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ILLINOIS POWER

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Docket No. 50-461

Document Control Desk
Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Response to Notice of Violation Documented in NRC Enforcement Action No. 92-110, dated July 21, 1992

Dear Sir:

This letter provides the Illinois Power Company (IP) response to the Notice of Violation documented in NRC Enforcement Action No. 92-110. The Notice of Violation discusses violations of 10CFR19.12 and 10CFR20.201(b) as related to the work performed on the Traversing Incore Probe (TIP) "C" during the period May 28, 1992 through June 2, 1992. Attachment 1 to this letter provides the response to the Notice of Violation.

The cover letter to the above-mentioned Notice of Violation contains concerns in the areas of communication and work control. Attachment 2 of this letter provides the response to these concerns.

IP shares the NRC's concerns addressed in the Notice of Violation. Although no regulatory or Clinton Power Station (CPS) administrative over-exposures occurred as a result of the TIP "C" work, we recognize our failures in these areas and take these issues very seriously. Extensive investigations to pinpoint root causes and identify corrective actions have been conducted.

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IP believes that this response addresses the concerns identified in the Notice of Violation and in the Notice of Violation cover letter.

Sincerely yours,

R F Shaw for

F. A. Spangenberg, III
Manager, Licensing and Safety

MAR/msh

cc: NRC Resident Office, V-690
Regional Administrator, Region III, USNRC
Illinois Department of Nuclear Safety

The Notice of Violation states:

A. "10CFR 20.201(b) requires that each licensee make such surveys as may be necessary to comply with the requirements of 10 CFR Part 20 and which are reasonable under the circumstances to evaluate the extent of radiological hazards that may be present. As defined in 10CFR20.201(a), "survey" means an evaluation of the radiological hazards incident to the production, use, release, disposal, or presence of radioactive materials or other sources of radiation under a specific set of conditions.

Contrary to the above, as of May 29, 1992, the licensee did not make surveys to assure compliance with the part of 10CFR20.101 that limits the radiation exposure to the whole body. Specifically, on May 28 and May 29, 1992, individuals performed work without benefit of an evaluation to determine the radiation hazards incident to the neutron activation of the TIP cable."

I. Background and Reason for the Violation

The Traversing Incore Probe (TIP) "C" detector and cable assembly were replaced on May 26, 1992, under Maintenance Work Request (MWR) D36919. ALARA Work Plan (AWP) 92-006 was written by ALARA personnel to provide radiological guidance for the performance of this activity. During the time this activity was being performed, Clinton Power Station (CPS) had been shutdown since February 27, 1992, for the unit's third refueling outage (RF-3).

CPS ALARA personnel were aware of the potential for very high dose rates from TIP detector and cable assemblies exposed to the neutron flux present in the CPS reactor core during power operations. CPS Radiological Engineering had previously performed engineering evaluations (RP-90-15 and RP-90-17) to determine the contact dose rates which could be expected from a TIP detector and cable assembly under the above-mentioned conditions. However, since AWP 92-006 was written to perform TIP detector and cable replacement approximately eighty-eight days after reactor shutdown, Radiation Protection personnel correctly assumed that sufficient time had passed to allow the decay of radiation dose rates from the TIP detector and TIP cable assembly.

Following replacement of the TIP "C" detector and cable assembly, Control and Instrumentation (C&I) maintenance personnel determined that Preventive Maintenance (PM) task PCINRM503, job step #7 needed to be performed on the TIP "C" assembly. This PM task requires that the TIP mechanical stop pin be inspected to ensure that it is free to activate. If there is any sign of friction, a drop of Mobil DTE heavy oil is applied to the stop pin pivots. C&I maintenance technicians also determined that to ensure the PM task was thoroughly completed, the TIP mechanical stop mechanism

needed to be exercised to ensure it performed its function. Neither the PM task card (PCINRM503) nor the TIP technical manual required that this action be done. Consequently, RP ALARA personnel reviewing the work package for RWP preparation were not aware that the TIP mechanical stop mechanism was to be adjusted and exercised, and therefore, did not prepare for this evolution.

The TIP "C" mechanical stop adjustment was scheduled to be performed on May 28, 1992. In the period between May 26, 1992 and May 28, 1992, reactor startup occurred.

The PM task card (PCINRM503) and AWP 92-006 were not revised to address TIP "C" mechanical stop mechanism adjustment or exercising. Consequently, the radiological conditions which would be present if the TIP detector and cable assembly were retracted after insertion into the reactor core at power were not addressed.

On May 28, 1992, with reactor power at approximately one percent, work to adjust the TIP "C" mechanical stop mechanism commenced. The TIP detector was inserted to the core top position (TIP detector inserted fully into the core) to allow for the adjustment of the mechanical stop mechanism. Subsequent to placing the TIP detector into the core, work was suspended to allow plant utility personnel access to the TIP drive area to clean up fyrquel (hydraulic fluid which had leaked from a component located in the Containment Building) in the suppression pool. The cleanup effort was unrelated to the TIP "C" incident.

On May 29, 1992, with reactor power at approximately one to two percent, C&I maintenance technicians withdrew the TIP "C" detector and cable assembly from the reactor core to test the operation of the mechanical stop mechanism. The RP technician providing continuous job coverage ordered the withdrawal to be stopped when portable radiation monitoring equipment indicated high radiation dose rates at the point where the TIP cable assembly penetrates the drywell wall. The C&I maintenance technician performing the TIP withdrawal inserted the TIP detector to the in-vessel storage position (approximately ten feet below the bottom of the reactor core), and the workers exited the area.

Although evaluations of the radiological hazards incident to the insertion and withdrawal of the TIP detector and cable assembly had been previously performed by Radiological Engineering personnel (RP Engineering Evaluations RP-90-15 and RP-90-17), these survey results were not applied to the task at hand.

The requirements of 10CFR20.201(b) were violated because AWP 92-006 was written to provide radiological controls and

guidance for the replacement of the TIP "C" detector and cable assembly eighty-eight days after reactor shutdown and did not address adjusting and exercising the mechanical stop mechanism with the reactor critical. Therefore, the evaluation to determine the radiological hazard incident to the neutron activation of the TIP cable did not benefit the individuals performing the work.

Contributing to the cause of the violation was that authorizing work documents (MWR D36919 and PM task card PCINRM503) did not provide guidance for the adjustment of the TIP mechanical stop mechanism.

II. Immediate Corrective Actions Taken

The decision was made to leave the TIP "C" detector in the in-vessel storage position to allow for radioactive decay of the TIP detector and cable assembly.

ALARA Work Plan 92-007 was prepared to address the adjustment of the mechanical stop mechanism on the TIP "C" drive assembly.

III. Corrective Steps Taken to Avoid Further Violation

The following corrective actions were taken subsequent to June 2, 1992.

CPS procedure 7500.02, "Radiological Safety Work Plans," was revised to require the preparation of a Radiological Safety Work Plan (RSWPs were previously titled "ALARA Work Plans") for high radiological risk jobs. High radiological risk jobs are defined as work tasks being conducted on a system/activity which challenge routine radiological safety. These work activities require additional planning and management attention to preclude the potential for unplanned and/or overexposure incidents. An RSWP is a coordination document that becomes a part of the Radiation Work Permit for the job to be performed. The RSWP provides specific special instructions regarding a planned work activity that has been identified as a high radiological risk job. RSWPs are used to help reduce the radiological risk of unplanned exposure and/or overexposure incidents. It is the responsibility of the Supervisor-Radiological Operations to declare a job a high radiological risk job.

CPS procedure 7500.02 was revised to ensure that surveys reflected in RSWPs are based on appropriate engineering evaluations, calculations, technical and/or historical data, and any other available information.

The Director-Plant Maintenance met with each maintenance supervisor to reinforce his expectations that each supervisor carefully and thoroughly review work packages to ensure that adequate job steps are present to cover the intended work scope.

IV. Date When Full Compliance Will be Achieved

IP is no[t] in full compliance with the survey requirements of 10CFR20[.1](b).

B. "10CFR19.12 requires, in part, that all individuals working in a restricted area be instructed in the precautions and procedures to minimize exposure to radioactive materials, in the purposes and functions of the protective devices employed, and in the applicable provisions of the Commission's regulations and licenses.

Contrary to the above, as of June 2, 1992, individuals who were working in the area of the TIP mechanical drive, a restricted area, had not been instructed on the precautions and procedures to minimize exposure to radioactive materials. Specifically, they were not instructed on the precautions and procedures associated with their assigned tasks in that personnel were not informed of the potential for extremely high radiation fields due to neutron activation of the TIP detector and cable."

I. Background and Reason for the Violation

On June 2, 1992, while attempting to adjust the mechanical stop mechanism on the TIP "C" assembly, higher-than-expected radiation doses were received by the C&I maintenance technicians performing the work and the RP technician providing radiological job coverage. These exposures were received while withdrawing the TIP "C" detector and cable assembly from the TIP core top position. The C&I maintenance and RP technicians performing the work did not fully comprehend that the TIP assembly cable would become as highly activated as the TIP detector upon insertion into the reactor core while at power.

On June 1, 1992, an ALARA Work Plan was prepared following discussions between the C&I maintenance technicians who were designated to perform the work, the day-shift Radiation Protection Shift Supervisor (RPSS), and ALARA personnel. This AWP (AWP 92-067) was prepared to provide radiological guidance for the adjustment of the TIP "C" assembly mechanical stop. The personnel present at the above meeting specifically decided that the TIP assembly would not be inserted into the reactor core during the performance of this evolution. The personnel present understood that the insertion of the TIP assembly into the reactor core would result in the TIP detector and cable assembly becoming

highly activated. If this occurred, the TIP detector and cable assembly would need to be placed in the in-vessel storage position to allow decay of high radiation dose rates. This would result in considerable delay in completing the task. The AWP developed (92-007) was written to provide direction for the adjustment of the TIP mechanical stop mechanism without inserting the TIP detector and cable assembly into the reactor core. No direction was provided in PM task card PCINRM503 or AWP 92-007 to give specific instructions not to insert the TIP detector and cable assembly into the reactor core.

Staging of materials needed to perform the work was completed on June 1, 1992, with the intent of performing the TIP mechanical stop adjustment on the next day.

On June 2, 1992, the day-shift Radiation Protection Shift Supervisor (RPSS) conducted a pre-job briefing to discuss the work to be performed on the TIP "C" assembly with the C&I maintenance and RP technicians who were going to perform the work. This briefing was done to ensure these individuals fully understood the AWP 92-007 requirements. Modifications to the AWP were suggested which included an option to insert the TIP assembly to the core top position to allow mechanical stop mechanism adjustment. There was considerable discussion about the length of time the TIP detector would be in the core if this option were performed. The Supervisor-Radiological Engineering emphasized that very high dose rates would be obtained on the TIP assembly even if it were inserted into the core for only a few minutes. The personnel present at this briefing were different from the personnel who discussed performance of the job on June 1, 1992, where it was decided the TIP detector and cable assembly would not be inserted into the reactor core.

Work commenced on day shift, but C&I maintenance personnel felt that there was not enough time to get to an appropriate stopping point for crew shift turnover. C&I maintenance technicians decided to remove the TIP "C" drive mechanism cover and leave the completion of the task to the next shift (second shift).

A pre-job briefing was provided to C&I maintenance and RP personnel who were to perform the TIP "C" work on second shift. The briefing was provided by the RP technician who had provided job coverage for this evolution on the previous shift (day-shift). The RP technician discussed current radiological conditions at the job site and work plan stop points. C&I maintenance personnel discussed their intention to fully insert the TIP assembly into the core to allow for TIP mechanical stop adjustment. Both C&I maintenance and RP personnel were aware of cautions in the AWP and PM Task Card that cautioned them concerning the potential for high dose

rates and high radiation exposure from activated TIP detectors and cable assemblies. These cautions read as follows:

AWP 92-007

> "Movement of tip drive assembly (tip & cable) can result in extremely high radiation dose rates. Extreme Caution is to be used when moving irradiated incore tip/cable assemblies. TIPS A, B,and D are not to be moved during work on TIP C."

PM Task Card

> "Recently irradiated components such as in-core flux detectors and attached drive cables, can create radiation fields in which permissible occupational dose standards can be exceeded in less than a few seconds and acute exposures, sufficient to cause serious radiation injury, are possible with just several minutes of exposure."

However, the personnel performing the work did not fully understand that the insertion of the TIP cable assembly into the core for only a few minutes would activate the TIP cable such that it would have radiation dose rates up to several hundred rem per hour. They were cognizant that the TIP detector would become highly activated, but anticipated the activation of the cable assembly to be much less.

Higher-than-expected exposures were received by this crew when the TIP assembly was being withdrawn after the TIP assembly had been inserted into the core. Reactor power was approximately seventeen percent at this time.

When very high radiation dose rates were indicated by the portable radiation monitoring instrument being used by the RP technician providing continuous job coverage, the RP technician immediately ordered the C&I maintenance technicians performing the work to stop work and evacuate the area. C&I maintenance personnel immediately stopped withdrawal of the TIP detector, secured the TIP cable reel, and evacuated the area.

The requirements of 10CFR19.12 were violated because RP personnel (ALARA and Radiological Engineering personnel) were aware that the TIP detector and cable assembly would become highly activated after insertion into the reactor core, but never fully conveyed this to the work crew performing the work. AWP 92-007 and PM task card PCINRM503

did contain cautions reflecting this information, but the workers did not fully comprehend the severity of these cautions.

II. Immediate Corrective Actions Taken

Following the work stoppage initiated by Radiation Protection on TIP "C", the Director-Plant Radiation Protection suspended all "high risk" radiological work. High radiological risk jobs are defined in CPS procedure 7500.02, "Radiological Safety Work Plans". Per this procedure, high radiological risk jobs are defined as work tasks being conducted on a system/activity which challenge radiological safety. These work activities require additional planning and management attention to preclude the potential for unplanned and/or overexposure incidents.

As an interim measure, the initiation of high risk radiological work required the permission of the Director-Plant Radiation Protection or the Assistant Director-Plant Radiation Protection. This action was taken to ensure that all necessary preparation and precautions were considered and were in place for the conduct of high risk radiological jobs.

III. Corrective Steps Taken to Avoid Further Violation

The RP Work Coordinator has been given the responsibility of identifying potential high risk jobs (as defined in CPS procedure 7500.02). This activity will be done while conducting reviews of future, scheduled maintenance activities.

The Supervisor-Radiological Operations has the responsibility to evaluate all potential high risk jobs to determine if an RSWP is required. The Supervisor-Radiological Operations or Director/ Assistant Director-Plant Radiation Protection authorization is required for release of all RSWPs to the field for execution. This is to ensure that all RSWPs contain specific special radiological instructions regarding the planned work activity.

All high risk jobs require that a "task manager" be assigned. Attachment 2 provides the responsibilities of task managers.

Personnel responsible for working under an RSWP are required to attend a briefing prior to the start of work and as required prior to critical evolutions. This is to ensure that all requirements contained in the RSWP are understood and met by all personnel. The RSWP pre-job briefing is only applicable to one shift and/or crew. Any new crew coming on shift is required to be briefed on the work scope to be

performed, the Radiation Work Permit (RWP) being used, the RSWP being used, and any other items learned as a result of previous history. All workers will acknowledge in writing that they have reviewed and understand the RSWP.

A seminar will be developed on how to identify and evaluate radiological risks of high risk tasks. This activity will be completed by January 31, 1993. The seminar developed will be included in the regular RP technician training cycle.

Job tasks for high risk work are being added to the RP technician certification program. This activity will be completed by May 31, 1993.

RP Operations and C&I maintenance technicians will be retrained on NRC Information Notice (IEIN) 88-63, "High Radiation Hazards from Irradiated Incore Detectors and Cables" and its supplements. This activity will be completed by October 1, 1992.

The C&I lesson plan on TIP work is being revised to expand emphasis on radiological hazards associated with TIP work. This is to include lessons learned from IEIN 88-63 and CPS experience. This activity will be completed by January 31, 1993.

A TIP device is being procured for use in mock-up training. Procurement will be completed by March 31, 1993.

A training course is being developed to ensure that briefings provide appropriate information and are sufficiently interactive to assure that information is understood by all personnel attending the briefing. This activity will be completed by September 30, 1992.

IV. Date When Full Compliance Will be Achieved

IP is now in full compliance with the requirements of 10CFR19.12.

Concerns as raised by the NRC in the Enforcement Conference held on July 14, 1992, and in the cover letter to NRC Enforcement Action No. 92-110 are as follows:

- lack of Radiation Protection (RP) input into and control of work scheduling,

- radiation work permits with untimely survey data and insufficient instructions to workers,

- weaknesses in the ALARA program including inadequate work plans and poor communication both within the group and with other departments,

- poor communications within RP and between RP and other groups,

- the lack of a questioning attitude displayed by RP supervisors and technicians

IP shares the NRC's concerns in these areas and takes these issues very seriously. Extensive investigations have been performed to pinpoint root and contributory causes. Extensive preventive actions have been implemented including substantial procedure changes and changes in the way communications occur and radiological work is planned.

Actions taken to address NRC concerns are listed as follows:

In order to communicate the seriousness of the June 2, 1992 TIP "C" incident to all nuclear program employees, the following two actions were taken:

The CPS Plant Manager issued a memorandum to site personnel directing employees to attend briefings on June 11, 1992, where the circumstances surrounding the incident would be discussed. This memorandum also provided a brief description of the incident and stressed that, although no personnel received radiation doses which exceeded CPS administrative or regulatory limits, the incident was serious and demonstrated weaknesses in radiological work practices.

On June 11, 1992, site work was stopped while management provided briefings to site personnel. These briefings emphasized the seriousness of the June 2, 1992, TIP "C" incident and conveyed the lessons learned from this incident. Personnel were reminded that work must be planned thoroughly and concisely and the plan must be followed. In order to provide clear communication, the work plan must be written. If the plan must be changed, then the entire work planning and communication process must be repeated. All personnel must have a questioning attitude to identify discrepancies in the written plan which, if followed, would lead to unwanted incidences and failures.

Two root causes for the TIP "C" incident were identified. One root cause was inadequate management direction for the preparation, planning, and control of work. This deficiency, if not corrected, could lead to similar breakdowns of work control in the future. Corrective actions to address this weakness are as follows:

CPS procedures 7500.02, "Radiological Safety Work Plans," and 1501.02, "Conduct Of Maintenance," have been revised to ensure that the instructions contained in Radiological Safety Work Plans (RSWPs) are consistent with maintenance work documents. If an RSWP is required to perform work, a job step will be included in the authorizing work document which implements the RSWP. RSWPs will provide specific references to authorizing document steps or an attached specific list of job steps to be worked in the high radiological risk evolution. RSWPs will not normally be approved unless they are refererced by a job step in the work authorizing document and the work scope described in the work authorizing document is consistent with the RSWP. RSWPs must be approved before the high risk portion of the associated Radiation Work Permit (RWP) can be activated (approved) for work

CPS procedure 7500.02 was revised to also incorporate directions on requirements to be included in RSWPs. These requirements include but are not limited to:

- acceptable limits for expected radiological conditions and action to be taken when these limits are exceeded,
- radiological hold points,
- points at which critical radiological surveys are required,
- chronology of critical job steps in relation to the potential changing radiological conditions,
- identification of points where verification by signature/initial are required,
- the identification of potential accident situations or unusual occurrences, and contingency plans, to reduce the potential for such occurrences and to enhance the capability for coping with the situations should they occur.

As identified in the corrective steps to avoid further violations of 10CFR20.201(b), the Director-Plant Maintenance met with all Maintenance Department supervisors to stress their responsibilities in the review of work packages for work to be performed. It is the responsibility of the supervisor to ensure that adequate job steps are included in work packages to allow work to be accomplished correctly without the need for interpretation. Not only does this permit work to be correctly performed, it also allows other pre-job activities (i.e., the preparation of Radiation Work Permits and Radiological Safety Work Plans) to be accurately and thoroughly accomplished. This is not to say that workers should blindly follow work instructions without questions. All personnel have been reminded to have a questioning attitude and bring potential problems to the attention of their supervision.

The remaining root cause from the TIP "C" incident involved poor communication between shifts, different departments and different groups within the same department. Corrective actions taken to improve communications at CPS are as follows:

The on-shift Radiation Protection Shift Supervisor (RPSS) will brief the RP technician assigned as lead technician at the beginning of the shift. This briefing informs the lead technician as to what maintenance activities that require RP coverage are going to be worked for that shift. This will ensure that only work properly planned and authorized is allowed to begin. Items included in this briefing include but are not limited to:

- nature of the work to be performed,
- current radiological conditions,
- radiological controls to be applied to each job,
- radiological information workers need to know for each specific job,
- the radiological support/coverage required for each job.

Each normal work day (Monday through Friday), the RP Work Coordinator will discuss the upcoming day's work with the on-shift RPSS. This will ensure that only RWPs to be used for job coverage that day are authorized (after appropriate review by the RPSS). This will also ensure that the RPSS is aware of work that the maintenance organization plans to work that day. The RP Work Coordinator meets with each shop to verify the work schedule for the next day.

CPS procedure 1501.02 has been revised to require that a "Task Manager" be assigned for all high risk tasks (including non-radiological high risk tasks). Task Managers are responsible for the overall management of the preparation, coordination, and execution of the designated work activity. Task Managers are also responsible for the review and approval of the RSWP when an RSWP is required. The Task Manager ensures that all personnel assigned to perform work under an RSWP are qualified to perform the assigned task and ensures that the workers understand the radiological risks and protective measures contained in the RSWP.

The radiation worker training plan has been revised to reflect procedure revisions which incorporate corrective actions as discussed above.

Appropriate RP personnel have been trained on the procedure revisions discussed above. Appropriate maintenance personnel will be trained on these procedure revisions by September 1, 1992.