

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-461/92015(DRSS)

Docket No. 50-461

License No. NPF-62

Enforcement Action No. 92-110

Licensee: Illinois Power Company  
500 South 27th Street  
Decatur, IL 62525

Facility Name: Clinton Power Station

Enforcement Conference At: Region III Office, Glen Ellyn,  
Illinois

Enforcement Conference Conducted: July 14, 1992

Inspector: *David W. Nelson*  
D. W. Nelson  
Radiation Specialist

7/21/92  
Date

Approved By: *B. Snell*  
William Snell, Chief,  
Radiological Controls Section 2

7/21/92  
Date

Enforcement Conference Summary

Enforcement Conference on July 14, 1992 (Report No. 50-461/92015(DRSS))

Areas Discussed: The circumstances surrounding the May 28 - June 2, 1992, traversing incore probe (TIP) mechanical stop mechanism adjustment events. Included in the discussion were the accuracy of the Inspection Report No. 50-461/92004(DRSS), concerns raised about this and other events and the details of the events, root causes, and the short and long term corrective actions. It was determined that escalated enforcement action was not warranted. However, two severity level IV violations were identified.

## DETAILS

### 1. Persons Present at the Enforcement Conference

#### Illinois Power Company

E. Bader, Supervisor, Calibration and Instrumentation (C&I)  
W. Baer, Attorney  
J. Cook, Vice President  
J. Clark, Director, Maintenance  
L. Everman, Director, Radiation Protection  
B. Fink, HPES Evaluator  
D. Koech, Radiation Protection Shift Supervisor  
J. Lewis, Principle Assistant to Vice President  
M. O'Shaa, Radiation Protection Technician  
S. Perry, Vice President  
R. Phares, Director, Licensing  
M. Reandeau, Licensing Specialist  
J. Sipek, Supervisor, Regional Regulatory Interface  
F. Smith, C&I Technician  
F. Spangenberg, Manager, Licensing and Safety  
R. Weedon, Assistant Director, Radiation Protection

#### U. S. Nuclear Regulatory Commission

C. J. Paperiello, Deputy Regional Administrator  
B. Berson, Regional Counsel  
C. Carpenter, Project Manager, Office of Nuclear Reactor  
Regulation (NRR)  
R. DeFayette, Director, Enforcement  
C. Gill, Senior Reactor Programs Specialist  
J. Hannon, Director, Project Directorate 3-3  
P. Hiland, Acting Chief, Division of Reactor Projects,  
Section 3-B  
D. Nelson, Radiation Specialist  
C. Norelius, Director, Division of Radiation Safety &  
Safeguards  
C. Pederson, Chief, Reactor Support Programs Branch  
K. Pederson, Enforcement Specialist, Office of Enforcement  
R. Pederson, Radiation Specialist, NRR  
C. Weil, Enforcement Specialist

### 2. Enforcement Conference

The Enforcement Conference was held in the NRC Region III office on July 14, 1992. The purpose of the conference was to discuss the circumstances surrounding the events of May 28 - June 2, 1992, which led to an unplanned exposure of three workers adjusting the mechanical stop mechanism on traversing incore probe (TIP) C. An inspection was conducted from June 1-5, 1992, and the inspection findings

were documented in Inspection Report 50-461/92011(DRSS), which was transmitted to the licensee on June 22, 1992.

The conference agenda included (1) a discussion of the apparent violations, (2) a discussion of the concerns raised by the events of May 28 - June 2, 1992 as well as other related incidents, and (3) the licensee's event investigation, root cause analysis, and immediate and long term corrective actions. The licensee noted only minor inaccuracies or discrepancies in Inspection Report No. 50-461/92011(DRSS).

The licensee discussed the results of the investigations conducted subsequent to the events of May 28 - June 2, 1992, and identified the following root causes: (1) poor management directions, including nonspecific job steps in the radiation work permit, an inadequate ALARA work plan, the lack of an effective ALARA trigger level, poor coordination between preventive maintenance and the ALARA work plan, and an inadequate evaluation of the radiological risks, and (2) poor communications, including inadequate shift turnovers, poor coordination between radiation protection, maintenance and job planning, and inadequate pre-job briefings. Contributing factors included a lack of adherence to the ALARA work plan, inadequate exchange of information (cable dose rates vs. TIP detector dose rates) and poor adherence to work documents and procedures. The licensee discussed the steps taken immediately following the June 2, 1992, event and the corrective actions taken to prevent recurrence. A few of the approximately 19 actions include: briefings with all departments to emphasize the seriousness of the events, multiple revisions to procedures that apply to high risk jobs, a revision of the ALARA review process, advanced training for radiation protection and calibration and instrumentation technicians on performing high risk jobs, and a continuing evaluation of the effectiveness of the licensee's program for identifying and correcting deficiencies. Other corrective actions are described in the attached copy of the licensee's conference handout.

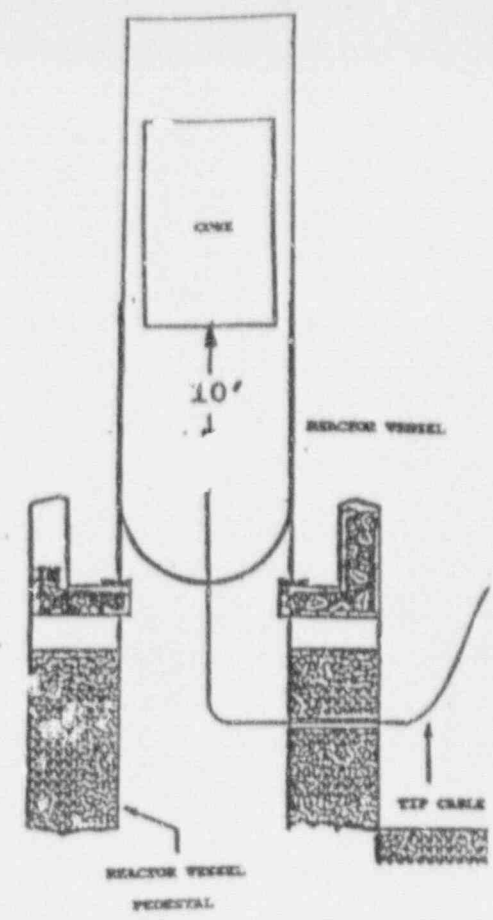
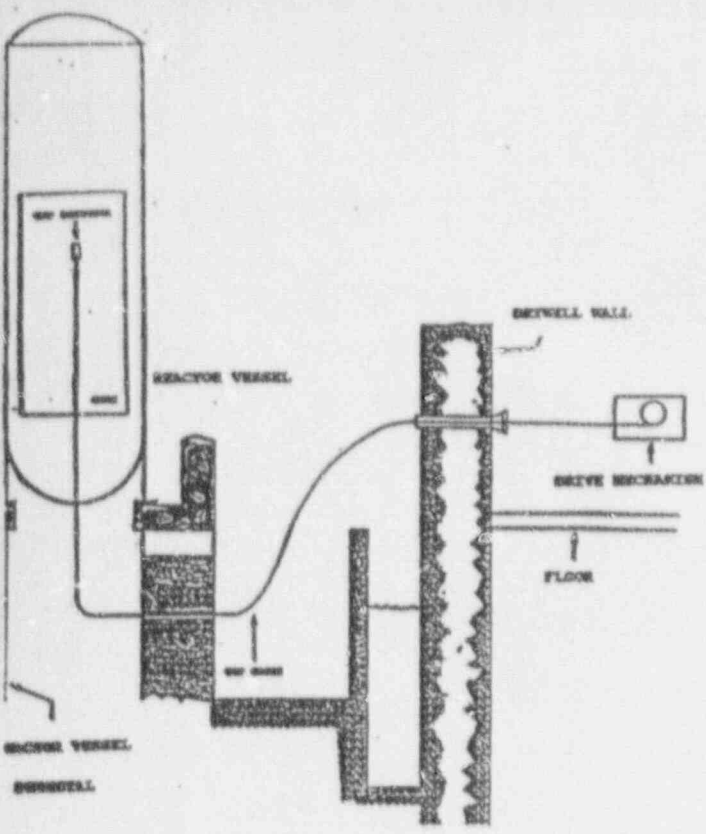
At the conclusion of the conference, the licensee was informed that they would be notified in the near future of the final enforcement action.

Attachment: As stated

TRAVERSING INCORE PROBE (TIP)  
MAINTENANCE  
ENFORCEMENT CONFERENCE  
JULY 14, 1992

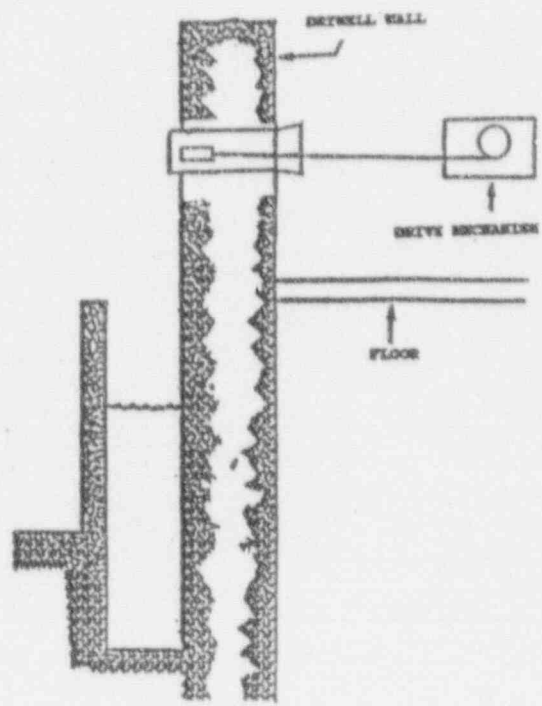
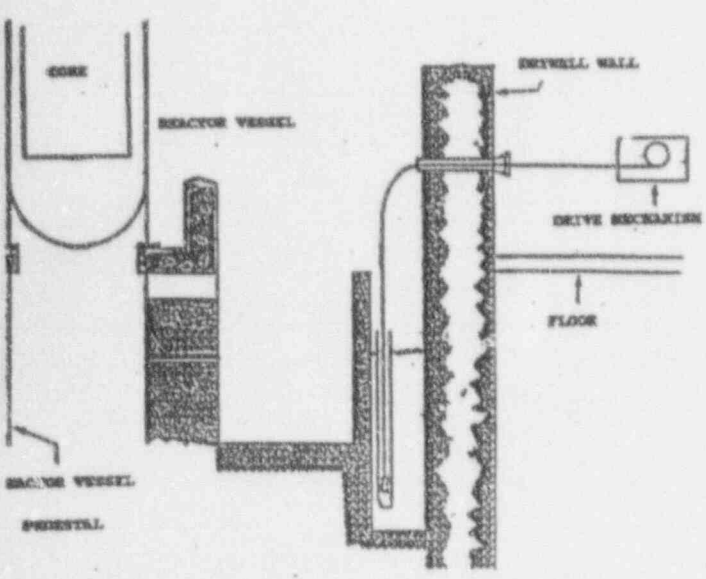
AGENDA  
ENFORCEMENT CONFERENCE  
EXPOSURE DURING TIP "C" WORK  
July 14, 1992

Introduction	J. G. Cook
Chronology of Events	L. Everman
Investigations Performed	L. Everman
Root/Contributory Causes	L. Everman
Responsive Actions	L. Everman
Safety Significance/Severity	J. S. Perry



ALTERNATE STORAGE POSITION

IN-SHIELD POSITION



**ENFORCEMENT CONFERENCE ON EXPOSURE DURING TIP "C"  
MECHANICAL STOP ADJUSTMENT  
- CHRONOLOGY -**

- 26 May New TIP "C" detector and cable installed. ALARA Work Plan 92-006 covers this work.
- 28 May 1750 Pre-job briefing conducted for TIP "C" mechanical stop adjustment. PM included appropriate warnings on radiological risks, but no specific instructions on how to avoid them. ALARA work plan 92-006 not modified to specifically address stop adjustment work. Craft personnel and RP Tech equipped with multiple radiation detectors/alarms.
- 28 May 1830 Work on TIP "C" mechanical stop commenced. TIP "C" inserted into core.
- 28 May 1856 Work suspended (suspension continued in order to allow clean up Fyrquel). TIP "C" left in in-core position.
- 29 May 0945 Pre-job briefing conducted for resumption of TIP "C" mechanical stop adjustment work. Craft personnel and RP Tech equipped with multiple radiation detectors/alarms.
- 29 May 1017-1159 Attempted withdrawal of TIP "C" to test mechanical stop. Cable radiation levels monitored continuously at drywell wall. Work stopped due to high rad levels (40 R/hr contact reading at drywell wall); TIP placed in undercore position to allow decay.
- 1 June 1400 Pre-job survey performed for recommencement of TIP "C" work.
- 1 June 1500-1630 New ALARA Work Plan (92-007) prepared but not issued. Intent of craft and RP personnel was that work would be stopped if adjustment could not be made without reinserting TIP "C" into core.
- 2 June 1230 ALARA Work Plan 92-007 incorporated into RWP and specific radiation limits at which work should be stopped established (30 R/HR drywell contact reading at cable guide, 1R/HR general area reading, 100 mRad smearable contamination, or any alarming accumulated dose alarm). Pre-job briefing conducted covering work plan (day shift). Work plan does not clearly state that TIP "C" should not be reinserted into core, but does specify that cable radioactivity is to be monitored continuously. C&I personnel at this briefing were not aware of prior discussions regarding reinsertion of TIP "C".
- 2 June 1500 End of dayshift; work ceases with TIP "C" still in undercore position.

**ENFORCEMENT CONFERENCE ON EXPOSURE DURING TIP "C"  
MECHANICAL STOP ADJUSTMENT  
- CHRONOLOGY - (continued)**

- 2 June 1645 Pre-job briefing held with swing shift personnel. Alarming dosimeters set at 50 mr accumulated dose. Personnel informed of radiological conditions under which job must be stopped. Craft personnel and RP Tech equipped with multiple radiation detectors/alarms.
- 2 June 1725 Work party enters containment; radiation levels within expected ranges. Mechanical stop tested and determination made that it must be adjusted.
- 2 June 1800 TIP "C" reinserted into core and mechanical stop adjusted.
- 2 June TIP "C" assembly (including cable) withdrawn; withdrawal halted and cable partially reinserted upon detection of 3 R/hr contact dose rate on cable guide.
- 2 June Decision made to again withdraw TIP "C" assembly with continuous monitoring of cable. RP tech notes rapid dose increase and immediately orders evacuation. Alarming dosimeters alarm. Cable reel immediately secured and area evacuated in 15-20 seconds.
- 2 June 1825-1845 RPSS notified of condition, new survey made and appropriate radiation area boundaries established. Dose and access records of personnel checked. Based on review of high and low range dosimeters, doses of the personnel involved in work estimated at 175 mr, 70 mr, and 50 mr.
- 2 June ~1915 New survey made with Teletector; job formally placed on hold.
- 2 June 2030 Assistant Director - RP notified; Assistant Director - RP notifies Director - RP.
- 2 June 2200 Director and Asst. Director - RP arrive on site and detailed fact-finding investigation conducted with persons involved in work, including review of causes. All "high-risk" radiological work suspended.
- 3 June 0838 TLDs of involved personnel read; doses of 170 mr, 70 mr, and 50 mr confirmed.
- 3 June ~0845 NRC notified.
- 3 June 0945 Director - RP conducts fact-finding investigations with work planners, ALARA personnel, and supervision.
- 3 June Human Performance Enhancement System (HPES) investigation initiated.
- 5 June Formal critique performed by Director - RP.



## INVESTIGATIONS

- Fact finding investigation with workers involved in 6/2/92 work commenced same night.
- Fact finding investigation with work planners, ALARA personnel, and supervision involved in 6/2/92 work commenced next morning.
- HPES evaluation commenced 6/3/92 (also covered 5/28-29/92 work).
- Detailed formal critique conducted by RP on 6/5/92 (also covered 5/28-29/92 work).
- Results of investigations used as input to identify root causes and contributing factors, and to determine corrective actions to address causes/ prevent recurrence.

## ROOT CAUSES

- Management directions
  - Work documents did not provide specific job steps.
  - ALARA work plan did not prohibit insertion of TIP into core.
  - No definition of exact circumstances under which ALARA work plan must be prepared.
  - ALARA work plan and PM not coordinated.
  - Work documents did not specify magnitude of radiological risks.
  
- Communication
  - Communication between shifts not clear/complete.
  - Coordination between RP/Maintenance/Job Planning did not result in clear, consistent job plans.
  - Pre-job briefings did not fully explain magnitude of radiological risks.

## CONTRIBUTING FACTORS

- Understanding necessity for strict compliance with ALARA work plan
- Expectations and understanding regarding cable dose rates vs. TIP dose rates
- Adherence to work documents/procedures
  - Certain steps in ALARA work plan not followed
  - ALARA work plan approval process not adhered to

## IMMEDIATE ACTIONS

1. May 29, 1992

- Immediate cessation of work; reinsertion of TIP "C" to undercore position and evacuation of area.
- Preparation of ALARA work plan prior to resumption of work.

2. June 2, 1992

- Immediate cessation of TIP "C" work, securing of cable reel and evacuation of area.
- New area survey and posting of appropriate radiation areas.
- All other "high risk" radiological work suspended.
- Approval of each Radiological Safety Work Plan (RSWP) by RP management required (interim action).

## ACTIONS TO PREVENT RECURRENCE

- Stand down of site work for briefings of site personnel in all departments to emphasize seriousness of event and convey lessons learned.
- Memorandum from Plant Manager to site personnel on nature of event and need for close attention to radiation protection.
- Director - Plant Maintenance met with each maintenance supervisor to reinforce expectations on necessity for adequate job steps covering intended scope of work.
- Procedures revised to require RP Tech/RFSS briefings at beginning of each shift to assure that both understand each Radiation Work Permit ("RWP") under which work will be conducted during that shift.
- Procedures revised to require daily review of items on Daily Radiological Work List by the RFSS and RP Work Coordinator.
- Procedures revised to change "ALARA Work Plan" to "Radiological Safety Work Plan" ("RSWP") and integrate RSWP with maintenance work documents. This assures that Maintenance, RADOPS, and ALARA personnel are all using work documents that are consistent with each other. RSWP must be approved before the "high risk" portions of the RWP can be activated for work.
- Procedures revised to ensure that surveys reflected in RSWPs are based on appropriate engineering evaluations, calculations, and other available information and quantify potential radiation risks.
- Procedures revised to provide definition of "high radiological risk" work to ensure that RSWPs will be prepared covering such work, and to specifically state that compliance with RSWP is mandatory.
- Responsibility for identifying potential "high risk" jobs during the planning process has been assigned to the RP Work Coordinator. The RP Operations Supervisor evaluates each potential high risk job and determines whether an RSWP is required.
- Procedures revised to provide that a Task Manager be assigned to "high radiological risk" tasks, as well as other high risk tasks.
- Procedures revised to require that each RSWP be based on detailed instructions contained in work package. Revisions include requirement that RSWP describe specific actions to be taken in event of higher-than-expected radiation levels.

## ACTIONS TO PREVENT RECURRENCE (continued)

- Procedures revised to require a pre-job brief on RSWP for each shift involved in task and to require workers to acknowledge in writing that they have reviewed RSWP. Training program being developed to ensure that briefings provide appropriate information and are sufficiently interactive to assure that information provided is understood.
- Radworker training is being revised to accommodate the revised procedures described above. Training of RP and C&I personnel on these changes has been completed (except for some individuals on vacation).
- RP Techs and C&I Techs being retrained on IEIN 88-63.
- The C&I lesson plan on TIP work is being revised to expand emphasis on radiological considerations.
- A seminar on how to identify and evaluate radiological risks of "high risk" tasks has been developed and will be provided to RP Techs during regular training cycle. Job tasks for "high risk" work are being added to the RP Tech certification program.
- A TIP device is being procured for use in mock-up training.
- Work scheduling now includes greater coordination with RP.
- Continuing evaluation of effectiveness of corrective actions.

## SAFETY SIGNIFICANCE/SEVERITY

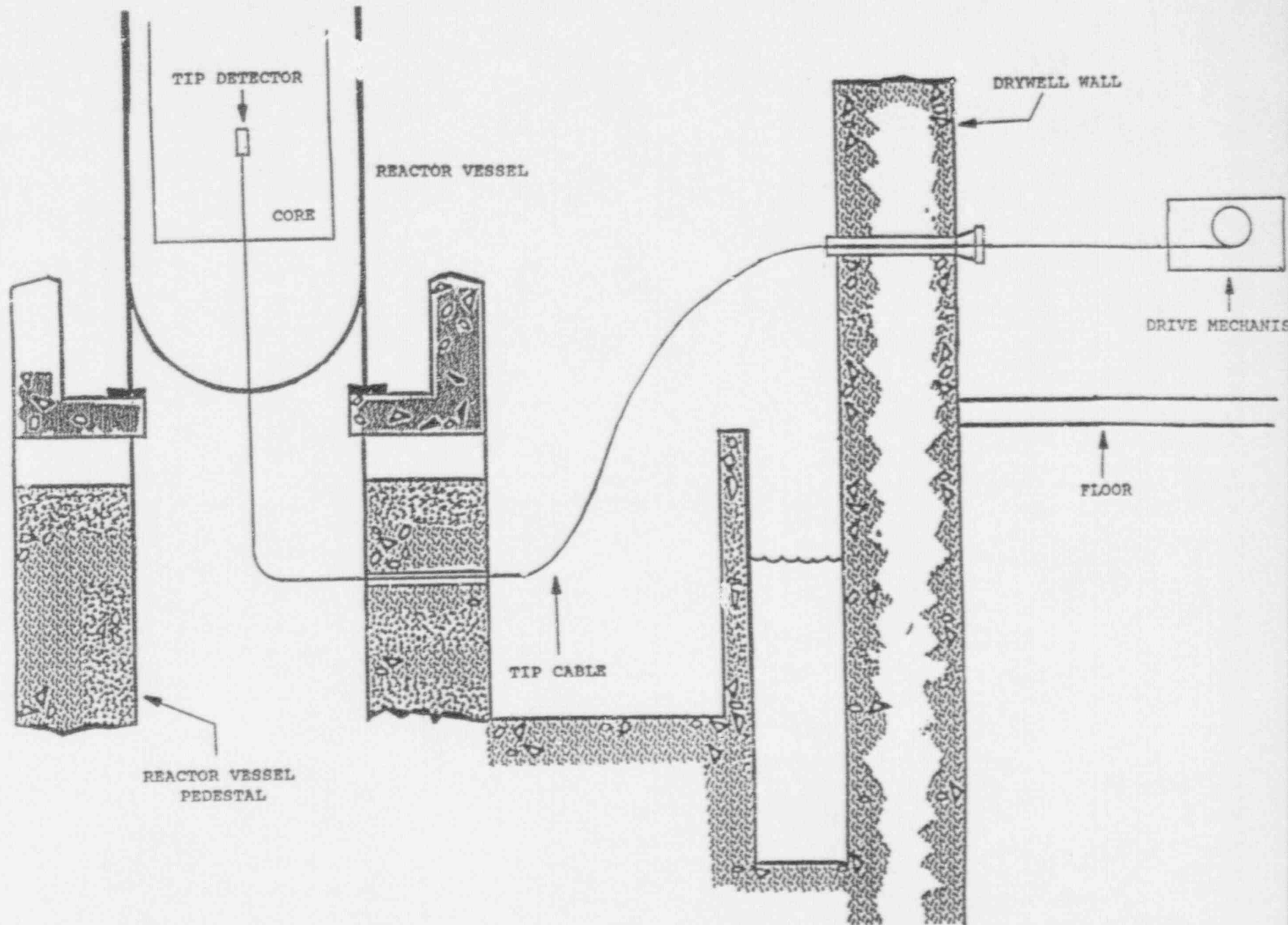
Several radiation protection measures were in place and were effective in keeping doses below administrative and regulatory levels.

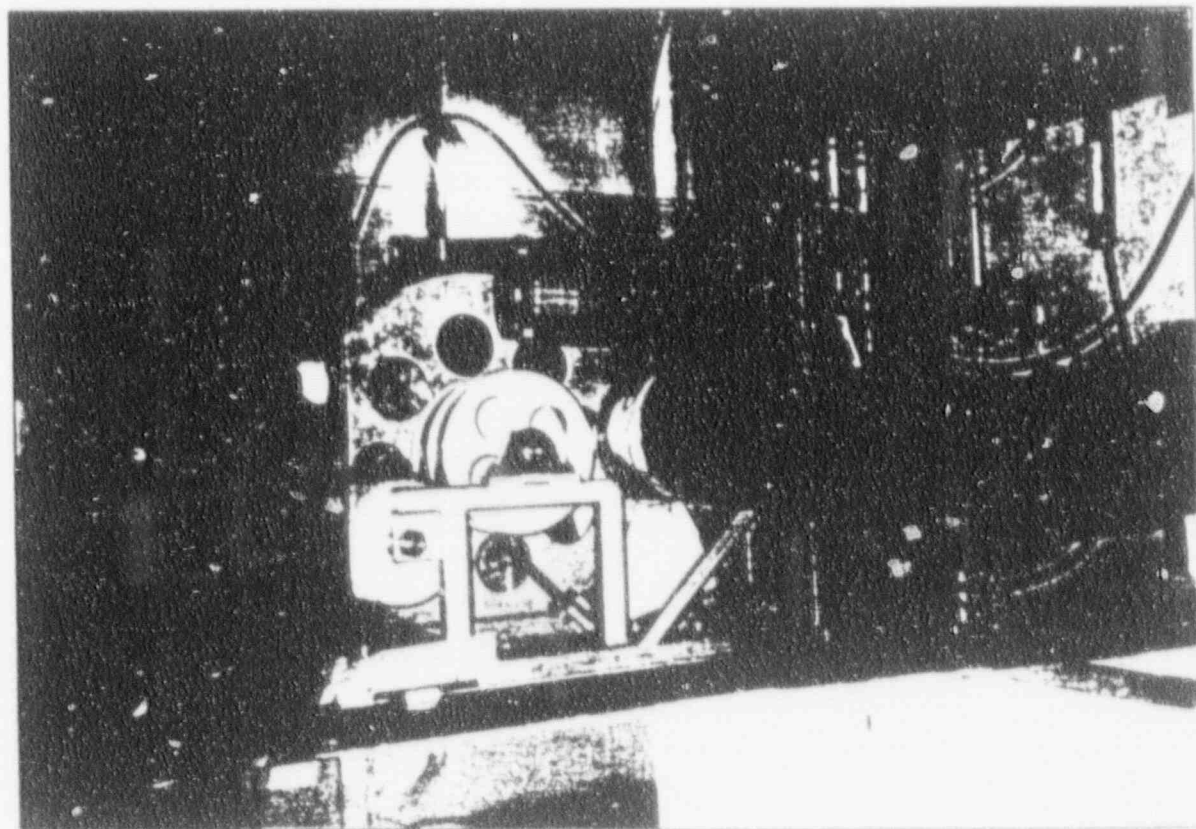
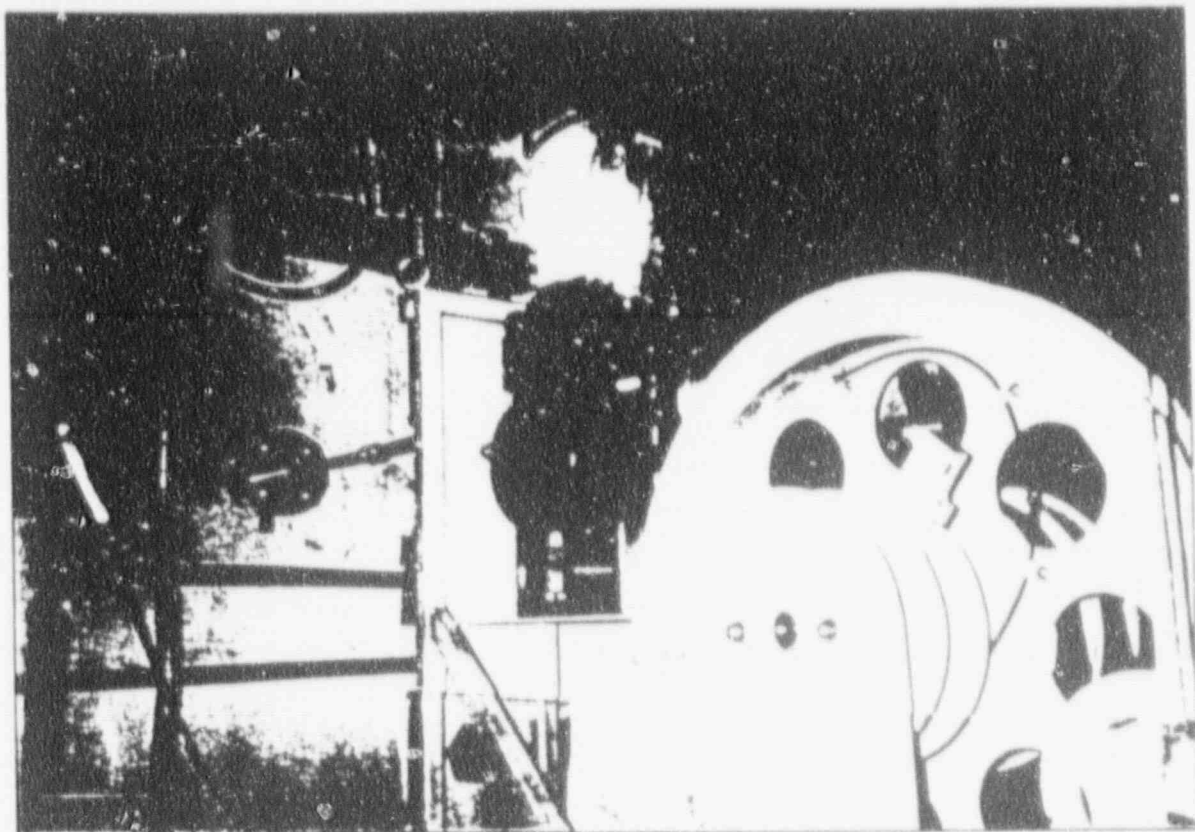
- RP techs trained and authorized to stop work when unexpected radiation levels are encountered.
- Craft personnel trained to follow RP tech directions.
- Craft personnel and RP Techs utilized multiple radiation detectors/alarms (individual ALNORS, contact dose rate meter, area radiation monitor). Procedures and training direct that work be stopped and area evacuated when alarms sound.
- Continuous monitoring of cable radiation level at entry point into work area.
- Proper and immediate identification of radiation exceeding expected levels.
- Proper response (immediate stop work and evacuation).

These radiation detection and response defenses worked properly and as planned; doses were kept below administrative levels.

Because of these multiple defenses, there was no significant potential for regulatory overexposure.

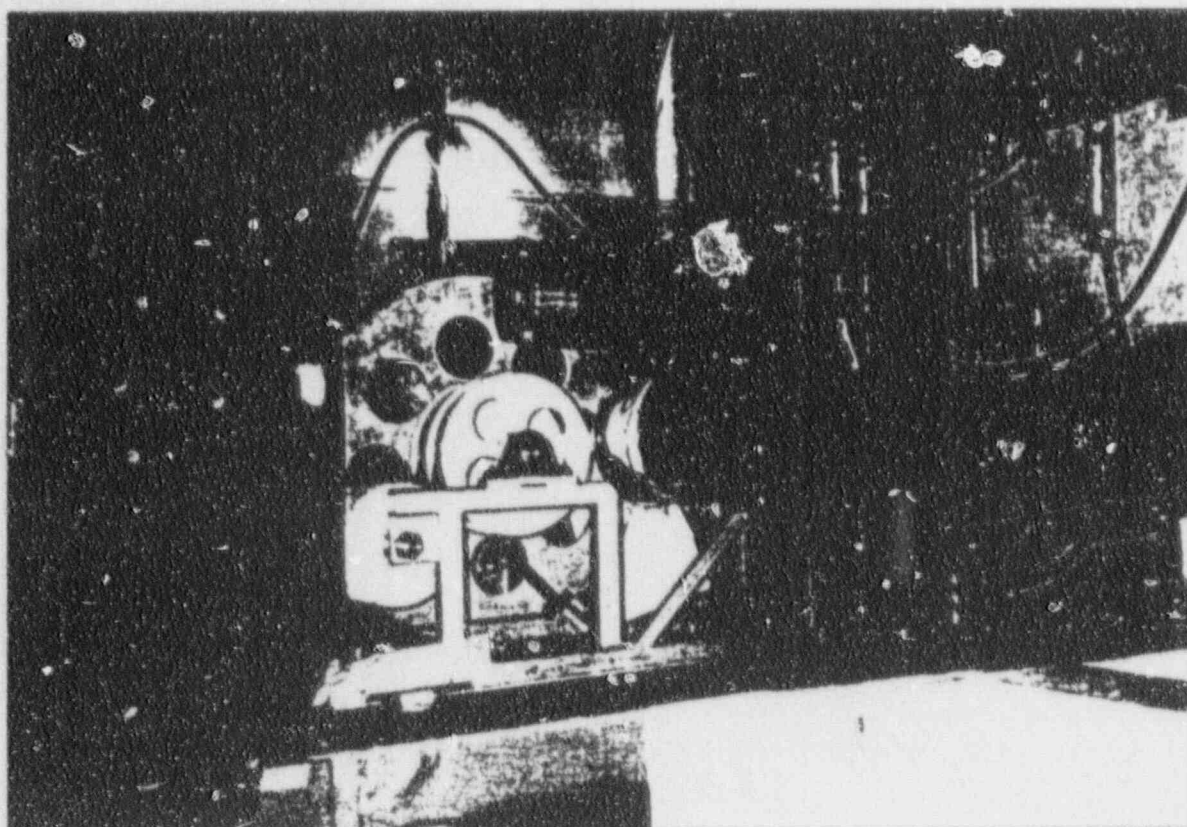
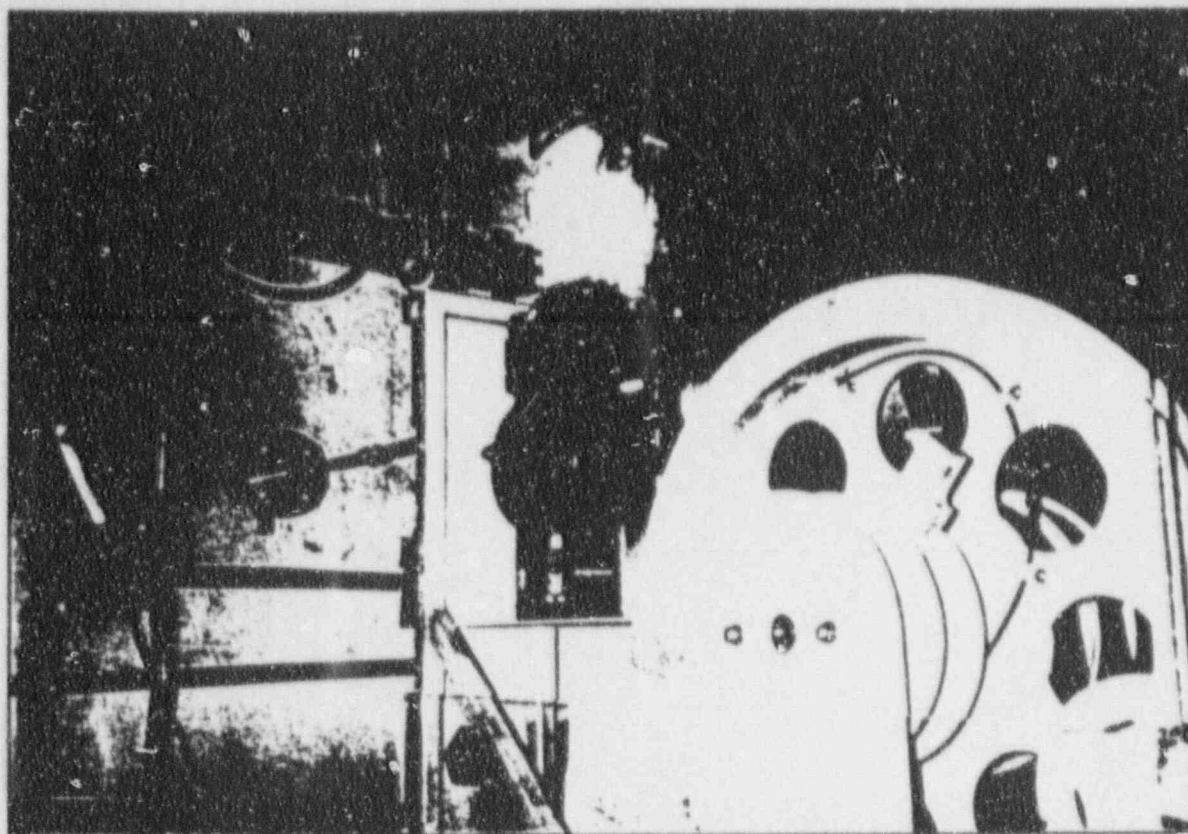
# TRAVERSING IN-CORE PROBE GENERAL ARRANGEMENT





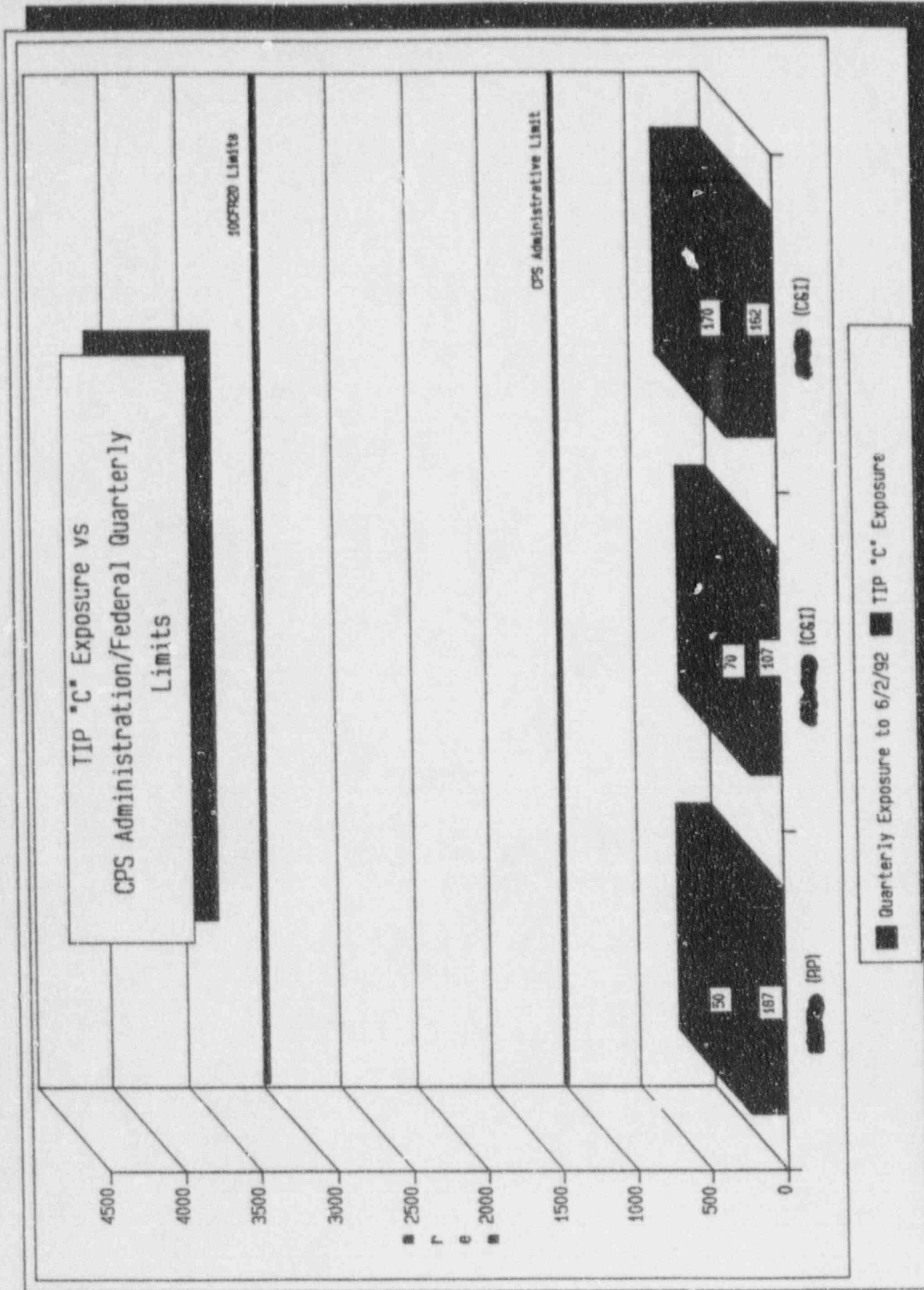
Pictured is the right and left view of the TIP drive mechanism internals. The drive unit cover has been removed and a prefabricated plexiglass enclosure (connected to a HEPA filter) has been installed.





Pictured is the right and left view of the TIP drive mechanism internals. The drive unit cover has been removed and a prefabricated plexiglass enclosure (connected to a HEPA filter) has been installed.

Names of parties and certain other identifying details have been removed in order to prevent a clearly unwarranted invasion of the personal privacy of the individuals involved.



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