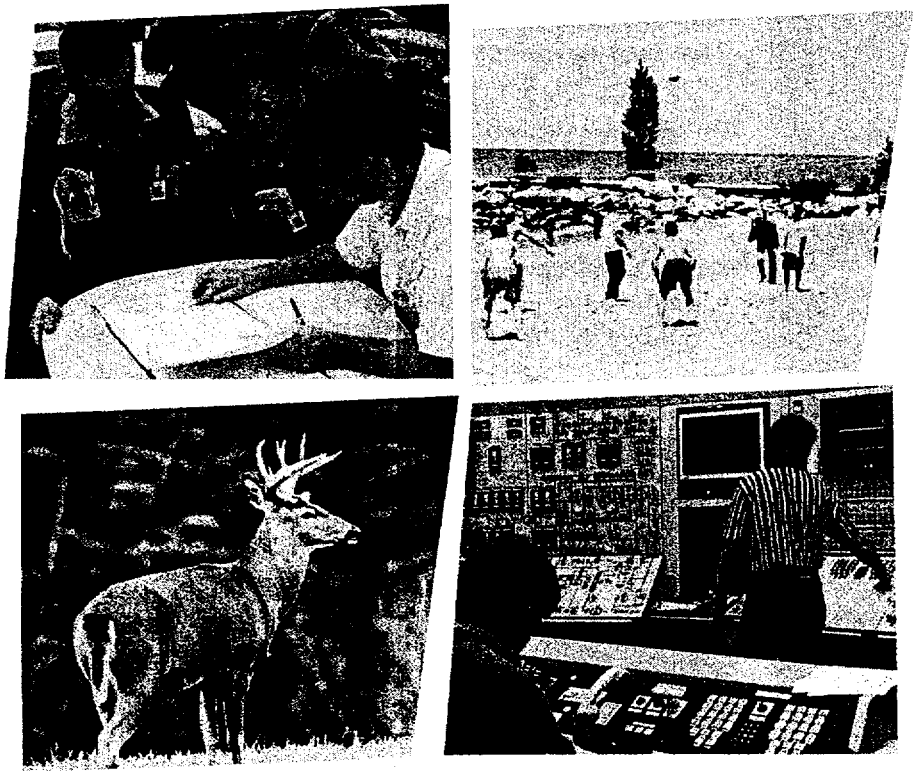
Ontario Power Generation
Nuclear Report Card

Bruce Nuclear
December • 2000



Report Cards are also available
individually for Darlington Nuclear,
Pickering Nuclear and OPG Nuclear Operations.

ONTARIOPOWER
GENERATION

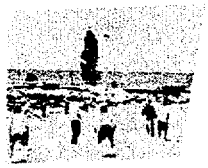
Why a Report Card?

We issue our Nuclear Report Cards as part of keeping our promise to operate in an open manner - in this case by providing key statistics on how well our nuclear stations are working.

Who sets these standards?

In these Report Cards, we measure our performance against standards used by the World Association of Nuclear Operators (WANO) - an independent, international organization created to ensure a high standard of excellence among nuclear operators around the world.

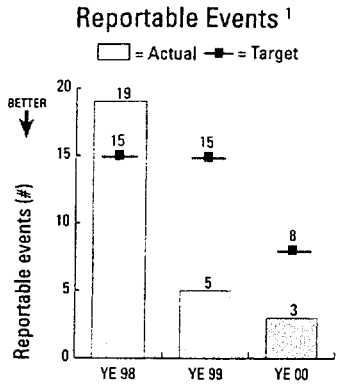
(continued on next page)



Public Safety

One gauge of how safe our stations are is the number of events that cause some reduction in the margin of public safety. Such events, in themselves, don't necessarily pose a danger to the public, but they do put pressure on the station's safety systems and therefore temporarily reduce the *margin* of safety.

This report card lists the number of Level 1 and 2 Reportable Events. A Level 1 Event is defined as highly significant. A Level 2 Event is significant.



[1] Data is cumulative

Reportable Events Summary:
There were no reportable events in December, which is better than target. This achievement demonstrates our commitment to public safety.

Another significant measure of safety system performance is the "Reactor Trip Rate" - the number of unplanned reactor shutdowns (per 7,000 hours of operation) triggered by automatic safety systems. Reactor trips indicate potential problems that need to be addressed - but they also demonstrate that safety systems are working as they should to catch these potential problems.

Reactor Trip Rate Summary:
In December, the reactor trip rate measured 0.00, which is better than both our target and the WANO standard of one trip per 7,000 hours of operation per year.

Radiation Exposure to the Public

Dose To Public [1]	Q4 2000 Actual (μSv)	Q4 2000 Target (μSv)	Performance
Bruce	3.3	8.0	Better than target

[1] Data is cumulative

This figure is an estimate of the radiation dose people would receive if they lived just outside the station boundary at their residences 24 hours a day, drank local water and milk, and ate local fish and produce. The dose is measured in microsieverts (μSv), an international unit of dose. By way of comparison, the average Canadian receives about 2,000 microsieverts a year from natural sources such as cosmic rays and radon in the soil.

Dose to Public Summary:
The Dose to Public was 59% better than target and significantly better than the regulatory limit of 1000 microsieverts (μSv). Dose to Public is reported quarterly.

Why these measurements?

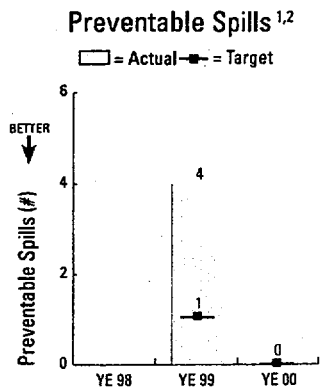
The measurements chosen for use in the Report Cards represent only a few of those we use to assess our performance. For example, the Report Cards also compare our performance with industry benchmarks which are based on industry best practices or performance of top performing nuclear utilities. To learn more about our performance, please visit the Ontario Power Generation website at www.ontariopower generation.com or call 519-361-7777.

One important note. You'll see that on occasion we don't meet the targets we've set for ourselves. This doesn't indicate an unsafe situation. Our performance targets are set well within the range of safe operation. Any unsafe condition - or the potential of one - leads to the immediate shut-down of a reactor.

We're working hard to make our nuclear generating stations world performance leaders once again. We'll keep you informed of our progress through these report cards.

Environmental Performance

The measure used here to gauge environmental performance is the number of spills of chemicals or other substances that have taken place at the stations. These figures indicate "major and moderate preventable spills" as defined by the Ontario Ministry of the Environment.

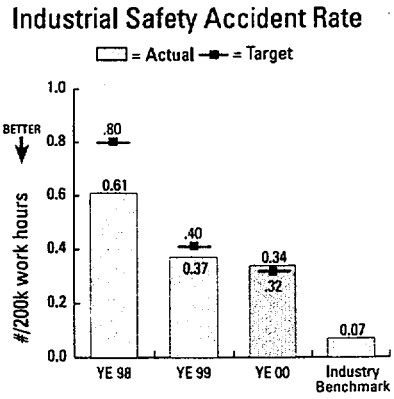


[1] Data is not available for 1998
[2] Data is cumulative

Preventable Spills Summary:
In December, there were no major or moderate spills. This meets target.

Employee Safety

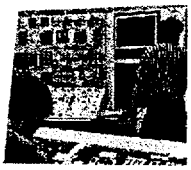
One of the most widely accepted measures of employee safety is the Industrial Safety Accident Rate - the number of employee accidents per 200,000 hours worked that result in lost time, injuries that restrict work, or fatalities.



Industrial Safety Accident Rate Summary:
There was one Industrial Safety Accident event in December. This and other events during the year resulted in an Industrial Safety Accident Rate of 0.34 against a target of 0.32. This result is slightly worse than target.

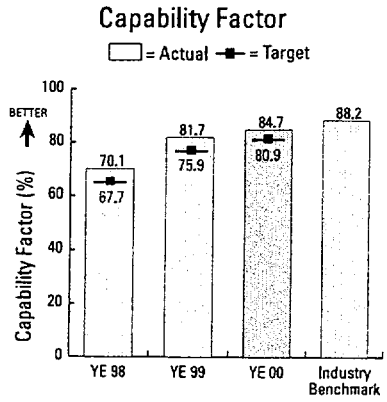
Another useful measure of employee safety is the Accident Severity Rate - the number of days lost to injuries per 200,000 hours worked.

Accident Severity Rate Summary:
There were 0.8 days lost due to Accident Severity in December. This result is better than the target of 4.0 days lost to injuries per 200,000 hours worked.



Electricity Production

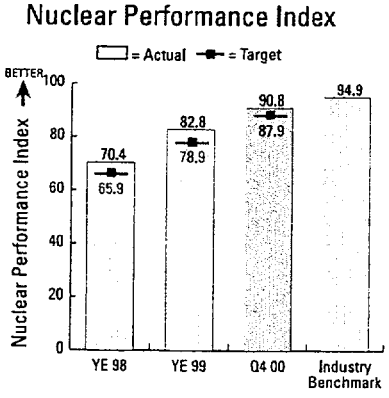
One measure of how well the stations are doing at producing electricity is the "Capability Factor." This figure represents the amount of electricity the stations are actually capable of producing per month as a percentage of their potential capacity — in other words, their capacity if all reactors and related systems were operating with no down-time at all.



Capability Factor Summary:
The year-to-date Capability Factor was better than target to the end of December.

Nuclear Performance Index

This index, reported on a quarterly basis, is measured out of 100 and provides an overview of performance based on 11 key statistics that cover a number of areas, including safety and production. The index is used by the World Association of Nuclear Operators - WANO to measure performance of nuclear plants worldwide.



Nuclear Performance Index Summary:
The Q4 2000 Performance Index is 90.8, which is better than the target of 87.9 and represents a 2.1 point increase from Q3 2000. The Nuclear Performance Index is reported quarterly.

Glossary

Index: *A collection of statistics that, taken together, provide a useful standard or measurement.*
WANO: *World Association of Nuclear Operators - an international organization created to ensure a high standard of excellence among nuclear operators around the world.*
YE: *Year-end*
YTD: *Year-to-date*

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD PANEL
WASHINGTON, D.C. 20555

July 10, 1986

50-247/286 SP

Chairman Lando W. Zech, Jr.
Commissioner Thomas M. Roberts
Commissioner James K. Asselstine
Commissioner Frederick M. Bernthal

Dear Mr. Chairman and Commissioners:

This letter is a response to the July 3, 1986 letter to you from Brent L. Brandenburg, Esq., Assistant General Counsel for Consolidated Edison Company of New York, Inc., (Con Ed) owner and operator of Indian Point Unit No. 2. No stranger to us because he represented Con Ed in the Indian Point Special Proceeding, Mr. Brandenburg characterized our June 9, 1986 letter to you as containing "erroneous, inaccurate and out-of-date information" regarding the Indian Point Alert and Notification System (ANS). As a result of his letter, we acknowledge that the information in our letter was out-of-date, but it was neither erroneous nor inaccurate. Furthermore, the fact that it was out-of-date is attributable to the failure of the Staff and/or the Licensees to inform the Board about NUREG/CR-2655 during the Indian Point hearing.

Mr. Brandenburg is simply wrong when he states that we erred in our June 9 letter by stating that NUREG/CR-2655 predicted that on a winter night with snow the sirens at Indian Point would alert only 53% of the residents in the EPZ. In point of fact, the 53% prediction does indeed occur at p. 4-2 in NUREG/CR-2655 (cited in Brandenburg's letter) as an estimate of alertability in rural areas (as opposed to urban areas) on a winter night during a snowfall at Indian Point. That prediction of 53% alerting was used by us because (1) it was the value for Indian Point selected by the Shearon Harris Board in their May 16, 1986 letter to you, and (2) it represented a worst-case situation. With urban areas included, the prediction jumps to only 57% under the same meterological conditions. Categorizing any of the densely populated Westchester County, New York, suburbs as rural perhaps stretches the meaning of the word, but that choice was made by the authors of NUREG/CR-2655, not by us.

Mr. Brandenburg seems to imply that that the Staff had no obligation to provide the Board with a copy of NUREG/CR-2655 when it was published in September 1982, because the Board had suspended filing dates and discovery on August 9, 1982 and did not order the hearing resumed until January 10, 1983. Board Notifications under the then existing policy, and under current policy as well, are not governed by procedural rules issued by licensing boards, as Mr. Brandenburg should know.

Mr. Brandenburg also argues that the Staff had no obligation to provide the Board with a copy of NUREG/CR-2655 because it was a "publicly available document". That position is, of course, untenable. The Staff routinely serves Boards and the parties to a proceeding with copies of public NRC documents which are relevant to issues at bar in the proceeding.

On the positive side, the information contained in Mr. Brandenburg's letter about the Indian Point ANS, which was upgraded following the analysis reported in NUREG/CR-2655 and now has 151 sirens (as opposed to the intial 88 in existence at the time of the NUREG/CR-2655 study), assuages the major concern we had about the adequacy of the siren system at Indian Point. The telephone survey by Con Ed following the March 1983 exercise showed that 87% of EPZ residents were alerted by sirens and 5% were alerted by television or radio, to give a total of 92% direct alerting. Again applying the Shearon Harris Board's method of accounting for informal alerting, one obtains an estimate of somewhat more than 95% alerting, which meets the more-than-95% criterion adopted by the Shearon Harris Board.

We were not told, however, whether the March 1983 test was conducted at night or during the day. Hopefully Con Ed will conduct another test, followed by a telephone survey, on a winter night during a snowstorm. If such a test and survey should confirm Mr. Brandenburg's theories about winter alertability, it could put NUREG/CR-2655 permanently to rest. It appears, however, that he may have failed to take into account the attenuation of sound by closed windows and storm windows, which would be expected during a winter snowstorm but probably not expected during a test in March.

Finally, while we no longer have a major concern about the adequacy of the Indian Point siren system, we remain concerned by the fact that the Staff never notified us about NUREG/CR-2655. Had the Staff and/or the Licensees been forthcoming about that study, and had they advised us that the siren system was being upgraded, presumably because of the NUREG/CR-2655 analysis, we would never have been movitated to write our June 9 letter to you concerning this matter.

Respectfully submitted,

Oscar H. Paris

Dr. Oscar H. Paris
Administrative Judge-Technical

Frederick J. Shon
Deputy Chief Administrative
Judge-Technical

cc: B. Paul Cotter, Jr.
W. C. Parler, General Counsel
S. Chilk, Secretary
Indian Point Service List