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Donald C. Cook Nuclear Plant Unit Nos. 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
TECHNICAL SPECIFICATIONS AND PROCEDURES GLOSSARY

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Denton:

Pursuant to our letter AEP:NRC:0983, dated April 10, 1986, we are transmitting as Attachment 1 a definitions list which we intend to use as part of the D. C. Cook Technical Specification update program (TSUP). We are not proposing that this list be added to the Technical Specifications (T/Ss), but rather that it be used in activities associated with the TSUP. This list is intended to provide a common understanding among our engineers, plant operators and NRC personnel, and it will aid in clarifying the interpretations of procedures, T/Ss, and other licensing and operating documentation.

This list contains working definitions which may be revised during the course of the TSUP. This list is considered preliminary in nature and has not been thoroughly reviewed by our engineering divisions or plant personnel. If we find, during the course of our review, that there are certain words that would be beneficial to include in the T/Ss Definitions Section, we will notify you accordingly.

The definitions list was prepared by AEP, with the assistance of our consultants Impell Corporation (Impell) and Combustion Engineering (CE). Resumes of the Impell and CE staff involved with this project are included in Attachment 2.

A001
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This document has been prepared following Corporate procedures which incorporate a reasonable set of controls to insure its accuracy and completeness prior to signature by the undersigned.

Very truly yours,

M. P. Alexich
Vice President

8/8/86

cm

Attachments

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ATTACHMENT 1 TO AEP:NRC:0950A

DEFINITIONS LISTS FOR THE D. C. COOK

TECHNICAL SPECIFICATION UPGRADE PROGRAM

Glossary of Terminology Used in Technical Specifications

Abnormal (also off-normal) -

Significantly different from what is expected or predicted.

Abnormal Degradation-

Service-induced cracking, wastage, wear or general corrosion occurring on a component beyond that expected and which may decrease the useful life of the component.

About-

Reasonably close to. Implies the use of engineering judgement in determining what is close enough. This term should not be used to quantify the closeness of a result to a given criteria or value.

Action -

Requirements contained in the Technical Specifications that allow limited exceptions to Limiting Safety System Settings or Limiting Conditions for Operation.

Activate -

To turn on (energize) a piece of equipment. To make functional or place in operation.

Active Failure -

A malfunction of a component that relies on a mechanical movement or electrical signal to accomplish its design function (typically failure of a valve to move or a pump to start).

Actuate -

A manual or automatic action that causes a device or component to change position or state, or to otherwise operate. Interchangeable with "Activate" in Technical Specifications usage.

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* Asterisk indicates that the word may not appear in the Technical Specifications or procedures, but appears in support documentation that is important to an understanding of T/Ss.

Actuation Cycles-

The number of times a system, sub-system or component is forced to actuate, operate, or otherwise move through a complete cycle of its intended function, e.g., safety injection initiation, diesel generator start, relay closure.

Adjust-

To cause a change in a process parameter through the manual or automatic operation of a controlling device or component, e.g., adjust auxiliary feedwater flow by throttling the flow control valve.

Adverse Condition-

Existing condition which if left unchanged may negatively affect the operability of systems, sub-systems or components, e.g, high compartment temperatures, high component vibration, insufficient cooling flow.

*Adverse Environment -

Ambient conditions, either during operation or post-accident, which may cause errors in the operation of equipment. Examples of such environmental conditions are high humidity, temperature, pressure, acceleration and radiation.

Agree-

To be similar to or consistent with but not necessarily equal. Criteria should always be given if this term is to be used, e.g., all four steam generator narrow range level indicators agree within 3% of each other.

*Alarm Conditions -

Situations when plant parameters are outside preestablished limits such that the operator should be alerted by an alarm to enable him to take timely corrective action.

Align -

To place components in the correct position for a desired operation. Usually applied to fluid and electrical systems. Examples: You align a pump to take suction from a specific source by opening and closing a series of valves in a specified sequence. You align a bus to be powered from its startup transformer.

Alternate-

To periodically use like but separate systems to perform a given function, e.g., alternate the use of the A & B trains of RHR based on

running time. Also, a person who is designated to take the place of the primary attendee.

Ambient Conditions-

An encompassing atmosphere. Generally refers to the environmental conditions including temperature, humidity, radiation and pressure immediately surrounding a component or piece of equipment.

Analyze-

The examination and evaluation of factors surrounding or associated with an event or condition with the intent of determining with high degree of confidence the attendant cause and effects.

Associated - Related by function, interaction or location. For example:

(1) for LCOs - related Action statements or surveillance requirements.

(2) for equipment - connected to, either physically, spatially or operationally, that may or may not be necessary for operability.

At -

(In reference to parameters read from instruments) "at a value" means closer to that value than to any other that can be reasonably read from the available scale.

At Least -

Greater than or equal to; the minimum required or acceptable.

*Atmospheric Release -

The discharge (emission) of radioactive materials to the air outside containment. Such discharge may be intentional or accidental, and may be controlled or uncontrolled.

Automatic -

Occurring without manual action. Dependent for actuation on mechanically or electronically derived signals.

Automatic Actions -

The preprogrammed response of systems and components to perturbations in the plant's operations.

Axial Flux Difference - The difference in normalized flux signals between the top and bottom halves of a two-section excore neutron detector.

*Backfill (also reflux) -

The phenomenon following a steam generator tube rupture where unborated water will flow from the steam generator secondary side to the reactor coolant system (RCS) if the RCS pressure is reduced below that of the secondary side.

*Backflow -

Flow in the reverse direction from that normally expected.

Balanced-

Physical equilibrium. A condition where competing effects cancel. e.g., where the four cold leg injection line flow resistances are balanced by throttling valve adjustments such that coolant injection to each RCS cold leg is the same.

*Barriers to Fission Product Release -

The major physical barriers that are designed to contain and prevent the uncontrolled release of fission products from anywhere within the reactor coolant pressure boundary or primary coolant boundary to the public.

Bias-

An electronic offset or voltage applied to the input or output of a device such that a uniform effect is obtained, e.g., bias the transmitter output by 30 psi. Also, to use a non-random technique for statistical selection, e.g., choose only small snubbers.

Blackout -

Loss of electrical power to a unit's electrical service busses (typically equated to a loss of offsite power). Station blackout involves loss of offsite power and loss of the unit's emergency generators.

Block -

To prevent the normal or automatic functioning of a signal or flowpath.

Break -

Mechanical: To burst, fracture or rupture, thus rendering something unusable, e.g., a pipe break. Electrical: To open an electric circuit or other type of connection, e.g., to break continuity.

Bus-

A conductor or assembly of conductors for collecting electric currents and distributing them to outgoing feeders, e.g., the 6.9kv Class 1E safety related bus.

Bypass - To establish a path for a fluid (or signal) to go around a component or subsystem and back to its original path.

Challenge -

A demand for the actuation of a reactor protective or engineered safeguards feature to perform a design function.

Channel -

A unique path for an electronically generated signal, including the sensor, and electronic processing and actuation devices.

Channel Calibration -

The adjustment of the output of a sensor and its associated channel's components against a known standard on a periodic basis such that the required accuracy of the channel is preserved during operation. The channel calibration shall encompass the entire channel including the sensor and alarm and/or trip functions, and shall include the channel functional test. The channel calibration may be performed by any series of sequential, overlapping or total channel steps such that the entire channel is calibrated.

Channel Check -

The qualitative assessment of channel behavior during operation by observation. This determination shall include, where possible, comparison of the channel indication and/or status with other indications and/or status derived from independent instrument channels measuring the same parameter.

Channel Functional Test -

The injection of a simulated signal into the channel as close to the primary sensor as practicable to verify operability including alarm and/or trip functions.

Check -

To confirm that a system or component is performing as expected, or is in its required position, by making a qualitative or quantitative assessment of the indications available.

Chemical Analysis-

To determine the constituents and their relative concentrations in a fluid, solids or gas. Also to determine properties such as conductivity, pH or gross radioactivity due the presence of those constituents.

Chemistry-

The composition, structure, and properties of a substances and the transformations they undergo. Also the department responsible for performing chemical analyses at the request of operations or as directed by procedure.

Circuit-

An interconnected assembly of electric/electronic components which together are designed to perform a specific function or functions usually by the transmission or otherwise processing of electric current.

Close -

Mechanical: to shut. Electrical: to place in a condition where electrical continuity is established.

Comply-

To perform the actions required by the accepted regulations, standards, procedures and other documents which govern the design, operation, maintenance and administration of the power plant.

Condition Restoration Time -

The time allowable for a process variable, component or system to be out of its specified limits or inoperable before action must be taken to place the unit in a condition where the status of the variable, component or system will not adversely affect plant safety.

Confirm-

To independently verify by observation or analysis a previously known or suspected condition or fact. Also used to denote independent authorization from a higher authority to proceed with a given action.

Confirmatory Measurements -

Those measurements which are made for the express purpose of verifying the validity of the measurement process.

Connected To-

Physically attached. Systems are connected if one can affect the other via the direct transfer of mass or energy over or through the system boundaries, e.g., through a connecting pipe, electrical breaker, bolted connection, or crack or hole in a wall.

Conservative -

The addition of an allowance over and above that which is required to produce acceptable results, so as to further mitigate the consequences of an expected event.

Consistent-

Conforms to expectations. Also steady or non-varying, e.g., given a steady turbine power, periodic feedwater flow readings are consistent when they are non-varying and of the correct magnitude for the power being produced.

Containment Integrity -

The unimpaired condition of the containment to control and limit the release of radioactivity to the amounts specified in its design basis.

Containment Isolation -

The process of sealing off the containment from the outside environment to prevent the release of radioactive material following an accident. This consists of automatically closing off all containment penetrations not already sealed and not required to be open to perform their safety function following an accident actuating the Containment Isolation Signal.

Continuous -

Refers to an action that is done without interruption, as opposed to one that is done intermittently.

Control-

Verb: to manually or automatically regulate the operation of a system or component. Noun: a mechanism such as a switch, auto-remote control station or mechanical regulator used to direct the operation of a system or component.

*Control Air -

The air provided at the appropriate pressure to air-operated control valves and other pneumatically operated control devices and/or the system providing such air.

Controlled Leakage -

The seal water flow supplied to the reactor coolant pump seals.

Controlled Path-

A preplanned route for the movement of material suspended from a crane designed to minimize the risk of damage to critical equipment or

components and possible spread of contamination due to a failure of the crane which results in dropping the load.

Core Alteration -

The movement or manipulation of any component within the reactor pressure vessel with the vessel head removed and fuel in the vessel including removal and reinstallation of the vessel head. Suspension of core alterations shall not preclude completion of movement of a component to a safe conservative position.

Corrective Actions -

Those steps taken to identify and fix an abnormal or out-of-limits condition or to compensate for a condition which cannot be fixed directly.

Critical Areas-

Areas of the steam generator tubes and associated supporting components shown to be susceptible to degradation at similar facilities.

Cycle (noun) -

A periodically repeated series of events that end such that the starting conditions exist again.

Cycle (verb) -

To cause to go through a cycle.

Cycling Test-

A test of components ability to operate through its full range of motion, e.g., valve cycling test.

Deactivate -

To make inoperative.

Decay Heat -

The continued energy output of the core after the reactor has been shut down. This is from the radioactive decay of unstable fission products produced from the fuel during power operation.

Declare -

Used with "operable" or "inoperable" - to formally acknowledge or document the status of equipment.

Defeat -

Nullify or prevent the effect of. (E.g., to defeat an interlock is to override or bypass the interlock to allow a piece of equipment to be operated under conditions where its operation would not normally be desired or permitted).

Defective-

A component is defective when it contains imperfections, such as cracks or wastage, which are severe enough to render the component incapable of performing its intended function; e.g., a steam generator tube with an imperfection greater than or equal to 40% of the nominal tube wall thickness is defective by definition.

*Degasification -

The removal of dissolved gas from a liquid.

Degraded System-

Containing inoperable components which may affect overall system function or operability; e.g., Train A of RHR is inoperable if the A RHR pump is inoperable.

Demonstrate -

To illustrate. In the context of Technical Specifications, to perform a surveillance, or other action (including a reasonable engineering evaluation) to confirm the status of a system or component, e.g., to "demonstrate" its operability.

*Design Basis -

"That information which identifies the specific functions to be performed by a structure, system, or component of a facility, and the specific values or ranges of values chosen for controlling parameters as reference bounds for design. These values may be (1) restraints derived from generally accepted 'state of the art' practices for achieving functional goals, or (2) requirements derived from analysis (based on calculation and/or experiments) of the effects of a postulated accident for which a structure, system, or component must meet its functional goals."

*Design-Basis Accident -

A design-basis accident is an unplanned occurrence (that must be accommodated) with specifically limited plant and off-site consequences. It is an event that has been analysed and presented in the accident analysis chapter of a plant's final safety analysis report. (e.g., Chapter 14 of the D. C. Cook FSAR.)

Design Thermal Power -

Maximum total heat transfer (including pump heat) to the reactor coolant analyzed for safe operation in the FSAR.

Deterioration-

The process by which a component or part becomes impaired in quality, function, or condition, e.g., through corrosion, wearing, hardening due to temperature.

Determine -

To establish as a fact by means of an examination or investigation.

Deviation-

The act of performing a task in a manner other than prescribed by procedure or instruction. Also the difference between a measured value and its setting or prescribed value, e.g., the difference between measured Tave and the reference of programmed Tave.

Diesel Generator -

An on-site electric generator powered by a diesel engine, held on standby, and used to supply emergency power to critical equipment in the event the normal power supply is lost.

Disconnect-

Physically separate, i.e., open a circuit breaker, determinate a wire, unbolt a support.

Dose Equivalent I-131 -

The concentration of the radioactive isotopes of iodine in air, expressed in terms of an equivalent amount of the principal isotope present (I-131) which would produce the same dose, in units of microcuries of I-131 per gram of air (uCi/gm). The thyroid dose conversion factors used for this calculation shall be those listed in Table III of TID-14844, "Calculation of Distance Factors for Power and Test Reactor Sites," or in NRC Regulatory Guide 1.109 Rev, 1, October 1977.

E--Average Disintegration Energy -

There is a unique/distinct quantity of energy given up by the decay of an atom of each radioactive isotope. If one averages the energy given up by the disintegration (decay) of one atom of each isotope present in the reactor coolant and apply a weighing factor to this based on the relative quantity of each isotope present, one has the average

disintegration energy of all isotopes in the reactor coolant. Since a number of the shorter half-life isotopes will have decayed between the time a sample is taken and the time it is analyzed, it is conservative to exclude the shorter half-life isotopes from the calculation (otherwise the result of 100/E uCi/gm would be higher than is expected to be measured). This correction is done by eliminating all isotopes with half-lives of 15 minutes or less.

Effluent -

A liquid or gaseous stream flowing from the plant to the environment, e.g., waste gas discharge from the gaseous radwaste treatment system.

Energize -

To supply with electric power, usually used in reference to an electrical bus or circuit.

Engineered Safeguards Systems (also Engineered Safety Features) -

A system, other than those related to a reactor trip, that is normally in standby during plant operation and responds automatically or manually to off-normal conditions to contain, mitigate and/or limit the consequences of an accident.

Engineered Safety Feature Response Time -

The time required from the instant a monitored plant condition (parameter) reaches its actuation setpoint at the sensor until the actuated equipment completes its actuation.

Ensure-

To take all additional steps or precautions necessary to make certain that a desired outcome takes place, e.g., include separate steps with sign-offs for each valve closure in system line-up procedures to make certain all desired valves are closed.

Enter -

To place the plant in the specified conditions.

*Equalize -

To make equal or uniform to a specified condition.

Equilibrium-

When forces acting on an object are balanced such that the resultant force is zero. Also, when competing effects producing change in a parameter are balanced such that the parameter is non-varying, e.g., xenon equilibrium.

Equivalent To-

Identical in effect or function, e.g., test instruments with identical performance specifications are functionally equivalent even though they may be manufactured by different companies and are of different design.

Erratic-

Unpredictable or inconsistent behavior.

Error Analysis-

An analysis which determines both the random and systematic errors inherent in a measurement system and combines them in a manner which describes the total uncertainty in a given reading. See ANSI/ANS 56.8 for an example pertaining to leakage rate measurement systems.

Establish -

To achieve the specified conditions.

*Evaluate -

To determine the significance.

Exercise -

To actuate a component as a means of maintaining it in operating condition and/or demonstrating its operability.

Failed-

To become incapable of performing an intended function, e.g., a broken bolt in a support baseplate, an open winding in a electric motor, a containment penetration with a pathway leakage greater than 60% of La.

Failure Mechanism-

The fundamental physical or chemical processes responsible for the failure of a part or component, e.g., intergranular stress corrosion cracking, neutron embrittlement, work hardening, oxidation.

Failure Mode -

The position a component is designed to take on loss of operating power or other failure event, e.g., fail-open, fail-closed, or fail-as-is for valves.

*Faulted -

Having imperfections to the extent that a system's or component's ability to function properly is affected.

Flaw-

Imperfection, e.g., crack, gouge, surface indication. Used in Tech. Specs. in conjunction with turbine valve inspections.

Frequency -

Repetitions per unit time, e.g., cycles per second, or once every 18 months.

Frequency Spectrum-

A graphic representation that describes the magnitude of a measured parameter (usually peak to peak) for a given frequency, e.g., pressure at the steam generator feedwater inlets may have a 50 psi component at 100 hz and a 5 psi component at 10 hz.

*FSAR - Final Safety Analysis Report

The document presenting the design of the plant and the results of the analyses performed to demonstrate that it will operate with an acceptable level of safety to the health and safety of the public, and upon which the Nuclear Regulatory Commission bases its decision to grant an operating license to the plant.

Generally Susceptible-

May be prone to failure from common causes or mechanisms. This term is used to categorize similar components such as snubbers for testing and evaluation purposes.

*Generic -

Relating to a class of items or conditions.

Grab Samples -

Manual samples taken for analysis.

Heat Sink -

A system or reservoir which acts to absorb heat from a higher energy (temperature) system.

*Human Factors -

The considerations in the design, development, operation, and maintenance of complex man-machine systems, that allow the operator to perform his tasks with less likelihood of error.

Identify -

To determine what something is.

Identified Leakage -

An undesired loss of fluid from the reactor coolant system via a known path and at a measurable rate.

Immediately -

As soon as practical and before doing any less essential operation.

Impaired-

Partial or complete loss of function or operability, e.g., due to a leak in the fire protection system the charcoal filter bed became wet thus impairing its ability to remove fission products from the containment atmosphere.

*Inadequate Core Cooling -

A state of the reactor coolant system in which it is no longer capable of removing sufficient heat from the core to prevent damage to the core, i.e., rupture and/or melting of the fuel cladding and release of radioactive materials into the primary coolant.

In Conjunction With -

To be performed at the same time as another action.

Independent-

Without reliance on others, also, when comparing two systems, not reliant on shared resources for functionality or operability, e.g., independent on-site power sources.

Initial Conditions-

The plant operating configuration that must be established prior to performing an evolution or maneuver, i.e., 100% power, all rods out, equilibrium xenon.

Initiate -

To take the steps that begin a process.

Injection -

Forcing a fluid into something, e.g., the reactor coolant system or reactor coolant pump seals, or feedwater chemical addition.

In Operation -

Performing an intended action in the required manner. There is a distinction between being in operation and running. A pump may be running, but if it is valved into recirculation it is not in operation. The reactor coolant system accumulators may be in operation without being running, as they are a passive system.

Inoperable -

Being unable to demonstrate that a structure, system, or component meets the minimum requirements for performing its required safety functions.

Inspect -

To view closely in critical appraisal.

*In Standby -

Ready and waiting to perform a function.

*Intact -

Having no relevant components removed or damaged.

*Intended Design Function -

The performance or safety base for a system, structure, or component.

*Interlock -

An electrical or mechanical means of preventing an action from occurring (or causing an action to occur) unless a pre-established condition is met.

Interval -

The span of time or distance between two (or more) occurrences of events or things.

Isolate-

To separate or disconnect from, e.g., close an isolation valve, open an electrical breaker, install a blind flange.

Isolation Valve -

Any valve that is designed for the purpose of preventing flow in one or both directions. These valves are normally either full open or full closed, and include check valves.

Latch In -

Also "locked in." An actuation or prohibition signal which continues to require its action even when the initiating conditions are no longer present.

Leak-

An opening, however minute, that allows the passage of a fluid. See ANSI/ANS 56.8.

Leakage-

The measurable quantity of fluid escaping from a leak. See ANSI/ANS 56.8.

Leakage Measurement System-

An electronic system including sensors, data acquisition, computation, and display devices used to determine and/or measure leakage.

Limit-

A setting or predetermined value, usually stated with a tolerance or range, which defines an operational restriction.

Load -

To place a burden on a system. In an electrical sense: to draw an increased current, especially by connecting a piece of equipment. In a mechanical sense: to perform work, especially against a heavy resistance. When used as a noun, the equipment or resistance itself.

Load Rejection -

To shed a load on an electrical system.

Load Rejection Capability -

The percent of full load that can be rejected without a unit trip. This is a function of steam dump capacity and rod control system response.

*Local -

In reference to controls, those located outside the control room generally near the systems being controlled.

Lock Out -

Deactivate by positive means so that a piece of equipment cannot be operated inadvertently.

Log -

To make an entry in a record. A compilation of records pertaining to a particular thing, e.g., an equipment-out-of-service log, or a maintenance log on a component.

*Logic -

The collection of electronic devices that determine if operation of a component or system is permissible, and its proper sequence, based on a predetermined set of inputs.

*Logic Train -

An independent network of logic paths traceable to a single set of initiating events and resulting in a single set of actuations.

Loop-

A closed path through which a fluid or electric current flows, e.g., reactor coolant loop, instrument loop.

Maintain -

To conduct an activity intended to keep the structures, systems, and components in satisfactory working condition, and/or plant parameters within their operating limits, including tests, measurements, replacements, adjustments, repairs, and engineering evaluations.

Maintenance-

The periodic actions such as calibrations, lubrications, parts replacements, and general housekeeping which act to prevent degradation of overall equipment performance. Also the corrective actions taken to restore functionality of failed equipment or components.

Makeup -

Water or other materials added to various plant systems from various tanks or reservoirs to compensate for system leakage or periodic discharges.

Malfunction -

Failure of a system or component to operate in the normal or required manner.

Manual -

Performed or controlled by human action instead of automatically.

Manufacturing Tolerance-

Specified allowances for installation, limits for operation or other margins of safety, which account for dimensional uncertainties in the fabrication of components, e.g., constants applied to fuel assembly hot channel peaking factors to account for manufacturing tolerances.

Measure-

To ascertain the dimensions or properties of something through the use of tools or instruments, e.g., ambient temperature measurements, RCS shim gap dimensions.

Measurement Uncertainty-

The inability to know the exact value of a measured parameter due to random and systematic errors inherent to the measurement system. These can be caused by such factors as material hysteresis, thermal offsets, and electronic noise.

Miniflow -

A flowpath designed to ensure that there is sufficient flow through a pump even when the pump is operating at its shutoff head to protect the pump from damage due to overheating.

Monitor -

Noun: an instrument that measures a particular plant function or parameter, and which may display or record its value, and/or generate an alarm or automatic action should the value of the parameter exceed preset limits. Verb: to periodically check the value or condition of a parameter by qualitative or quantitative means.

Narrow Range-

The term used to differentiate instrument loops which sense a relatively narrow range (usually the normal operation range) of a process variable, e.g., narrow range pressurizer level, narrow range hot leg temperature, narrow range steam generator level.

Natural Circulation -

Movement of fluid around a closed vertical path due to temperature induced density differences.

Noble Gas -

A chemically inert gas, including the fission products xenon and krypton, and the rare gases argon, helium and neon. Radon, a decay product of radium, is also a noble gas.

Normal -

Not significantly different from what is expected or predicted.

Normalize -

To adjust the representation of a quantity so that it lies in a prescribed range generally between zero and one.

Objectives-

The stated goals of a procedure.

Obstructed-

The condition of a loop or path through which flow or passage is blocked by a foreign object, or substance. Also, where the line of sight is blocked or obscured as in obstructed vision.

Offsite Dose Calculation Manual -

The document containing the methodology and parameters for calculating the offsite doses due to radioactive gaseous and liquid discharges, the alarm/trip setpoints for gaseous and liquid effluent streams, and for the conduct of the environmental radiological monitoring program.

Open -

Not shut. To withdraw one part of a component from another part so as to break the connection between them.

Operable/Operability -

A system, subsystem, train, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing, or is actually performing, its specified safety function(s), and when all necessary attendant instrumentation, controls, normal and emergency electrical power sources, cooling or seal water, lubrication or other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its safety function(s) are also capable of performing their related support function(s). Under certain conditions where a component or device is not fully OPERABLE, the associated system, subsystem or train may be demonstrated OPERABLE, or to have OPERABILITY, so long as an analysis is performed to justify continued operation.

Operate -

To cause to function in a manner to produce a desired result.

*Operational (also Functional) -

Used in reference to a piece of equipment (component or system) known to be capable of performing its design safety function, but declared inoperable due to a technicality, such as a missed surveillance or the inoperability of support equipment.

*Optimal -

The course of action that will produce the desired result in the surest or most efficient manner.

Out of Service -

Intentionally made or declared incapable of operating, usually so that maintenance or an inspection can be done on a component or system.

Overspeed Test -

A test conducted to ensure that protective equipment is operating properly when the speed of rotating machinery reaches a predetermined level above its normal operating speed.

Permissive -

A value above or below which certain manual or automatic actions are permitted or prevented.

Physics Tests -

Those tests performed to measure the fundamental nuclear characteristics of the reactor core, core components, and related instrumentation and 1) described in Chapter 13.0 of the FSAR, 2) authorized under the provisions of 10 CFR 50.59, or 3) otherwise approved by the Commission.

Power Operated -

Any valve or tool whose movement is controlled or caused by an electric, pneumatic or hydraulic force, as opposed to hand operated or self-actuated.

Precaution-

A qualitative statement found in procedures which provides advanced warning of existing conditions, or requirements which must be followed, to ensure the safety of personnel or to protect equipment.

Prerequisite-

An action to be performed, or a condition that must be verified, prior to proceeding with an evolution, e.g., establishment of initial conditions, independent verification of a valve line-up.

Pressure Boundary Leakage -

Leakage (except steam generator tube leakage) through a non-isolable fault in a reactor coolant system component body, pipe wall or vessel wall.

Process Control Program -

The document containing the methodology and parameters for determining that the processing and packaging of solid radioactive waste meets the federal and state requirements for its shipment and disposal, e.g., 10 CFR 20 and 10 CFR 71.

Process Variable -

A plant parameter which may be measured and controlled, e.g., pressure, temperature, flow, level, rod position, boron concentration, and power.

Prove-

To demonstrate through measurement, test, or analysis.

Purge/Purging -

To get rid of an undesired substance, usually by passing a stream of gas or fluid through a confined area. To discharge air from the containment, in a controlled manner, replacing it with fresh air so as to control the humidity, temperature, or concentration of undesired gasses within containment.

Quadrant Power Tilt Ratio -

The ratio of the maximum upper excore detector calibrated output to the average of the upper excore detector calibrated outputs, or the ratio of the maximum lower excore detector calibrated output to the average of the lower excore detector calibrated outputs, whichever is greater. With one excore detector inoperable, the remaining three detectors shall be used for computing the average.

Rated Thermal Power -

The licensed core power level of a nuclear power plant.

Reactor Trip -

An automatic or manual signal to the reactor trip breakers causing the circuit breakers to open, removing power from the control rod drives and allowing all full-length control rods to drop into the core to add the required degree of subcriticality to ensure that the core will be shut down and remain shut down.

Reactor Trip System Response Time -

The time interval from when the monitored parameter exceeds its trip setpoint at the channel sensor until loss of stationary gripper coil voltage.

Realign-

To return to a pre-existing condition or status, or change to an alternate alignment. E.g., realign the Safety Injection system for hot leg injection.

Record -

To preserve an account of, usually by documenting in a written or computerized log, or on an instrument chart.

Recovery -

The actions taken to restore control following an unplanned event. In the ERGs, recovery implies establishing operator control over plant processes and taking the plant to a stable and safe end state.

Redundant -

Equipment that independently duplicates the essential function of other equipment for the purposes of reliability and safety.

Reevaluation-

To make a separate and often independent appraisal of a prior determination, conclusion or condition, e.g., reevaluate the need to reduce Tave to mitigate steam generator tube corrosion.

Release -

The discharge of a contained material to the environment. Examples of releases are steam from the main steam safety valves, heat from the condenser to the lake, and radioactive waste which is shipped offsite for processing.

Remote -

Distant from the place at which it is being sensed and/or controlled, as distinct from local indication and control.

Remove From Service-

To make inoperable. When referring to systems, usually includes mechanical and electrical isolations from other systems via valve closures and breaker alignments for the purpose of maintenance or periodic testing.

Repair-

To fix or otherwise make operable through maintenance, but falling short of restoring the item to its original quality specifications, e.g., sleeving steam generator tubes to prevent primary to secondary leakage.

Replacement-

The substitution of an identical or functionally equivalent component of equal or better specifications, for another, usually failed component. Care must be exercised when determining equivalence to include such factors as equipment qualification.

Reportable Event -

Any event which results in the violation of a plant design basis. Specifically, any of those conditions specified in the Code of Federal Regulations, License Conditions and Technical Specifications.

Reset-

To initialize a function by rearming a circuit which has actuated, e.g., reset the condenser hot well low level alarm or, reset the safety injection actuation signal.

Restore/Restoration -

To return to a former or normal condition. In the ERGs, restoration implies establishing operator control over plant processes and returning the plant state to one in which the Critical Safety Functions are satisfied.

Running -

In operation.

Rupture -

To break apart or burst a pressure boundary, usually with the release of a contained fluid.

Safeguards Loads -

The safeguards equipment powered from the ac emergency busses, and which must be powered by the diesel generators if their normal power source is lost.

Safety Injection -

The addition of borated water to the reactor coolant system to ensure that the RCS Inventory and Core Cooling safety functions can be maintained and to assist in the continued accomplishment of the subcriticality safety function.

Safety Related-

Of significance or importance because it applies to structures, systems or components assigned to a safety class. See ANS 50.

Safety Valve -

A self-actuated valve installed to protect systems and components from an internal pressure in excess of their design pressure.

Sample -

A quantity of material taken for the purposes of analysis or examination.

Seal -

A barrier to control or prevent the passage of fluids or contaminants, between separated volumes.

Seal Injection (RCP) -

The relatively clean and cool charging flow diverted to the reactor coolant pumps for the purpose of prolonging the pump seals' life by replacing reactor coolant as the fluid used for controlled bleedoff to cool and lubricate the seals.

Secure-

To seal or make safe, e.g., secure the fire door. Also, to remove from service, or stop an evolution, e.g., secure letdown flow from the RCS.

Seismic Event -

Earth tremor or earthquake.

*Sequencer -

An electrical or mechanical device which energizes separate pieces of equipment in a preprogrammed order and at set time intervals. For example: The group of timers that control the order of connection of safeguards loads onto an ac emergency bus following the loss of the bus's normal power supply and connection to an operating diesel generator.

Service Air (Plant Air) -

The high pressure air system used for maintenance operations. The system providing such air, which also can serve as a backup for the control air system.

Serving Safety Related Equipment-

Supporting the operation or operability of safety related equipment, e.g., Essential Service Water, and Component Cooling Water.

Setpoint-

A predetermined constant usually expressed in engineering units at which an automatic action is taken, or about which a process is controlled.

Shutdown -

A plant condition in which (1) the reactor is subcritical with a Keff of less that 0.99, (2) the reactor is at 0% rated thermal power, and (3) the RCS average coolant temperature is less than 350°F. The process of placing the plant in such a condition from power operation.

Shutdown Margin -

The instantaneous amount of reactivity by which the reactor is or would be subcritical from its present condition assuming all full length rod cluster assemblies (shutdown and control) are fully inserted except for the single rod cluster assembly of highest reactivity worth whch is assumed to be fully withdrawn.

Simulated -

A controlled variation of an input signal representing changing plant conditions introduced, for testing purposes, in place of the normal signal input to an instrumentation channel.

*Single Failure -

A random failure and its consequential effects, that result in the loss of capability of a component to perform its intended nuclear safety function(s).

Site Boundary -

That line beyond which the land is neither owned, leased, nor otherwise controlled by the licensee.

Solidification -

The conversion of radioactive liquid, resin and sludge wastes into a stable, compact form, with limited activity per unit volume, that meets shipping and burial site requirements.

Solution-

The answer to a problem, or a homogeneous fluid mixture containing dissolved substances, e.g., boric acid solution.

Source-

A fluid reservoir, electrical feed, or other storage or generating system which supplies the needs of a user. Also a term used to describe a quantity of radioactive material, e.g., radioactive calibration source.

Source Check -

A qualitative assessment of a channel response when the channel sensor is exposed to a radioactive source.

Span-

The calibrated range over which an instrument will accurately perform its intended function.

Spurious -

An unintentional action, usually caused by an erroneous signal of short duration. For example, an alarm for an out-of-limits condition which has not actually occurred, or a reactor trip when the conditions requiring one are not present.

Stable -

Operating within the normal control band and/or controllable within a desired range.

Staggered Test Basis -

a. A test schedule for n systems, subsystems, trains or other designated components obtained by dividing the specified test interval into n equal subintervals,

b. The testing of one system, subsystem, train or other designated component at the beginning of each subinterval.

Start -

To initiate an action.

Steady State-

An operating condition in which the major plant processes are functioning such that power output is constant. When using this term as an initial condition to a test or evolution, a tolerance should be provided defining what variations in power are acceptable.

Subsequent Failures-

For surveillance testing, subsequent failures are additional failures within a predetermined sample of components already shown to contain failures, e.g., snubber testing.

Subsystem -

A portion of a system which by itself performs a particular function.

Suitable-

Qualified in every way. A suitable replacement is one that is not only functionally equivalent, but is also certified to the same level of quality.

Support Equipment -

Components, systems or subsystems that assist a structure, system or component to perform its design function(s). Such equipment may or may not be required for the performance of any (or all) of the design safety function(s); e.g., a local pressure gauge may be used for a performance test, but not for actual operation of a pump.

Survey-

To make measurements of a given parameter at several locations, e.g., radiation survey or temperature survey.

Suspend -

To stop temporarily until some condition has been satisfied.

Symptoms-

Indicators of an overall condition that can be used to perform a diagnosis of that condition; e.g., symptoms such as locally depressed neutron flux and a corresponding low core exit thermocouple reading may indicate a broken and dropped control rod pin.

System -

An integrated set of components and/or structures that perform a specific function or set of functions.

Systematic-

Not random. Methodical in approach. In general, affecting the whole system. A term used to differentiate systematic errors such as thermal offset or bias from random errors such as electronic noise which can cause loss of repeatability.

Target Band-

The predetermined range within which the reactor core Axial Flux Difference is to be maintained.

Test -

To determine the performance characteristics or operational readiness of a component, system, or subsystem under controlled conditions.

Testable -

Capable of being tested without interfering significantly with the normal and safe operation of the plant.

Thermal Power -

The total reactor core heat transfer rate to the reactor coolant.

Thermal Shock -

The stress produced in thick-walled components by a sudden large temperature change.

Throttle -

Controlling of a valve at an intermediate position so as to restrict the passage of fluid to a certain flow rate or pressure drop.

Time Delay-

The period of time between the demand for an action and its actual occurrence. The diesel generator sequencer has programmed time delays which determine when a given safety-related load is connected to the bus.

Total Flow-

Summation of flow into all paths, including pump miniflow. For pump performance measurements, it is important to determine the total flow

including miniflow and leakage paths, as well as discharge paths, for comparison with the pump curve.

Train -

One set (channel, system, or subsystem) of redundant equipment; each such set being capable of providing the design function by itself, assuming a failure in the other set(s).

Transient-

A departure from steady-state conditions caused by a system perturbation; e.g., closure of a MSIV at power will cause a pressure transient in its associated steam line and steam generator.

Trip -

The opening of a contact to interrupt power to a component. The initiating action may be automatic or manual, and the trip mechanism electrical and/or mechanical. Examples of trip mechanisms are circuit breakers, relays, and governors.

Try -

To attempt to accomplish an action, making a continued effort if success is not immediately obtained.

Uncontrolled -

Not managed or guided properly by manual or automatic actions.

Unidentified Leakage -

All leakage which is not identified leakage or controlled leakage.

Uniform-

Equal throughout; e.g., a uniform RCS boron concentration is one where the pressurizer concentration and loop concentrations are the same.

Unrestricted Area -

Any area at or beyond the site boundary to which access is not controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials or any area within the site boundary used for residential quarters or industrial, commercial, institutional and/or recreational purposes.

Unreviewed Safety Question -

"A proposed change, test, or experiment shall be deemed to involve an unreviewed safety question (i) if the probability of occurrence or the

consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report may be increased; or (ii) if a possibility for an accident or malfunction of a different type than any evaluated previously in the safety analysis report may be created; or (iii) if the margin of safety as defined in the basis for any technical specification is reduced." 10 CFR 50.59(a)(2).

Untrippable-

In reference to a control rod, a condition caused by a mechanical or electrical defect which prevents tripping of the control rod into the reactor core.

Venting -

The controlled process of providing an opening for the escape of a gas or liquid, usually for the control of pressure in a confined area, but also to allow temperature, humidity, and concentration or other operating conditions an opportunity to equalize with the ambient atmosphere.

Verify -

To demonstrate that an established condition exists and documented in writing.

Visual Inspection-

A planned assessment or appraisal of a condition which is performed by direct observation.

Wide Range-

The term used to differentiate instrument loops which sense a relatively wide range (usually the range of possible values) of a process variable, e.g., wide range steam generator level or wide range RCS cold leg temperature.

Without Delay -

An imperative form of "immediately," implying before doing anything else.

ATTACHMENT 2 TO AEP:NRC:0950A

RESUMES OF IMPELL CORPORATION AND
COMBUSTION ENGINEERING STAFF

STUART A. WEBSTER

EDUCATION

B.S. in Chemical Engineering
Rensselear Polytechnic Institute,

Masters in Business Adminstration
University of Hartford, 1970

Juris Doctor
University of Connecticut, 1977

SUMMARY OF QUALIFICATIONS

Mr. Webster serves as a consultant in the Technical Support Services Department in the preparation, improvement and defense of the technical specifications for C-E plants. He has developed the procedures for assembly and certification of Technical Specifications for near-term operating license plants and conducted these engineering efforts for the Waterford Unit 3 plant. He has served as consultant on more recent efforts for Palo Verde and San Onofre. He has also administered the Chapter 15 accident analysis for the St. Lucie Unit 2 plant. He has 18 years experience in the nuclear industry and an additional 5 years of industry experience. Mr. Webster is also an attorney.

EXPERIENCE

Mr. Webster is presently a lead engineer in the Technical Specifications Service Group in the Operating Plant Systems Section at Combustion Engineering. Mr. Webster serves as task leader and consultant on programs for the development and improvement of technical specifications for operating and near-term operating license plants. He directs other engineers in the conduct of analyses for upgrades for technical specifications and develops methodology for their development, standardization, certification and amendment. He is a consultant to the C-E Owners Group Technical Specification Subcommittee, a member of the Atomic Industrial Forum's Subcommittee on Technical Specification Improvement, and chairman of the ANSI/ANS 58.4 standard's revision working group.

Mr. Webster earlier had responsibility for the development of the Waterford Unit 3 technical specifications, and developed the methods used

EXPERIENCE (Con't)

for their assembly and certification. He has served as a consultant to other engineers for similar efforts for Palo Verde and C-E's CESSAR standard plant technical specifications, as well as for the assembly of license amendment submittal (Sholly) packages for the reload report on San Onofre and other plants. Mr. Webster shared in the development of the design specifications for Combustion Engineering's computerized technical specification system: Technical Specification Monitoring Module.

Prior to this, Mr. Webster was a Senior Design Engineer in the Plant Systems Analysis and Evaluation Section. In this position, Mr. Webster was responsible for systems interaction studies in the safety analysis group. He prepared sequence of events analyses, event categorization and referability requirements for C-E's standard plant. As Plant Safety Analyst for the St. Lucie Unit 2 plant, he had adminstrative responsibility for the preparation, coordination and defense of the St. Lucie Unit 2 safety analysis; and for assembly of the accident analysis input to their technical specifications.

From 1970 to 1978, Mr. Webster held positions with increasing responsiblities in the Plant Engineering Department at C-E. He was adminstrative assistant to the department director. He was one of two individuals responsible for the development and implementation of a computerized budgeting and scheduling system throughout the nuclear engineering departments. He was also responsible for development of portions of C-E's standard engineering package for its System 80 generation of nuclear plants. He also participated in the development of the original version of C-E's quality assurance design manual; implementation of the Project Management System (PERT networks) for engineering work on the design and procurement phases of nuclear plant construction, and developed speciality computer programs for the department.

TECHNICAL PUBLICATIONS

W. R. Corcoran, S. A. Webster, J. C. Braun and D. R. Earles, "Verifying the Adequacy of Technical Specifications," Transactions of the American Nuclear Society 1982 Winter Meeting, 43:555-556, November 14-18, 1982.

D. J. Finnicum and S. A. Webster, "Vital Auxiliaries - The Underrated Events," Transactions of the American Nuclear Society Topical Meeting on Anticipated and Abnormal Transients in Light Water Reactors, 205-218, September 26-29, 1983.

G. F. Caruthers, S. A. Webster, W. R. Corcoran, M. D. Green and F. R. Nandy, "Increased Plant Availability Through Technical Specification Improvement," Transactions of the International Nuclear Power Plant Thermal Hydraulics and Operations Topical Meeting, Taipei, Taiwan, C7:1-6, October 22-24, 1984.

S. A. Webster and M. D. Green, "Changing Technical Specification Philosophy: Emphasis on Clear Requirements, " Transactions of the American Nuclear Society 1985 Annual Meeting, 49:303-304, June 9-13, 1985.

S. A. Webster and D. J. Finnicum, "The Impact of Technical Specification Surveillance Requirements and Allowable Outage Times on Plant Availability," American Society for Metals International Conference on Nuclear Plant Aging, Availability Factor and Reliability Analysis, San Diego, California, July 8-12, 1985.

S. A. Webster and S. E. Johnson, "Technical Specification Improvement," Transactions of the American Nuclear Society Winter Meeting, 50:405, November 10-14, 1985.

S. S. Webster, J. C. Braun and R. T. Pearce, "Guidelines for Writing User Friendly Technical Specifications," to be presented at the American Nuclear Society Topical Meeting on Human Factors in Nuclear Power Plants, Knoxville, Tennessee April 21-24, 1986.

Resume of Theodore A. Swanson

I. Professional Experience

A. 1980 - Present - Combustion Engineering, Inc., Nuclear Training Simulator Instructor. Integrated plant instructor. Conduct cold license, hot license and requalification training for RO and SRO licenses. Conduct startup certification exams.

B. 1978 - 1980 - General Electric Co., Installation and Service Engineering. Coordinated refueling on the BWR. Member of the nuclear field services. Taught boiling water reactor technology. Performed quality control procedures. Certified on BWR simulator.

C. 1972 - 1978 - Virginia Electric & Power Co. (Surry). SRO shift supervisor for (2) 800 Mwe units (Westinghouse). Coordinated (5) refuelings. Supervised initial startup and testing of unit #2.

D. 1967 - 1972 Wisconsin Michigan Power Co. (Point Beach). SRO Operating Supervisor (assistant shift supervisor) for (2) 500 Mwe units (Westinghouse). Attended 9 months of Westinghouse SRO training. Certified by the NRC at the Saxton Nuclear Station. Supervised the initial startup and testing of both Westinghouse units.

II. Military

A. 1965 - 67 - USS Francis Scott Key (SSBN 657) Reactor Control Division Leading Petty Officer

B. 1963 - 65 - USS Casimir Pulaski (SSBN-633) Reactor Control Division Leading Petty Officer

C. 1961 - 63 - USS Thomas A Edison (SSBN-610) Reactor Operator

D. 1959 - 61 - Nuclear Power Training Unit (S1C). Staff Instructor.

III. Licenses

A. 12/70 - Senior Reactor Operator, SOP 1434.

B. 9/75 - Senior Reactor Operator, SOP 1945.

Above licenses were on Westinghouse PWR.

James C. Zimmerman - Section Manager, Business Development Section

Education:

B.S. Nuclear Engineering - The University of Michigan - August, 1976

Experience:

11/76 - 06/77 - Employed by Combustion Engineering, Inc. Assigned to the Reliability and Safety Assurance Section of the Nuclear Safety Division. Responsible for the identification of generic deficiencies with CE Steam Supply Systems. Coordinated with plant engineering to resolve and implement solutions. Developed computerized data base (including software) to provide an automated problem identification system. Authored CE Topical Report on Reactor Coolant Pump Design and Performance.

06/77 - 10/77 - Employed by Combustion Engineering, Inc. Assigned to the Maine Yankee Atomic Power Station. Participant in an EPRI sponsered Limiting Factors Analysis Study. Responsible for plant operations analysis and computer software development in support of the study. Results were used to identify cost effective design change areas to improve plant availability and capacity factor.

10/77 - 03/78 - Employed by Combustion Engineering, Inc. Assigned to the Reliability and Safety Assurance Section of Nuclear Safety Division. Responsible for development of computer software designed to assimilate, sort and correlate commercial operating experience data for CE Steam Supply Systems.

03/78 - 04/78 - Employed by Combustion Engineering, Inc. Assigned to Calvert Cliffs Nuclear Power Station. Provided engineering supervision of technicians during the repair of fuel control rod guide tubes under refueling outage conditions.

04/78 - 04/79 - Employed by Combustion Engineering, Inc. Assigned to the Arkansas Nuclear One Unit Two Nuclear Power Plant. Was a shift test director for conduct of the hot functional and initial startup test programs. Individual test responsiblilities included: Emergency Feedwater, Control Rod Drive Mechanisms, Core Protection Calculator Response Times, Reactor Coolant System Thermal Expansion and Reactor Trip with Xenon follow testing.

04/79 - 04/80 - Employed by EDS Nuclear, Inc. Assigned to the Duane Arnold Energy Center. Responsible for the coordination and development of plant responses to corporate quality assurance and NRC audit findings. Also responsible for the technical investigation and preparation of written communciations for plant Licensee Event Reports, I&E Bulletins and Circulars. Performed surveillance testing on fire penetration sealing systems.

04/80 - 01/81 Employed by EDS Nuclear, Inc. Assigned to the Comanche Peak Steam Electric Station Spare Parts Task Force. Responsible for the specification of spare parts for all balance of plant valves and accessories. Also responsible for the supervision of two EDS engineers assigned to the Task Force.

01/81 - 01/82 Employed by EDS Nuclear, Inc. Assigned to the Comanche Peak Steam Electric Station. While working with the startup test organization, was responsible for the prerequisite testing of all drain channels of the liquid waste processing system. Authored preoperational test procedures for the waste evaporator package, reactor coolant drain tank system and the containment upper auxiliary crane.

01/82 - 06/82 Employed by EDS Nuclear, Inc. Assigned to the Comanche Peak Steam Electric Station. While working with the preoperational test organization, was responsible for development of testing procedures for the safety injection, centrifugal charging, accumulator tanks and engineered safety features systems. Was also responsible for development of the Containment Integrated Leak Rate Test program including data acquisition system specification and procurement, preoperational test procedure development, data analysis computer software design and test conduct supervision.

06/82 - 05/84 Employed by Impell Corporation. Assigned to the Comanche Peak Steam Electric Station. Transferred from the CPSES startup organization to plant operations and assumed responsibility for management of the Initial Startup Test Program. Supervised fifteen engineers who developed the various administrative and testing procedures as well as schedules for implementation of the post fuel load test program. Also responsible for the preparation of all safety evaluations associated with design transient testing procedures (10CFR50.59) and the maintenance of FSAR chapter 14 licensing changes. Developed a utility position document for submittal to ASLB to justify loading fuel under the 10CFR50.55e rule.

05/84 - 10/84 Employed by Impell Corporation. Assigned to the Comanche Peak Steam Electric Station. Assumed responsibility for the development of the integrated project schedule. Used Gilbert Commonwealth's CUE System scheduling software to update and analyze the progress of Unit 1 construction, startup and licensing activities. Presented the project schedule to the Director of Licensing, USNRC on behalf of the utility. Made verbal weekly reports to the utility executive management.

10/84 - 08/85 Employed by Impell Corporation. Assigned to the Comanche Peak Steam Electric Station. Directed the conduct of the Unit 1 second hot functional test program utilizing the resources and administrative procedures of the initial startup test group. Directed preservice thermal expansion testing of code piping supports and reactor coolant system shims. Managed the interface between the test group, plant operations, maintenance, and quality assurance organizations to resolve field problems.

08/85 - Present Employed by Impell Corporation. Assigned to the Chicago Regional Office. Am client manager for Detroit Edison Company, Illinois Power Company, Wisconsin Electric Power Company, American Electric Power Company, and Consumers Power Company. Responsible for marketing, project management, and administration of contracts.

Certifications:

None

Professional Affiliations:

Member American Nuclear Society

Member, ANSI/ANS 56.8 Committee "Containment System Leakage Testing Requirements"

Publications:

"Microcomputer Based Data Acquisition and Analysis Applications for Nuclear Power Plant Startup," presented at the 11th Biennial Conference on Reactor Operating Experience "Plant Startup and Operations in the 80's," August 1, 1983.

GARY A. WEBER

EDUCATION

B.S. in Electrical Engineering
University of Michigan, 1975

B.A. in Physics
Kalamazoo College, 1974

SUMMARY OF QUALIFICATIONS

Mr. Weber has extensive experience in the startup and operation of Westinghouse PWR NSSS plants including the D.C. Cook Nuclear Plant. He has designed process instrumentation and control systems including the integration and programming of microprocessor based data acquisition components. He has also been involved recently with the NUREG-0737, Supplement 1 issues of Safety Parameter Display Systems and Emergency Response Facility requirements. His experience has also included safety sequence analyses, instrument power failure modes and effects, equipment qualification studies and nuclear plant thermal performance analysis.

EXPERIENCE

Mr. Weber is presently Manager of Special Projects within Impell Corporation specializing in process instrumentation and control, systems analysis, startup and operations. He recently completed a Task Force assignment to audit the Grand Gulf Technical Specifications to ensure all plant specific desig features had been properly incorporated into the NSSS vendors standardized Technical Specification.

Mr. Weber has applied his systems background to real time computer system design for applications in nuclear and non-nuclear power generation facilities. Specific applications with which he is familiar include SCADA, plant process monitoring and control, and physical security. Recently, Mr. Weber played a principal role in Impell Corporation's development of Safety Parameter Display System (SPDS) and Plant Safety Status Monitoring concepts and technology for implementing NUREG 0696 Emergency Response Facility requirements.

Related work includes the conceptual design and planning and, subsequently, technical specifications
for an Emergency Response Facility Information System (including SPDS) at CP&L's Brunswick Station.

EXPERIENCE (Con't)

Mr. Weber is familiar with and has applied many different analytical techniques to electrical, I&C, and process systems. His work has included safety sequence analysis, system steady-state and transient analysis, instrument power failure mode and effects analysis, statistical error analysis, equipment qualification studies, radiation shielding studies, and plant thermal performance analysis. He has also had project engineering responsibilities for a major research effort to determine the response of power plant generation and auxiliary systems to grid electrical disturbances.

As a start-up engineer at the D.C. Cook Nuclear Plant, Mr. Weber has had field start-up and preoperational testing responsibilities. Included in this experience was the start-up and testing of D.C. Cook's emergency diesel generators, emergency electrical power system, emergency core cooling system, auxiliary feedwater system, and both nuclear and non-nuclear HVAC systems. Mr. Weber has directed major testing efforts, including several primary containment local and integrated leak rate tests, a full-scale ASME heat rate test, T_{avg} optimization tests, and main turbine-generator trip and transient tests. Involvement in these tests has included preparation of the test procedures, the design, installatio and start-up of microprocessor-based precision measurement and data acquisition systems, data evaluation, and reporting. One very unique test that Mr. Weber conducted involved the initial role of the D.C. Cook steam turbine generator during the startup phase of the second unit. In addition to conducting this test, Mr. Weber designed the steam flow control and test instrumentation system that controlled the diversion of steam from the Main Steam System associated with D.C. Cook Unit 1 to the turbine of the second unit.

Mr. Weber's operating experience was gained as a plant engineer at D.C. Cook, where he gained aworking knowledge of the plant staff organization and operating responsibilities. Mr. Weber's job required frequent interface with the Indiana and Michigan Power Company's Technical, Operations, Maintenance, and QA Departments, and working knowledge of department operating and administrative procedures.

EXPERIENCE (Con't)

Mr. Weber is experienced in the supervision of technicians and maintenance personnel in plant design change implementation, electrical and mechanical equipment maintenance, and in coordinating personnel in the set-up and performance of surveillance tests. He was responsible for test development and administration, compliance with required codes and standards, and test documentation.

As a D.C. Cook plant engineer, Mr. Weber was responsible for performance and vibration testing and analysis, plant thermal performance monitoring, and troubleshooting of process control and logic system problems. Mr. Weber was responsible for the development of FORTRAN programs on the plant's process computer to compute a daily index of plant thermal performance. He has led investigations of plant transient events and has been successful in improving plant protective system reliability. Mr. Weber's experience also includes field engineering during the construction phase of D.C. Cook, where he performed electrical integrity tests on cable insulation, terminations, small motors, low-voltage circuit breakers, and motor control centers. He also has had experience with protective relaying calculations and auxiliary electrical system load flow computer analysis.

REGISTRATIONS AND LICENSES

Professional Engineer, State of Michigan
Registration No. 27689

PUBLICATIONS AND PRESENTATIONS

"Nuclear Plant Response To Grid Electrical Disturbances", EPRI NP-2849, February 1983