

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos. 50-54/86-02
70-687/86-03

Docket Nos. 50-54
70-687

License Nos. R-81
SNM-639

Licensee: Cintichem, Inc.
P. O. Box 324
Tuxedo, New York 10987

Facility Name: Sterling Forest Research Reactor/Hot Laboratory

Inspection At: Tuxedo, New York

Inspection Conducted: August 6-8, 1986

Inspectors: D. Haverkamp, Project Engineer
J. Roth, Project Engineer

Approved by: *D. Haverkamp*
for T. C. Elsasser, Chief, Reactor Projects Section 3C

11/25/86
Date

Inspection Summary: Inspection on August 6-8, 1986 (Report Nos. 50-54/86-02;
70-687/86-03)

Areas Inspected: Special, unannounced inspection of alleged concerns regarding management followup to violations, and routine inspection of licensee activities including facility operations and Nuclear Safeguards Committee reviews.

Results: Two violations concerning failure to properly establish reactor building confinement prior to startup of the reactor (Section 2.1) and inadequate control of access to the facility (Section 2.4) were identified during the course of this inspection. The alleged concerns regarding inadequate management followup to violations of Technical Specifications and procedures generally were not substantiated, with the exception of management followup to previous licensee-identified facility access violations.

DETAILS

1.0 Persons Contacted

During the course of this inspection, the following personnel were contacted or interviewed:

- J. Baird, Senior Reactor Operator
- D. Cagney, Senior Reactor Operator
- *C. Konnerth, Manager, Site Operations
- I. Kroun, Senior Reactor Operator
- *J. McGovern, Plant Manager
- T. Mach, Reactor Operator (Trainee)
- K. Morales, Senior Reactor Operator
- *W. Ruzicka, Nuclear Operations Manager
- R. Saxton, Reactor Operator
- L. Thelan, Radiation Safety Officer

*Present at the exit interview on August 8, 1986.

2.0 Alleged Concerns Regarding Management Followup to Violations

In early July 1986, an anonymous individual called the NRC Headquarters Duty Officer who then bridged the call to the NRC Region I Duty Officer. The caller identified several alleged concerns regarding various past practices at the Cintichem reactor facility that he considered were indicative that violations of Technical Specifications and procedures were overlooked by management. A few days later, as agreed during the initial telephone conversation, the alleged caller called again to provide amplifying information regarding the initial concerns as well as to discuss some additional concerns. Following these initial contacts, the alleged caller called during July and August 1986 to determine the NRC's plans in reviewing the concerns; however, no additional concerns or amplifying information were identified during the subsequent calls.

A total of nine separate concerns of alleged inadequate management followup or questionable practices were identified by the anonymous caller. During this inspection, interviews were conducted with a representative number of licensed reactor operators and senior reactor operators to obtain additional or clarifying information regarding the alleged concerns. The inspectors also interviewed plant operations department supervisory personnel regarding these matters and reviewed applicable Technical Specifications and procedural requirements.

Each of the concerns, as initially alleged and subsequently clarified, and the inspectors' findings regarding the concerns are discussed in the sections that follow.

2.1 Concern No. 1 - Reactor Startup Without Containment

Summary of Allegation

About six months ago (late 1985), the reactor was shut down to repair an air supply solenoid valve associated with containment ventilation. The reactor was started up with the repair unfinished and the air supply valve open, but with no containment. A senior reactor operator brought the matter to the attention of the nuclear operations manager, who forgot the whole thing. All licensed people knew about this incident and are surprised that no one did anything about it.

Clarification of Allegation

Based on discussions with licensed operators and nuclear operations department supervisors, the inspector determined that on October 8, 1984, while the reactor was operating, a boiler house air compressor malfunction occurred. The reactor was shut down and the air compressor problem corrected. However, in the process of restoring normal ventilation, a solenoid failure was detected in one of the two (hot or cold) air supply dampers. The failure caused the damper to close which resulted in a large negative pressure, possibly as high as one inch, in the reactor building. In order to gain control of the building pressure differential and to reduce the negative pressure to normal values, it was necessary to increase air flow into the building. With the unaffected (hot or cold) air supply damper open, the inner sliding door of the double air lock doors between the reactor building and the hot laboratory was partially opened. The outer door was physically closed but the O-ring gasket was not inflated. In that condition the increased air in-leakage reduced the building pressure to a balanced, smaller negative pressure.

With the partial normal air supply to the reactor building and the abnormal augmented air supply via air lock door in-leakage, a reactor startup commenced and power was held at 0.01-0.1% of rated power. About 15 minutes later the air supply damper repairs were completed. The damper was reopened, the outer door gasket was inflated, and the reactor startup was continued into the power range. The inspector noted that this abnormal operating condition during the reactor startup was not logged. In fact, one of the operators believed he would have been in trouble if this was logged, as the chief reactor operator was at the console. As a result of not logging or otherwise communicating the abnormal startup conditions, the nuclear operations manager did not become aware of the problems that had occurred until one to two weeks after the event. He assessed the Technical Specifications requirements and nuclear safety considerations, determined that no violations or adverse safety conditions occurred, and discussed the event with the chief reactor operator. In their view, although the O-ring gasket was not inflated, the door was in its closed position, which thus complied with the Technical Specifications for confinement. Furthermore, the negative pressure was being maintained.

Findings

The inspector considered that the alleged event and subsequent abnormal reactor startup was substantiated, although the problem reportedly occurred in late 1984, not in 1985. Based on the inspector's review of this event and Technical Specification (TS) 3.5.3, requirements for "Confinement," although a negative pressure in the reactor building was present during the startup, the airlock door clearly was not "closed" when its O-ring gasket was not inflated. In the event of exhaust fan or damper malfunction, there would have been no assurance of maintaining building leakage inward under accident conditions. Therefore, conducting a reactor startup without at least one door of the double airlock doors fully closed (with its gasket inflated) is considered a violation of TS 3.5.3 (54/86-02-01). Furthermore, the abnormal conditions were not identified in the operator's log and there was no feedback to operators of the nuclear operations manager's review of the event. This matter is discussed further in Paragraph 2.10.

2.2 Concern No. 2 - Violation of Startup Procedure

Summary of Allegation

During the second or third week in May 1986, the project engineer was on the console performing shift duty to maintain his license. In preparation for changing fission product molybdenum (FPM) irradiation targets, he ran the rods in too far and inadvertently shut down the reactor. Targets were then changed. Subsequently, he did a startup to 100% of rated power with no restart checks, no heat balance at 50% of rated power, and he ignored procedures. When informed, the manager - nuclear operations said, "We'll call it a long dip." The caller alleged that the above actions violated the procedure, if not the Technical Specifications.

Clarification of Allegation

Based on discussions with licensed operators, the inspector determined that the events occurred, essentially as described above, on May 1, 1986 when the nuclear project engineer, under supervision by the assistant chief reactor operator, ran the rods in to the seat. He reportedly had used the "normal" switch vice the manual run-in method.

The nuclear operations manager was informed of the abnormal reactor power reduction for changing FPM targets about one week or more after its occurrence. He then discussed the matter with the nuclear project engineer and operations management personnel including the assistant chief reactor operator, the chief reactor operator and the reactor supervisor. He did not consider the occurrence to be a major incident. The matter was treated as more of a political rather than a technical concern, due to the perception of some operators that a "double standard" existed for disciplinary actions when operating errors were caused by licensed engineers or operations supervisors as compared with mistakes made by non-

supervisory licensed operators. The plant operations manager had committed to operators to discuss the results of the operations management review of this event, but that discussion had not yet been conducted.

Findings

The inspector reviewed Technical Specifications requirements and applicable reactor operating procedures for sample (target) changes, reactor startup, and reactor restart checks. Although the rods were inserted to the seat, rather than only partially inserted as during other routine target changes, the reactor technically was still in operation, albeit subcritical, comparable to the power level of a normal partial insertion. On the other hand, more negative reactivity resulted from full insertion of the rods, as compared to the normal partial (subcritical) insertion associated with target changes. In fact, the reactor was shut down, as the Technical Specifications define "Reactor Shutdown." However, this condition lasted only a short time (15-20 minutes), before the rods were withdrawn and the reactor returned to 100% of rated full power. During the time that the rods were fully inserted, all equipment remained in a normal operating configuration. Therefore, although the abnormal rod insertion ("long dip") was substantiated, there were no apparent Technical Specifications violations, procedural violations, or adverse safety implications as a result of this event. Nonetheless, the abnormal rod manipulation for the target change was not logged or otherwise documented as an abnormal operating condition. Also, this matter had not been discussed with operators, although three months had passed since the event occurred. The inspector noted that there were no regulatory or procedural requirements for such feedback of operating experience, but in light of the sensitivity of the matter as viewed by operator's perception of a "double standard" and the operations manager's admission that this was a "political" concern, the operations management review of the event should have been done more promptly. This matter is discussed further in Paragraph 2.10.

2.3 Concern No. 3 - Unsafe Reactor Operation Due to Nonvisible Core

Summary of Allegation

At the end of April or the beginning of May 1986, heat exchanger cleaning was conducted using hydrogen peroxide, and some of the hydrogen peroxide got into the pool of the reactor. Although this had caused very poor visibility in the pool, operations personnel decided to start up the reactor. At 5MW, operators could not even see the glow from the reactor. Operators wrote a letter to management about the unsafe startup, but nothing was done.

Clarification of Allegation

Based on discussions with licensed operators and the nuclear operations manager, the inspector determined that the hydrogen peroxide intrusion to the reactor pool occurred on Thursday, March 6, 1986, generally as

summarized above. Heat exchanger cleaning is done normally on an annual frequency, generally each spring. In past years, there had been some cloudiness of the pool water, but in this case the walls of the pool were also cleaned more intensely than normal. Also, there may have been a valving error when cleaning the heat exchanger such that hydrogen peroxide entered the pool, but this is somewhat speculative and not proven. Nonetheless, the pool water had become very cloudy during this year's cleaning. With water level lowered and operators standing on the pool shelf, they observed no objects present over the core that could restrict or inhibit flow. The nuclear operations manager was aware of the extent of murkiness of the water. But having assessed the condition, the reactor was started up on the midshift on March 7, 1986. About 8:00 a.m. that morning, the plant manager, manager-site operations, and nuclear operations manager all observed the cloudiness of the water. They assessed that it was safe to continue to operate because the murkiness was due to small particulate that was being filtered. Also, based on past experience, any flow core problems caused by blockage would be detected early by the log N instrument that would become erratic and oscillate due to voids forming. However, plant management did not inform the operators on Friday of the basis for their judgement, and operator concern apparently escalated over the weekend. That is when the operators' letter of concern was written, although it was dated March 14, 1986. (That memo included the operators' statement of their hope that management develop a plan which would eliminate future situations where production schedules come before safety. During telephone conversations with several operators on November 16 and 17, 1986, the inspector verified that the operators' basis for their expressed concern was limited to the startup of March 7, 1986, and no similar situations.)

Plant management had considered the known and measurable core parameters that could predict or indicate a degrading flow condition, they had questioned the possible mechanisms for flow blockage, and they had assessed the risk of not detecting degraded flow during operation with reduced core visibility. However, their considerations were not communicated to operators. Also, the operators' concerns were not conveyed directly to plant management during the weekend. However, after receiving the operators' letter, management immediately met with the operators and met subsequently on several additional occasions to discuss this matter.

Findings

The inspector reviewed Technical Specifications for water quality and reactor operating procedures and determined that there were no violations or direct adverse safety concerns as a result of this occurrence. The Technical Specifications include no specific provisions for pool water clarity, but only for pool water quality. The pH of the pool water was maintained between 5.0 and 7.5 following the heat exchanger and pool wall cleaning operations. The pool water specific resistance fell below the

normal operating limit of 200,000 ohm-cm, to as low as 160,000 ohm-cm. This was well above the 70,000 ohm-cm Technical Specification transient limit, and the specific resistance was restored to greater than 200,000 ohm-cm on March 13, 1986, which was within the 14 days allowed by the Technical Specifications. Nevertheless, operators were clearly not comfortable operating in the abnormal condition of not having the core visible, although they did not express their concern directly to management during the weekend. It is probable that the operators would have gained the insight to monitor flow conditions using alternate methods had they expressed their concern. This matter has been reviewed by the nuclear safety committee, and the heat exchanger cleaning procedure will be reviewed and revised prior to its next use, as discussed in Paragraph 4.

The inspector determined that although the alleged clouding of the pool was substantiated, contrary to the allegation, management acted responsibly and promptly in response to the operators' written concerns. However, the decisions and performance of both operators and management before and after the startup on March 7, 1986 were questionable. Simply stated, the startup probably should not have been permitted to proceed with the pool water clarity substantially degraded. The cloudy water condition was not normal for plant startup and power operation. Furthermore, operating with the core not visible is not specifically covered by Technical Specifications and only marginally addressed in plant procedures. The NRC considers that operation with the core visible is a prudent mode of operation for the facility; and operation with the core not visible is abnormal and should have been treated as such. Operations and facility management should have better (and formally) evaluated the abnormal operating conditions, established appropriate compensatory (or backup) measures for operation, and properly informed the operators concerning their assessment and decisions. Further, the operators should have voiced and emphasized their concerns of safe operation prior to the startup on March 7, 1986. Although this is considered an isolated occurrence, the NRC is concerned that this event occurred. Further explanation of management's review of this incident has been requested in the cover letter which transmits this report.

This item is unresolved pending review of the licensee's response, including verification of actions taken to prevent recurrence, during a subsequent NRC inspection (54/86-02-02).

2.4 Concern No. 4 - Unauthorized Access to Reactor Building

Summary of Allegation

In March or April 1986, the quality control supervisor, authorized for unescorted access to the building, informed one of his workers, who was not authorized for unescorted access, how to access the building. This action gave the person access without using the access procedure. Opera-

tors were concerned about unauthorized access and the safety of individuals involved. Now operators do not challenge individuals suspected of not having authorized access, because "no one cares."

Clarification of Allegation

Based on discussions with licensed operators, the inspector determined that on two other occasions, once last winter and most recently a month ago (during July 1986), different individuals, who were not authorized access, were informed how to access Buildings 1 and 2 (the reactor building and hot laboratory). The reactor supervisor, also assigned as the designated controlled area access security officer, became aware of these or similar incidents, which, as he noted in a memorandum to all facility department heads dated July 21, 1986, "seem to indicate a lack of appreciation or understanding of our security plan." The memorandum emphasized the heavy dependence of the security system's success on the employees, and requested each group to conduct team meetings or other communications to inform employees of the importance of properly implementing the required security measures of the controlled access area. The memorandum also specifically stated certain responsibilities of people who are not authorized access to Buildings 1 and 2, as well as people who are authorized access.

Findings

Although the specific example of unauthorized access, as described in the initial allegation was not confirmed by the operators interviewed, other similar examples were described that, in effect, substantiated the alleged concern. These incidents were known by responsible licensee security management, and measures were initiated to correct the problems and prevent recurrence of past violations.

However, at or about 7:00 a.m. on August 7, 1986, another incident occurred that indicated a continuing lack of appreciation or understanding of the security plan. The inspectors were then at the entrance of Buildings 1 and 2 and desired to contact a control room operator to obtain escorted access to the facility. Seeing a telephone by the door, the inspectors asked two painters (temporary summer help), in the vicinity of the entrance, the telephone number of the control room. The painters did not know the number. The inspectors then asked how to get into the control room. The workers provided specific directions in response to this question and, if the inspectors had implemented the directions as subsequently demonstrated to the licensee, the inspectors could have accessed the buildings and the control room without authorization. Failure to properly control access is considered a violation of the security plan, for which previous corrective actions were not effective (54/86-02-03).

2.5 Concern No. 5 - Improper Administration of Requalification Examination

Summary of Allegation

The licensed operator requalification examinations have been routinely passed out and collected two weeks later. The lowest grade on the recent examinations was 89. The caller questioned whether requalification examinations are supposed to be given in a two-week period.

Clarification of Allegation

Based on discussions with licensed operators and nuclear operations department supervisors, the inspector determined that requalification examinations have been routinely administered as a take-home exam taken by operators on an honor-system basis. By letter dated May 5, 1986, the licensee provided NRC Region I a copy of the Operator Requalification Program (ORP). The ORP introduction states:

"The purpose of this requalification program is to take into account the requirements of 10 CFR 50.54(i-1) while recognizing the problems associated with a requalification program for research reactors which have a limited training staff available. This requalification program meets these purposes while providing flexibility which enables facilities with minimum staff to complete the program biennially. This requalification program also meets the requirements of the American National Standard 15.4 - 'Selection and Training of Personnel for Research Reactors.'"

Regarding the comprehensive biennial written exam given to all licensed personnel, the ORP states, in part, "...Because of the problems associated with proper reactor staffing during periods when the examinations will be administered to operating staff members, the examinations may be given in parts and within a 2 week period."

Findings

Based on the inspector's review, the alleged requalification exam administration practices are substantiated. The ORP does not appear to prohibit administration of the requalification exam as a take-home exam to be taken on an honor-system basis. However, neither does the ORP clearly permit this practice. Further, the NRC Region I staff had not previously understood that this exam was taken home and returned for grading two weeks later. Clearly, this raises serious questions as to the integrity and validity of the requalification exam process. Based on informal discussions following this inspection and preliminary review of this matter, the NRC Region I staff's initial determination is that administration of requalification exams as a take-home exam is an unacceptable practice. However, because the ORP is not specific to addressing this practice, this matter is being referred to the Operator Licensing Section, NRC Region I for their formal assessment and evaluation. This item is unresolved (54/86-02-04).

2.6 Concern No. 6 - Potential Conflict of Interest Regarding Nuclear Safeguards Committee Staffing

Summary of Allegation

The nuclear safeguards committee consists of "business" people motivated by profit. The caller questioned whether this was a conflict (of interest), as he stated that this may be part of the general problem he perceived and alleged of violations being overlooked by management.

Clarification of Allegation

Based on interviews with licensed operators and nuclear operations department supervisors, the inspectors determined that none of the individuals shared the alleged concern. In fact, each person interviewed either had no adverse opinion or generally expressed their respect for and confidence in the motivation of nuclear safeguards committee (NSC) members. The inspector reviewed the Technical Specifications requirements for the composition and technical qualifications of NSC members and verified that these requirements were met. In addition, the inspector reviewed NSC meeting minutes (also see Paragraph 4.0) and verified that the predominant emphasis of NSC concerns was toward nuclear safety.

Findings

The alleged implied concern regarding NSC members being unduly motivated by profit was not substantiated. Although business profit is expected to be a consideration in overall facility operations, the inspector found no evidence that NSC recommendations or actions were improperly balanced toward business profit as opposed to safety of operations.

2.7 Concern No. 7 - Reactor Startup to Avoid Reporting Shutdown

Summary of Allegation

Management conducted a startup of the reactor within 23 hours of being shut down, since they knew that Technical Specifications require informing the NRC if shut down over 24 hours. The caller could not find the requirement in Technical Specifications, but he stated that it may be in 10 CFR or in procedures. He alleged further that the requirement was common knowledge among operators.

Clarification of Allegation

Based on discussions with licensed operators and nuclear operation department supervisors, none of the individuals were aware of any startup conducted within a certain time period, as described above, in order to not inform the NRC of the shutdown. Furthermore, none of the individuals were aware of any requirements in either Technical Specifications or

procedures regarding informing the NRC of being shut down over 24 hours. The inspector reviewed Technical Specifications and verified that there were no such reporting requirements.

Findings

The alleged concern was not substantiated due to the lack of specificity regarding the initial allegation, the inability to confirm the alleged startup for the alleged reasons, and the inability to identify the alleged requirements.

2.8 Concern No. 8 - Unexplained Processing/Discharge of Contaminated Water

Summary of Allegation

Prior to the caller's arrival (employment) onsite, about 30,000 gallons of water got into duct work over a hot cell. The water then contained fission product iodine and was put in a holding tank from which it disappeared in about a week. The site evaporator has a capacity of only about 500 gallons per day.

Clarification of Findings

Based on discussions with the licensee representatives and a review of licensee records, the inspector determined that about 45,000 gallons of ground water leaked into the room containing the T-1 liquid waste storage tank during March-April 1983. The inspector verified through direct observation that there was no interconnection between this room, located under the Building 2 Isotope Laboratory, and the Hot Cell ventilation system. This water contained residual fission product activity as a result of contact with the radiologically contaminated floor and walls of the T-1 tank room. The water was transferred to a series of small tanks, analyzed for fission product activity, and released from the facility without going through the site evaporator. Licensee records indicated that a total of 77.4 microcuries (strontium-90 equivalent) of fission products were released from the facility during April 1983. This value corresponds to an average concentration of $2.76 \text{ E-}8$ microcuries per cubic centimeter, which amounts to less than one percent of the 10 CFR Part 20, Appendix B, Table II, Column 2 limit for the release of soluble strontium, in water, to unrestricted areas.

Findings

The alleged improper processing or disappearance of water containing fission product iodine was not substantiated. Although the alleged concern was not entirely accurate, in that a substantial quantity of water did not get into ventilation duct work over the hot cell, the inspectors substantiated that in excess of 30,000 gallons of contaminated water was released from the facility without going through the site evaporator. However, no federal regulations or facility license conditions were

violated as a result of this release of liquid waste. Based on the inspector's review of this incident, the licensee's actions taken to process and release the water were found acceptable.

2.9 Concern No. 9 - Operator Counseled to Withhold Information from NRC

Summary of Allegation

During an NRC inspection, a lead operator was asked about the requalification program. He responded that there wasn't any but they had the books for self-study. Management later told him not to say anything if it would look bad.

Clarification of Allegation

Based on discussions with licensed operators, the inspector determined that the operators were generally dissatisfied with the requalification training program relying primarily on self-study vice formal retraining lectures/seminars. However, the inspector verified that such self-study was in conformance with Operator Requalification Program requirements. One of the operators confirmed that following an NRC inspection exit meeting, the plant manager told him not to tell the NRC about "things that are bad." The inspector noted that this recollection was a minority view, as all other operators had not recalled being given such direction. The inspector reviewed a memorandum issued by the plant manager in March 1979 which provided clear and definitive guidance regarding the method for contacting the NRC Region I office and the freedom to express individual safety concerns to the NRC. The memorandum also requested that such concerns also be identified to plant management but did not mandate such in-house notification as a prerequisite to contacting the NRC. This memorandum was included as an attachment to the operators' letter of concern regarding reactor operation with cloudy pool water after cleaning the heat exchanger (see Paragraph 2.3). Thus, this memorandum was common knowledge to all operators. As a related matter, the inspector asked each person interviewed during this inspection if he had been given any instructions as to what to say during the interview. Each of the operators said the only directions they were given were to answer the inspectors' questions honestly and completely.

Findings

The inspector determined that although the operators shared a common preference for formal requalification lectures/seminars in lieu of self-study, the ORP supported the latter. With respect to alleged management directives to not say anything to NRC inspectors if it would look bad, the prevailing view was that operators should be candid and forthright in their discussions with NRC inspectors, particularly regarding potential safety concerns. The inspector considered that management's instructions to not say anything bad was nothing more than encouragement to put one's best foot forward or to not express differing management/

employee views of established policies/practices merely in order to gain some kind of job-related benefit or advantage. Moreover, there was no evidence to substantiate that management had acted unfavorably toward an employee for expressing dissenting or differing views.

2.10 Summary and Conclusions

Although certain of the alleged concerns were substantiated fully, or in part, the inspector determined that there were no common indicators or trends that formed the bases to generally conclude either: 1) that management had taken improper corrective actions to problems brought to their attention or 2) that management would require, approve, or otherwise encourage operators to act in a manner unsafe to reactor operations. However, as a result of the forthright and direct responses to the inspector's questions by both licensed operators and facility management, certain problem areas or operating weaknesses were identified that require corrective measures. The inspector learned that a recently licensed operator was dismissed for cause based on some specific instances of conduct unacceptable to management. The reasons for the operator's dismissal were not related directly to improper performance of his licensed duties, but were associated more with indicators of overall attitude, professionalism, attention to duties, and general maturity and behavior. Nonetheless, the individual's dismissal has clearly resulted in a heightened degree of polarization and perhaps distrust between management and operators. This is a condition that must be promptly rectified to assure continued safe operation of the facility.

Lastly, some operators were of the view that nuclear operations managers and supervisors simply were not communicating effectively with each other and with operators. Although no specific instances were identified, operators felt that the personalities of some individuals did not facilitate free and candid communications of operating problems. Operators felt that one or another individual would respond to problems and solve them independently and not inform their supervisors of either that problem or the corrective action taken.

The inspector discussed these concerns with nuclear operations department and plant management. They were sensitive to some of the recent communications problems and noted that they were attempting to communicate more frequently and more openly with plant operators. They acknowledged the inspector's comments regarding the apparent need to develop a system for identification of operating problems and feedback of operating experience. The inspector stated that this area would be reviewed during future inspections (54/86-02-05).

The fundamental weakness of facility operations that requires improvement is operator/management communications. Operators need to be aware of management's bases for operating decisions and management needs to be informed promptly of operators' concerns regarding safe operation of the facility. The inspector noted that operating logs seldom describe plant

problems or abnormal conditions. Further, there is no system in place to facilitate identification of operator's perceptions of abnormal operating conditions or operating problems such that the abnormal condition is required to be evaluated and resolved by plant management, and that there is feedback of the solutions or management decisions to operating personnel.

Some of the operators believed that an operator representative should be permitted to attend meetings of the nuclear safeguards committee. This could strengthen their understanding of the technical bases for NSC recommendations and judgements. Some operators also believed that they should review NSC minutes. The inspector considered that both of the actions could strengthen operator/management communications.

3.0 Facility Operations

On several occasions during the inspection, the inspectors toured the facility with licensee representatives. During the tours, the inspectors verified the correct status of plant conditions and equipment. The inspectors also verified that the facility was manned in accordance with Technical Specifications requirements and that plant logs accurately reflected plant conditions. The inspectors found that, in general, housekeeping, radiological and security controls were adequate, with the exception of a security violation that occurred on August 7, 1986 (see Paragraph 2.4).

The reactor operated at full power during the inspection with the exception of a scheduled shutdown on August 7, 1986 to change FPM targets and to install new test and experiment equipment in the reactor pool. During that shutdown period, the inspectors observed the rigging operations, including the lift and placement, associated with the major structural assembly of the recently manufactured Neutron Transmutation Doping (NTD) Silicon Irradiation Facility. The reactor core had been moved about 15-20 feet from its normal operating position to a temporary staging position between the fuel pool/storage pool divider wall passageway, and the pool level had been lowered to permit personnel access to the fuel pool ledge to facilitate handling and placement of the NTD facility. The inspectors noted that handling operations were properly supervised and were being conducted in a controlled manner by maintenance personnel. Also, special radiation surveys were being performed by plant operations and health physics personnel to identify increased radiation levels that might result from the lowered pool level. As a result of that survey, a neutron radiation source was found exposed above the water surface, causing a localized elevated radiation area (about 100 mRem/hr). The source was lowered into the water, which reduced the radiation field to the general area background level.

The inspectors expressed concern regarding one aspect of the NTD facility handling operation. The inspectors first observation of the rigging operation occurred while the NTD structure was suspended above and being lowered into the fuel pool. After the structure was placed on the pool floor, the inspectors questioned operations personnel and management regarding lifting of the structure in relatively close proximity to the suspended core. The inspectors'

concern in this case was the possibility of damage to the reactor core or its support bridge in the event of postulated drop of the NTD structure. Although the structure was not lifted directly over the reactor core, it was large enough to possibly impact the core and core supports if it had dropped. This event did not occur, however, the inspectors stated that the licensee hazard summary for the NTD facility (see Paragraph 4.0) should have evaluated the possibility and consequences of a postulated heavy load accident as a result of dropping the NTD facility structure, or the core should have been moved further from its normal operating position, where the NTD structure was being installed. Licensee management acknowledged the inspectors' concern and later that day, when the NTD structure had to be lifted from the pool as a result of misalignment problems, the nuclear operations manager stated that the reactor core was moved further from its normal location to prevent any possible damage from the postulated drop of the NTD structure. The inspector had no further questions concerning this matter.

4.0 Nuclear Safeguards Committee Reviews

The independent review of reactor facility operations is performed by the Nuclear Safeguards Committee (NSC). The NSC is comprised of a minimum of five members who collectively are required to provide a broad spectrum of expertise in the appropriate reactor technology. During this inspection, the inspector reviewed NSC meeting minutes to verify that NSC review functions were conducted as required by Technical Specifications 6.2.3 and 6.4. The inspector's review included the minutes for NSC Meeting Nos. 117, dated August 20, 1985; 118, dated November 6, 1985; 119, dated December 21, 1985; and 120, dated May 21, 1986.

NSC Meeting No. 117 included reviews of (1) new waste storage plugs, (2) a wiring modification to the function switch of the reactor log-N amplifiers, (3) cutting reactor beam tubes, and (4) fire protection. With regard to the latter item, the consequences of two recent fires in the waste hot cell were discussed. The committee requested that a full report of the incidents be submitted to the NSC with recommendations for corrective actions. Also, the NSC requested that a subcommittee be formed to review fire protection in hot cells and that they submit recommendations to the NSC for review.

NSC Meeting No. 118 included reviews of (1) topaz irradiation, (2) cutting beam tubes, (3) the B-3 cask unload procedure, (4) wiring modification to function switch, (5) audits, (6) the fire in hot cell No. 1, and (7) formation of a three-person fire protection committee (FPC). The FPC was charged with reviewing fire protection in hot cells and reporting back to the NSC by the end of the year (1985).

NSC Meeting No. 119 included reviews of (1) audits, (2) topaz irradiation, (3) expected radiation levels from N-16 activity, and (4) the North Face Silicon Irradiation Facility polystyrene containers, reactivity analysis, and thermal analysis. The NSC requested Operations to consolidate all engineering analysis reports into a formal Hazard Summary for the new Neutron Transmutation Doping (NTD) Silicon Irradiation Facility.

NSC Meeting No. 120 included reviews of (1) the B-3 cask maintenance procedure, (2) pool duct sweep modifications, (3) a radiation safety audit, (4) tonaz irradiation, (5) annual audit of the physical security program, (6) the consolidated hazard summary for the North Face NTD Silicon Irradiation Facility, (7) a modification to the ion chamber alignment shelf and to uncompensated ion chamber containment cans, and (8) heat exchanger cleaning treatment which caused the reactor pool to become cloudy and which led to operator concerns in the areas of safety and production. With respect to the last item, the NSC concluded that better communications between operators and supervisors/management could have relieved operator concerns at an earlier time and that procedures are in existence to handle such questions. Reactor Operations also committed to a review and update of the present peroxide cleaning procedure prior to its next use. This item is also discussed in Paragraph 2.3.

With respect to the hazard summary for the North Face NTD Silicon Irradiation Facility, the inspector considered that the analyses included appropriate discussions of the expected radiation hazards, reactivity effects, heat generation, interference with core components, and component installation.

Based on the inspector's review of NSC meeting minutes, the inspector determined the NSC reviews were conducted as required by Technical Specifications and to an appropriate depth of technical assessment analysis. The fire protection committee report of fire protection in the hot cells has not yet been completed due to delays caused by other priority work assigned to the committee members, but this report is still expected in a near-term NSC meeting. The inspector had no further questions concerning this matter.

5. Exit Interview

The inspector met with licensee personnel denoted in Section 1.0 at the conclusion of the inspection on August 8, 1986. The scope and findings of the inspection were discussed at that time. At no time during this inspection was written material provided to the licensee by the inspector.