

INADEQUATE PERFORMANCE BY REACTOR OPERATING AND SUPPORT STAFF MEMBERS

DESCRIPTION OF CIRCUMSTANCES

Increases in numbers of errors by members of the reactor operating and support staff at various licensed power reactor facilities have resulted in a number of incidents where the individual's contribution to the overall "defense in depth" approach to safety was reduced.

A recent event of concern to NRC involved an inadvertent criticality at a boiling water reactor as follows:

During refueling activities at a BWR an inadvertent reactor criticality occurred due to operator error. A shutdown margin test was being conducted from the control room using an approved procedure. This test calls for withdrawals of a high worth rod and a second rod diagonally opposite from the high worth rod. The licensed reactor operator incorrectly selected the adjacent control rod and withdrew it until the reactor was automatically scrammed by the reactor protection system.

Other examples of events of concern which represent a cross section of such occurrences are listed below:

Improper Reactivity Change/Power Distribution

1. Valving error between refueling water storage tank and spent fuel pool lowered primary boron concentration.
2. Incorrect estimated critical position and failure to recognize 1/M plot indications resulted in criticality being achieved with control rods below the insertion limits.
3. Leakage from secondary to primary side of steam generator through failed tubes resulted from improper maintenance which led to primary system boron dilution.
4. Personnel error and procedural inadequacies defeated an administrative control established to preclude inadvertent criticality resulting in the withdrawal of adjacent control rods.

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5. Improper control rod movements resulted in fuel cladding failures.

Improper Valve Lineups

6. Valving errors led to overpressurization of the reactor coolant system.
7. Valving error prevented two control rod hydraulic control units from being scrambled.
8. Valving error resulted in air ejector offgas monitor being isolated.
9. Valving errors resulted in drywell atmosphere monitoring equipment being isolated.

Improper Maintenance and Surveillance

10. Incorrect interpretation of a drawing resulted in a core boring penetrating a condensate storage tank (CST) level indicating line resulting in a loss of CST water and automatic realignment of ECCS systems.
11. Unauthorized offgas isolation valve wiring change resulted in an explosion, personnel contamination, and injury.
12. An operating error resulted in a diesel generator being returned to service in an inoperable condition.
13. A calibration error resulted in the high power reactor trip setpoints on all four power range channels being set in a non-conservative direction.

ALTHOUGH NONE OF THESE EVENTS RESULTED IN CONSEQUENCES AFFECTING THE PUBLIC HEALTH AND SAFETY, A REVIEW OF THESE AND OTHER INCIDENTS INDICATES THE OPERATING OR SUPPORT STAFF MEMBER CAN BE A SIGNIFICANT CONTRIBUTOR TO SUCH EVENTS. Insufficient attention to and knowledge of plant operating history and status can degrade the individual's contribution to the overall defense in depth approach to nuclear safety.

Recognition of the individual's role by both the operator and management is a key element in the system for safe operation of nuclear reactors. Renewed emphasis is being requested to assure appropriate and continuing management attention to this important issue.

ACTION TO BE TAKEN BY LICENSEE:

Nuclear power reactor license conditions require that adequate procedures be provided for the safe operation of the facility. To assure these procedures are being implemented, all operators of nuclear power reactor facilities with operating licenses are requested to take the following action:

Conduct a review of your plans or programs which are to provide positive assurance that members of your reactor operating and support staff are, in fact, complying with the safety procedures you have in effect and that they are aware of safety related incidents that have occurred at your facility or similar facilities. Your review should include but not be limited to consideration of the following three matters:

1. Program for periodic shift and operator training whereby incidents which occur at your facility as well as at other licensed reactors, including all significant personnel errors, will be reviewed with the objective of identifying "the lessons to be learned."
2. Procedures routinely implemented by knowledgeable individuals to qualitatively assess the performance of the operating and support staff in such areas as adherence to operating procedures, use of systems checklists, and implementation of component and system tagouts. This should include review of the degree to which operating procedures, tagout procedures and checklists require signoff, i.e., signature or initials to verify proper completion and to identify the responsible personnel.
3. Procedures for random backshift and weekend visits by management and supervision to the facilities, to monitor and assess operations including crew manning and performance, equipment status and plant conditions.

A report acknowledging completion of your review should be submitted within 90 days to the Director of the NRC Regional Office and a copy should be forwarded to the NRC Office of Inspection and Enforcement, Division of Reactor Inspection Programs, Washington, D. C. 20555.

Approval of NRC requirements for reports concerning possible generic problems has been obtained under 44 U.S.C. 3152 from the U. S. General Accounting Office. (GAO Approval B-180225 (R0072), expires 7/31/77)