# 12.0 CONDUCT OF OPERATIONS

## 12.1 ORGANIZATION AND RESPONSIBILITY

Overall responsibility for all plant operations is vested in the American Electric Power Company. The Westinghouse Electric Corporation provided technical assistance during the period of pre-operational testing, core loading, initial startup and pre-commercial operation.

The approach to operating the plant was compatible with the organizational concepts and operational philosophy that have been successfully employed for many years in the Company's conventional thermal plants. Many of the plant personnel were initially drawn primarily from the existing American Electric Power System conventional plant staff, and most had significant conventional power plant experience, plus varying degrees of nuclear experience.

The plant organization is shown in the QAPD. This organization is in accordance with the organizational practices of the Company for conventional generating plants, with increased emphasis on the technical functions required for the operation of a nuclear plant. The Site Vice President through the Plant Manager and appropriate department superintendents, provides supervision for the plant personnel and maintains direct responsibility for all plant activities. The plant organization is under the functional direction of and receives technical support from the American Electric Power Service Nuclear Generation Group, located on-site and in Buchanan, Michigan.

The individuals selected for Site Vice President position and each of the professional staff positions in the operating organization meet or exceed the minimum qualifications of ANSI N18.1-1971/ANS 3.1-71 for comparable positions. In addition: (1) the Plant Radiation Protection Manager meets or exceeds the qualifications of Regulatory Guide 1.8, September 1975; (2) the shift technical advisors have a Bachelor's degree or equivalent in a scientific or engineering discipline with specific training in plant design and response and analysis of the plant for transients and accidents; and (3) the Operations Director holds or has held a senior operator license, or has been certified with senior operator equivalent knowledge.

## 12.2 LICENSED OPERATOR REQUALIFICATION PROGRAM

The initial training programs for licensed reactor and senior reactor operators, non-licensed operators, and shift technical advisors are based on, and maintained in accordance with the systems approach to the training process, which is accredited by the National Nuclear Accrediting Board, in accordance with NRC Generic Letter 87-07. The continuing training program (Licensed Operator Requalification) is also based on, and maintained in accordance with the systems approach to training process, which is accredited by the National Nuclear Accrediting Board. The reference plant simulators used in these training programs are certified and maintained to meet the NRC requirements described in Title 10, Code of Federal Regulations, Part 55, "Operators' Licenses."

## 12.2.1 Control of Heavy Loads

### 12.2.1.1 Introduction / Licensing Background

NUREG 0612, "Control of Heavy Loads at Nuclear Power Plants" (Reference 1 in Section 12.2.1.9), gives guidelines for crane operator training, conduct, and performance; crane and equipment inspection, testing, and maintenance; and procedure review, modification, and development, to ensure that heavy loads are properly and safely handled in nuclear plants.

Cook Nuclear Plant (CNP) has established a Control of Heavy Loads Program that follows NUREG 0612 guidelines. The heavy loads program has been established based on the seven general guidelines listed in Section 5.1.1 of NUREG 0612.

CNP summarized the establishment of their Control of Heavy Loads Program by making commitments to the NRC through a series of AEP:NRC:0514 letters in the 1981-1983 time frame. These letters were known as Phase I Submittals. On 09/20/83, the NRC issued a SER Document titled "Safety Evaluation for Heavy Loads" (Chapter 15, Reference 15.3 #22) to CNP and this safety evaluation officially approved the CNP Phase I submittals. This SER document is the licensing basis for the Control of Heavy Loads at CNP.

### 12.2.1.2 Safety Basis

The safety basis of the CNP Control of Heavy loads program is that the heavy loads program is based on the seven general guidelines listed in Section 5.1.1 of NUREG 0612.

The seven guidelines are listed as follows:

***Safe Load Paths***

CNP maintains a defense-in-depth approach in their Control of Heavy Loads Program. Safe load paths for heavy loads keep the load as close to the floor as reasonably possible to minimize the potential load drop impact energy. Safe load paths are also kept separated horizontally as much as possible from spent fuel and/or safety related equipment.

## Load Handling Procedures

An upper tier procedure titled "Control of Heavy Loads" provides for safe and proper handling of heavy loads to meet the requirements of NUREG 0612 at CNP. Safe load paths for major plant components (reactor head, RCP motor, etc.) have been developed based on the above upper tier procedure and these safe load paths appear in lower tier procedures.

## Crane Operator Training

The minimum requirements are that crane operators are trained, qualified, and conduct themselves in accordance with ANSI B30.2-1976 (Reference 2 in Section 12.2.1.9), Chapter 2.3.

## Special Lifting Devices

A special lifting device at CNP is a below the hook lifting device in either the Auxiliary Building, the Containment Building, or the Screenhouse that carries loads over areas that are subject to NUREG 0612 (safety related areas). These special lifting devices have been designed and tested to the requirements of ANSI N14.6-1978 (Reference 3 in Section 12.2.1.9) or later equivalent version of this Standard. All commercial elements used for a part of a special lifting device (wire ropes, chains, etc.) are to conform to ANSI B30.9-1971 (Reference 4 in Section 12.2.1.9).

## Lifting Devices Not Specially Designed

Lifting devices not specially designed are routine lifting devices such as chains, wire ropes, slings, etc. that are classified as "shelf" items. These devices shall be designed per the requirements of ANSI B30.9-1971 or later equivalent version of this Standard and arranged per the guidelines set forth in the EPRI Rigger's Handbook 1009706 (Reference 5 in Section 12.2.1.9). The safety factor for these devices used in safety related areas are given in NUREG 0612. If these devices are used over restricted areas, the safety factors are given in NUREG 0554 (Reference 6 in Section 12.2.1.9). NUREG 0554 also allows for use of redundant lifting devices over restricted areas.

## Cranes (Inspection, Testing, and Maintenance)

The minimum requirements for crane inspections, non-destructive examinations, and maintenance is to follow the guidelines in ANSI B30.2-1976, Chapter 2-2.

## Crane Design

All major overhead cranes except the East Auxiliary Building Crane were designed by Whiting Corp. to the guidelines of EOCI Specification 61 and ANSI B30.2-1967. These cranes were later upgraded to conform to ANSI B30.2-1976 and CMAA-70 (Reference 7 in Section 12.2.1.9) as required by NUREG 0612. Future overhead cranes at CNP will be designed to the guidelines of ASME NOG-1-2004 (Reference 8 in Section 12.2.1.9).

### 12.2.1.3 Scope of Heavy Load Handling Systems

The following major overhead cranes are involved in lifting and transporting heavy loads per the requirements of NUREG 0612. These cranes are not single failure proof. The polar cranes have each had a load drop analysis performed (Reference Section 12.2.1.6). The safe load path for the Screenhouse Crane excludes those areas over the safety related ESW Pump Enclosure roofs. The ESW Pump Enclosure roofs have been designed for the entire crane with a 30 ton load falling upon the roof. Therefore, the three cranes listed below can safely lift and transport heavy loads.

- Unit 1 250/35 Ton Containment Polar Crane
- Unit 2 250/35 Ton Containment Polar Crane
- 30 Ton Circulating Water Pump and Screenhouse Crane

The following major overhead cranes are involved in lifting and transporting heavy loads per the requirements of both NUREG 0612 and NUREG 0554. These cranes are single failure proof cranes.

- 150 Ton West Auxiliary Building Crane, Maximum Critical Load = 55 Tons
- 150/20 Ton East Auxiliary Building Crane, Maximum Critical Load = 145 Tons Main Hook, 13 Tons Auxiliary Hook

The following load handling systems are designed to lift and transport a single piece of safety related equipment when this equipment has been removed from service. The removed component could be lifted over another component that is safety related during power operation; therefore, these lifting systems are subject to the guidelines of NUREG 0612. The capacities of all of these monorails or cranes are 2 or 3 tons.

- Diesel Generator Crane
- Reciprocating Charging Pump Monorail
- Centrifugal Charging Pump Monorail
- Safety Injection Pump Monorail
- Containment Spray Pump Monorail
- Residual Heat Removal Pump Monorail
- Main Steam Valve Monorail
- Recirculation Valve Monorail
- Auxiliary Feedwater Pump Hoist
- Ice Condenser Crane

#### 12.2.1.4 Control of Heavy Loads Program

The procedure titled "Control of Heavy Loads" is the upper tier procedure that provides for safe and proper handling of heavy loads to meet the requirements of NUREG 0612 at CNP. Safe load paths for major plant components (reactor head, RCP motor, etc.) have been developed and these safe load paths appear in lower tier procedures. If a safe load path has not been developed for a component or if it is necessary to deviate from a safe load path that is listed in a lower tier procedure, Control of Heavy Loads takes over as the governing procedure for the handling of this heavy load. Per the Control of Heavy Loads procedure, any movement of a heavy load over an unapproved load path must have Plant Oversight Review Committee (PORC) Approval.

Control of Heavy Loads also provides for crane operator training; use of special lifting devices; use of slings; and crane design, inspection, testing, and maintenance.

The Control of Heavy Loads procedure does not include movement of loads over the Spent Fuel Pool (SFP). Loads over the SFP are controlled by another procedure titled, "Control of Loads Over the Spent Fuel Pool and Fuel/Insert Handling in the Spent Fuel Pool".

## 12.2.1.5 NRC Commitments in Response to NUREG 0612, Phase I Elements

CNP has established a Control of Heavy Loads program based on the seven general guidelines listed in Section 5.1.1 of NUREG 0612 and summarized in Section 12.1.2 above. CNP summarized the establishment of their Control of Heavy Loads Program by making commitments to the NRC through a series of AEP:NRC:0514 letters in the 1981-1983 time frame. These letters were known as Phase I Submittals. On 09/20/83, the NRC issued a SER Document titled "Safety Evaluation for Heavy Loads" to CNP and this safety evaluation officially approved the CNP Phase I submittals. This SER document is the licensing basis for the Control of Heavy Loads at CNP.

## 12.2.1.6 Reactor Vessel Head Lifting Procedures and Load Drop Analysis

CNP has a load drop analysis in place to support lifts of the reactor vessel head. The assumptions in this load drop analysis (restrictions on load height, load weight, and medium present under the load) have been incorporated into the following head lifting procedures titled "Reactor Vessel Head Removal with Fuel in the Vessel" and "Reactor Vessel Head Installation with Fuel in the Vessel".

The above procedures limit the elevation of the RVCH flange to not exceed 18" above the operating floor El. 652'-7-1/2". This limits any possible head drop to 33'-1-1/2" which is the drop height in air that is covered in the RVCH head drop analysis. Also, the load cell for the lift must read less than 325,000 lbs. This is the RVCH head and lifting device weight that is covered in the RVCH head drop analysis.

The above lifting procedures with limitations based on the load drop analysis provide assurance that the core will remain covered and cooled in the event of a postulated reactor pressure vessel head drop.

## 12.2.1.7 Single Failure Proof Cranes for Spent Fuel Casks

Only the 150/20 Ton East Auxiliary Building Crane will be used in the lift of the spent fuel canisters.

## 12.2.1.8 Safety Evaluation / Conclusion

The CNP Control of Heavy Loads Program was implemented by the submission of NUREG 0612 Phase I elements to the NRC. The CNP Phase I submittals were approved by the NRC per SER Document dated 09/20/83. The controls implemented by these Phase I submittals make the risk of a load drop very unlikely.

In the event of a postulated reactor head load drop, the consequences are acceptable per the load drop analysis listed above in Section 12.2.1.6. Restrictions on the load height, load weight, and medium under the load are reflected in the reactor head lifting procedures also listed in Section 12.2.1.6.

The risk associated with the movement of heavy loads is evaluated and controlled by CNP procedures. A high risk lift is treated as a high risk activity in both the Lifting and Rigging Program and the Control of Heavy Loads procedures.

## 12.2.1.9 References for Section 12.2


1. NUREG 0612, "Control of Heavy Loads at Nuclear Power Plants"
2. ANSI B30.2-1976, "Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)
3. ANSI N14.6-1978, "Standard for Special Lifting Devices for Shipping Containers Weighing 10,000 lbs. or More for Nuclear Materials"
4. ANSI B30.9-1971, "Slings"
5. EPRI Rigger's Handbook 1009706, dated April 2004
6. NUREG 0554, "Single-Failure Proof Cranes for Nuclear Power Plants"
7. CMMA-70, "Specifications for Top Running Bridge & Gantry Type Multiple Girder Electric Overhead Traveling Cranes"
8. ASME NOG-1-2004, "Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)"

## 12.3 EMERGENCY PLAN

The Cook Nuclear Plant Emergency Plan is a separate document which has been previously submitted to the NRC. The Emergency Plan describes Indiana & Michigan Electric Company's plans for responding to all foreseeable emergencies at the plant or at the Independent Spent Fuel Storage Installation (ISFSI) which have resulted in, or have the potential to result in, the accidental release of radiation to the environment. The plan has been prepared to fulfill the requirements as set forth in 10 CFR 50 and in 10 CFR 50 Appendix E as well as the planning objectives set forth in NUREG-0654/FEMA-REP-1. The objective of this plan is to define and assign authority and responsibility in order to protect the health and safety of the general public, persons temporarily visiting or assigned to the reactor facility, and the employees of the plant.

## 12.4 RECORDS

Records documenting the operation, maintenance and modifications performed at the plant are maintained on file as appropriate at the plant site and/or the corporate office. Operating records include appropriate log books, log sheets, data logger output, and recorder charts covering all aspects of operation. Detailed records of the routine operational testing of nuclear safeguards systems and components are also maintained. Maintenance and modification records are kept, documenting the inspection, preventative maintenance, alteration and repair of mechanical, electrical and instrumentation systems. Administrative records such as personnel radiation records, plant licenses, and permits are maintained on file at the plant.

## 12.5 REVIEW AND AUDIT OF OPERATIONS

Reviews and audits of facility operations are conducted in accordance with the document "Quality Assurance Program Description" as referenced in Sub-Chapter 1.7.

## 12.6 NUCLEAR DESIGN AND SUPPORT CAPABILITY

The Cook Nuclear Plant organization is under the functional direction of and receives technical support from the AEP Nuclear Generation Group (NGG) which is headquartered at 500 Circle Drive, Buchanan, Michigan.

The American Electric Power Service Corporation (AEPSC), with offices currently at 1 Riverside Plaza, Columbus, Ohio, 43215, provides engineering operational support, design, legal, accounting and related services to the AEP System. Consequently, AEPSC employs engineers, designers, and drafters who are experienced in the design and construction of electric generating stations. AEPSC acts as the architect-engineer for the AEP system and as such has designed and built nearly all of the System's present generating capacity. AEPSC was responsible for the design of the Donald C. Cook Nuclear Plant and for construction of the entire plant. Design and fabrication of the nuclear steam supply system components and the initial fuel load were performed by the Westinghouse Electric Corporation and its subcontractors.

AEPSC began training employees in nuclear power in 1952 with the assignment of several engineers, designers and maintenance specialists to Oak Ridge National Laboratory, Bettis Atomic Power Laboratory, Knolls Atomic Power Laboratory, and various projects at the National Reactor Testing Station. Since that time, a large number of additional AEP personnel have completed assignments at various national laboratories or pursued graduate level work in nuclear engineering at leading universities, while others have attended shorter courses and seminars in various aspects of the nuclear power industry.

In 1953, AEP became one of the co-founders of the Nuclear Power Group, Inc., and in the ensuing years participated, technically and financially, in the development of the Dresden Nuclear Power Station. This group was then dissolved. It evolved into the East Central Nuclear Group (ECNG); and AEP was instrumental in the new group's formation. ECNG was comprised of 10 utility companies. Its goal was to research and develop nuclear power. The AEP Service Corporation acted as architect-engineer administrator and research and development manager for the group.

ECNG's major undertakings were the development with the General Nuclear Engineering Corp. of the Florida West Coast Nuclear Group gas-cooled, heavy water moderated reactor from 1957-61, the joint development with Babcock & Wilcox of a Supercritical Pressure Steam Cooled Fast Breeder Reactor from 1963-65, the development of a Gas Cooled Fast Breeder Reactor in cooperation with Gulf General Atomic from 1965-67, the development with General Electric of a Steam Cooled Fast Breeder Reactor in 1967-1968, and from 1968 through 1982, a further project with General Atomic for the Gas Cooled Fast Breeder Reactor, first through an informal group of utilities and then through Helium Breeder Associates.

In addition, ECNG, with the aid of AEPSC staff and S. M. Stoller Associates, made a thorough study of the "The Outlook for Uranium", a survey of the likely demand and availability of nuclear fuel; and with the Massachusetts Institute of Technology produced a study of the "Effects of Changing Economic Conditions of Fuel Cycle Costs". This program investigated the ten-projected effects of private ownership of nuclear power economics. ECNG is now dissolved.

At the present time, the AEP Nuclear Generation Group consists of professional personnel who devote all of their professional energies to Cook Nuclear Plant and nuclear power industry issues. In addition, there are other individuals at AEPSC with substantial nuclear training or specific nuclear experience in key engineering, design and operating positions.

## 12.7 WRITTEN PROCEDURES

Detailed written procedures for normal operations, as well as for abnormal and emergency situations, have been prepared. These procedures incorporate the limits and parameters set forth in the plant Technical Specifications. The Emergency Plan includes provisions to provide the necessary facilities and personnel to deal effectively with any foreseeable emergency. However, the plant design is such that none of the credible nuclear accidents would create an undue hazard to the public. Station personnel are thoroughly familiar with the emergency plan, and practice drills are held as necessary for training.

The review and approval for all plant operating, maintenance and test procedures is conducted in accordance with the document "Quality Assurance Program Description" as referenced in Sub-Chapter 1.7.