Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690 - 0767

August 31, 1988

Mr. T. E. Murley
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC. 20555

Attn: Document Control Desk

Subject: Braidwood Unit 2
Environmental Qualification
Bunker Ramo Penetration
NRC Docket No. 50-457

Reference: (a) May 11, 1988, S.C. Hunsader letter to T.E. Murley
(b) Facility Operating License, NPF-77
(c) NUREG-1002, Safety Evaluation Report, Supplement #6, dated May, 1988

Dear Mr. Murley:

Reference (a) provided Commonwealth Edison's (Edison) latest in a series of submittals that supported a request for a temporary exemption from applicable parts of 10CFR 50.49. The exemption request had been made because Edison had not been successful in establishing the environmental qualification of the Bunker Ramo instrumentation penetration assembly to the NRC staff's satisfaction. In reference (a) Edison stated that we intended to continue our efforts to obtain documentation that supports the environmental qualification of this component.

In part 2.D of reference (b), the NRC staff granted a temporary exemption to 10CFR 50.49(f) and 10CFR 50.49(j). In part 2.D the following condition was included:

> "The exemption is required until startup following the Braidwood Unit 2 surveillance outage scheduled in January, 1989 prior to which time the unqualified Bunker Ramo containment penetration assemblies in question will have been qualified or replaced with ones which have been previously demonstrated to be qualified per the licensing criteria applicable to the facility."

A048
1/1

Section 3.11 of reference (b) provided the NRC staff's review of the submittals made in support of the environment qualification of the penetration assembly and the request for a temporary exemption. As a part of that review, the NRC staff indicated the additional information that was required to establish qualification. On page 3-6, the NRC staff stated:

> "The staff reviewed additional information, not available during the inspection and determined that environmental qualification of the Bunker Ramo assemblies had not been demonstrated. This review was focused on two major test programs, the Midland tests and the Braidwood tests. The test data was reviewed from the viewpoint of whether the penetration assemblies would perform their intended function during and after experiencing the harsh environment of a LOCA event. The test results do not establish acceptable IR readings since (1) one of the tests had numerous failures but included terminal blocks and (2) the Midland test failed to demonstrate acceptable IR during the test due to a lack of IR measurements (the time dependence of IR was not established).
>
> The staff views the Midland tests as a basis for evaluating operability of Braidwood Unit 2 configuration after 16 hours into a LOCA events. This restriction is due to the lack of performance information (i.e., IR Measurment) during the first 16 hours of the simulated event. (underline added) After this time, all measurements were found to be acceptable (i.e., 1.0 megaohm)."

In response to reference (c) and in accordance with the intention stated in reference (a), Edison is providing additional information that addresses the NRC concerns about "lack of performance information (i.e. IR measurement) during the first 16 hours of the simulated event." Attachment A provides the affidavit of Mr. Ray Perez, who was the individual who performed the Midland II environmental qualification test. This affidavit was previously provided to the NRC staff in a meeting held with the Nuclear Utility Group on Equipment Qualification on August 4, 1988. As indicated in the affidavit, a minimum of 40 insulation resistance (IR) readings were taken, per circuit, throughout the test. The affidavit indicates for the circuits with Raychem splice connections that values of greater than 1.0 megaohm were measured. The measurements had been taken to verify that flooding of the test chamber was not occurring, since that had been a problem in previous tests. As indicated in the affidavit, IR readings were taken covering the first 16 hours of the test. These included readings taken at or near the peak LOCA condition.

Edison believes that Attachment A provides the necessary documentation to address the "...lack of IR measurements..." concern. In Edison's judgement, the Midland II test report (Test Report #123-2201), coupled with the Ray Perez affidavit, establishes full qualification of the Bunker Ramo Penetration at Braidwood Unit 2. The Midland II test was performed subsequent to the test that became the basis for the Braidwood test report. Edison believes it resolves the questions about low IRs being caused by terminal blocks since it included both terminal blocks and splice connections and appropriate comparisons can be made of IR measurement results.

Attachment B provides a legal analysis that demonstrates the sufficiency of an affidavit for the purposes of satisfying environmental qualification requirements.

This information is being provided for NRC review and acceptance. In light of this new information and the basis for qualification that it provides, Edison believes that replacement of the penetrations at Braidwood Station Unit 2 is no longer necessary.

Since Unit 2 outage planning, will be affected by our decision regarding replacement, an expedited review by the NRC staff is requested.

Edison is willing to meet with the NRC staff to discuss this matter further. Please address any questions concerning this matter to this office.

Very truly yours,

S. C. Hunsader

S. C. Hunsader
Nuclear Licensing Administrator

SCH/klj

cc: S. Sands (NRR)
W. Forney (RIII)
Braidwood Resident Inspector
5056K

ATTACHMENT A

AFFIDAVIT OF RAYMOND PEREZ REGARDING ELECTRICAL PENETRATION ASSEMBLY TESTING

INTRODUCTION

I, Raymond Perez, being first duly sworn hereby depose and state as follows:

During calendar years 1977 and 1978 I worked as a consultant to Bunker Ramo Corporation, Amphenol SAMS Division, Chatsworth, California, in, among other things, qualification testing of electrical penetrations. (My professional qualifications are noted in Attachment 1.) I was involved substantially in the initial planning and development of the test program to qualify to IEEE 323-1974 the electrical penetration assemblies (EPA's) for the Midland Plant Units 1 & 2. I attended meetings with Amphenol and Bechtel Ann Arbor engineers and managers both in California and in Michigan regarding the planning and performance of these qualification tests. I witnessed or personally performed the functionability tests for this test program. Among other things, I developed data collection sheets, recorded data taken during the testing and reviewed data taken. At the conclusion of the testing I personally reviewed all the data taken and wrote the following test reports:

Test Report - Qualification Testing of Electrical Penetration Assemblies For Midland Plant Units 1 & 2 of the Consumer Power Company - Project 1003-3 August 1978

Test Report - Midland Supplementary II Qualification Testing of Electrical Penetration Assemblies For Midland Plant Units 1 & 2 of the Consumer Power Company - Project 1003-7 February 1979

On May 13, 1988, I was contacted by Malcolm Philips, Jr., an attorney in the Washington, D.C. law firm of Bishop, Cook, Purcell & Reynolds, and requested to provide information regarding the insulation resistance (IR) measurements taken during the LOCA exposure testing of the low voltage instrumentation electrical penetration assemblies. This affidavit is in response to that request.

SUMMARY AND CONCLUSIONS

During the initial preparation for LOCA testing, it became apparent that control of the steam/water environment was extremely difficult. Because of the test set-up, excessive water (and chemicals) in the chamber was a significant problem. This problem was reflected in, among other things, low IR readings. While significant moisture (and chemicals) usually resulted in lower IR values for circuits with terminal blocks, where "flooding" was present even circuits with splices (instead of terminal blocks) were significantly impacted.

By trial and error we refined our control of the test equipment to minimize "flooding" problems. However, we had no direct method of indicating water levels during testing. For the latter testing (Midland Supplementary II Qualification Testing), I devised informal criteria using IR readings to determine if "flooding" was present. For example, if IR values of circuits with splices were equal to or greater than 10^6 Ohms, I was fairly certain that there was no flooding.

(It should be noted that based on my experience with the earlier Midland tests, I was able to maintain values above 10^6 Ohms at peak temperature conditions as long as flooding was not present.)

In the early stages of the Supplementary II Test, IR readings were taken on a very frequent basis (approximately once every 1 to 2 hours). This was more frequent than required by the test plan, and was done as a check to know, among other things, the "flooding" status of the chamber. As the threat of flooding subsided in latter stages of the test, IR readings were taken less frequently -- eventually only once a day (consistent with the test plan). Accordingly, the total number of IR readings taken during the 30-day test were in excess of 40 for each circuit. Upon completion of the Test, I prepared the Test Report.

Based on, among other things, my direct observation of IR readings and my review of all IR data at the time I wrote the Midland Supplemental Test Report (Report #1003-7), I knew that we had successfully completed the LOCA testing, there was no evidence of flooding during the test, and all IR readings for circuits with Raychem splices were at least 10^6 Ohms, including during the early stages of the LOCA when the environmental conditions were the most severe. These IR values increased as the severity of the exposure environment decreased.

DISCUSSION

As background, the LOCA testing chambers for all the Midland testing consisted of two horizontal 10-foot long pipes (i.e., an 18 inch pipe standard (IPS) and a 12 IPS) stacked one upon the other which enclosed the EPA's being tested. These chambers were in turn housed in a cinder block concrete "block house" approximately 15-feet long and 10-feet wide, through which the steam inlet and chemical spray piping entered overhead and the drain pipes exited below. At the connection point of the piping to the chambers were a number of hand-controlled valves used to control temperature, pressure and chemical flow rate. There was very little working space between the cinder block wall and these valves. There was also very little room around the electrical connections on the EPA's which carried as much as 8800 volts and 600 amps. The IR readings were taken from these electrical connections.

The single most degrading factor in the LOCA exposure testing was the prolonged "immersion" of some of the cables and terminations in the chemical spray solution at elevated temperatures. During the early tests (i.e., the December 1977 test described in Project 1003-3 Test Report), substantial flooding of the LOCA chamber occurred due to excessive amounts of chemical spray (i.e., 25 gpm per square foot), insufficient drainage and inadequate control of the thermal hydraulic LOCA system (see NPD-1270, Attachment 2). This was evidenced by the low IR readings and, in the extreme, by excessive amounts

of fluid released to the floor by the steam traps and visual evidence of the liquid in the LOCA chambers after the testing. (No sight glass or direct monitoring of liquid level in the chamber was available.)

To provide perspective, simulation of a DBE LOCA event entails the control of significant quantities of fluid and thermal energy. Due to the non-steady state character of the initial blow-down and the requirement to maintain elevated temperature and pressure under pseudo-equilibrium conditions throughout the 30-day test period, a trade-off between sustaining elevated pressure through the introduction of steam, and minimization of flooding caused largely by the chemical spray had to be maintained. As a result of several impromptu meetings discussing possible solutions to the flooding problems, attempts were made to improve control of the thermal hydraulic system, including (1) the use of additional steam traps on the steam inlet side, which helped only minimally, and (2) the use of an electrically powered superheater, which was found to be ineffective.

During the subsequent testing (i.e., the October 1978 Midland Supplementary II Tests described in Project 1003-7 Test Report), the chemical spray was reduced to 0.25 gpm per square foot for the first 6 hours of the LOCA and then reduced to 0.15 gpm per square foot thereafter; additional drainage capacity was achieved by putting two pumps in series (not shown on the drawing); and better overall control of the LOCA

environment was maint ·ed. As a result, based on all evidence, no flooding occurred.

In order to monitor the possibility of flooding during the Midland Supplementary II Test, I used IR readings as criteria to detect flooding. For example, if readings on circuits with Raychem splices were at least 10^6 Ohms I had confidence that no sustained flooding was present. Again, based on my experience with previous Midland tests, I was able to maintain values above 10^6 Ohms at peak t··erature conditions as long as flooding was not present. (It should be noted that even excessive moisture alone, without flooding, usually caused immediate and significantly lower IR readings on circuits with terminal blocks.) Because there was no flooding during the duration of this test, the electrical and mechanical characteristics of the low voltage EPA's (LVEPA), during and after the LOCA were significantly enhanced over the initial tests (i.e., Test Report 1003-3).

Another factor which enhanced the IR values during the Supplementary II LOCA Test for the Module D 69#16 instrumentation LVEPA was the fact that the Raychem RFR in-line splice and epoxy termination were enclosed in the J-box (see NPD-1339, Attachment 3) on the inboard side of the LOCA chamber. This further reduced the effects of the direct chemical spray.

The wiring diagram (see NPD-1337, Attachment 4) shows the IR test connections for the Module D 69#16 instrumentation EPA. IR measurements were made using an HP4329A High Resistance Meter (see data sheet, Attachment 5) during the

functionability tests. Additionally, during the Midland Supplementary II tests a Simpson Model 270 VOM was used to make "quick look" IR measurements at random intervals (to check for flooding). During the Supplementary II tests, per the test plan, IR readings were taken eight hours into the LOCA and then once daily throughout the 30 day exposure. In addition, IR readings were taken much more frequently during the early stages of the test (on the order of every 1-2 hours) to check for "flooding" problems. The total number of IR readings taken during the LOCA test were in excess of 40 for each circuit. The readings were recorded on standard letter size forms which were submitted to Amphenol SAMS along with all the other supporting documentation and finished test reports.

During the testing I recorded virtually all of the IR data. Further, I discussed with others the data taken -- particularly with respect to the facts that (1) the data reflected that we did not have flooding in the chamber and (2) we had been able to maintain our expected electrical performance. At the conclusion of the testing I reviewed all data prior to writing the report. While I cannot remember the individual IR readings, I do know that all the IR readings for the Raychem circuits were at least 10^6 Ohms, a criterion used to determine if flooding was present.

I recently visited ANCO, Inc. in Los Angeles, California, to review remaining Amphenol files to determine whether any of the original data sheets were available. My thorough review

indicated that the data sheets were not in the files, and I have no knowledge of their location. However, two data points contained in a partial log-book referred to by Mano Aaron in Attachments to this affidavit support my clear recollection that no flooding occurred and all IR readings for Raychem splice circuits were equal to or above 10^6 Ohms. (The magnitude and time of these readings are reflected in the attached letters from ANCO Engineers Product Group, Inc., Attachments 6 and 7.) Additionally, no data regarding the Midland Supplemental test of which I am aware is contradictory to my clear recollection.

Raymond Perez

Subscribed and sworn to before me this 3rd day of August, 1988.

Notary Public

RAYMOND PEREZ

Education

B.S., Mechanical Engineering, UCLA, 1971
M.S., Nuclear Engineering, UCLA, 1974

Professional Registration

Mechanical Engineer - California No. 17525
New Mexico No. 9440
Washington No. 21743
Nuclear Engineer - California No. 784

Professional Areas

Qualification Testing
Mechanical Engineering
Nuclear Engineering
Digital Signal Processing
Data Acquisition Systems
Structural Dynamic Testing

Relevant Qualifications

Experienced in qualification testing of systems, structures, and components for nuclear applications;
Familiar with nuclear codes, standards and regulatory guides; and,
Experienced in the design, development and direction of complex nuclear equipment qualification programs for electrical utility systems, U.S. DOE Defense Programs, and the U.S. Navy.

Experience

1985 to present Westinghouse Electric Corporation, Sunnyvale, Ca.
Senior Engineer, Machinery Test Group, Marine Division. Responsible for qualification testing of marine propulsion and electrical generation machinery systems to U.S. Navy specifications.

Projects include:

Electrical Generation Systems for Trident Submarine and CVN Carrier Nuclear Power Plants.
Marine Propulsion Systems for MP-85 and MP-21 Prototype Nuclear Power Plants.
Marine Propulsion Systems for CG-47, LHD and other non-nuclear power plants.

1976 to 1985 Engineering Analysis and Test Company

President responsible for administrative and technical aspects of the firm's business. Responsible for the management of nuclear and mechanical engineering projects including the performance of equipment qualification programs; radioactive effluent dispersion analysis; safety and environmental impact analysis, etc.. Provided engineering consulting services to architectural engineers, equipment manufacturers, utilities and government agencies.

Projects included:

IEEE-317-1972 Qualification of Electrical Penetration Assemblies for Bunker Ramo Corporation, Amphenol SAMS Division, Chatsworth, California.

IEEE-323-1974 Qualification of Class 1E Electrical Equipment for Nuclear Power Generating Stations for:

- Bunker Ramo Corporation, Chatsworth, Ca.
- Powers Regulator Co.,Skokie, Illinois
- Comsip Inc., South El Monte, Ca.
- G & H Technology, Santa Monica, Ca.

IEEE-344-1975 Seismic Qualification of Class 1E Equipment For Nuclear Power Generating Stations for:

- Bunker Ramo Corporation, Chatsworth,Ca.
- Powers Regulator Company, Skokie, Illinois
- Custom Control Panels, Santa Fe Springs, Ca.
- Ronan Engineering Company, Los Angeles, Ca.
- Northwest Process, Seatle, Wa.
- Lawrence Livermore National Laboratory
- and others

ASME Section III Pressure Vessel Code Stress Report Preparation for:

- Bunker Ramo Corporation, Chatsworth, Ca.
- Amatek Division of Straza, Santa Fe Springs,Ca.

Nuclear Engineering Consulting including waste management studies, criticality and shielding analysis for:

- Bunker Ramo Corporation, Chatsworth, Ca.
- Garrett Corporation, Torrance, Ca.
- Atlantic Richfield Hanford Company, Wa.
- Allied Chemical Company, INEL, Idaho

1974 to 1976 — Applied Nucleonics Company, Los Angeles
Engineering consultant to architectural engineers, equipment manufacturers, and government agencies on nuclear projects;

Projects included:

Idaho Chemical Processing Plant, Idaho
Fuels and Materials Examination Facility, Wa.
High Level Waste Management Program Hanford, Wa
High Energy Gas Laser Facility LASL, N.M.
Humbolt Unit 3 - PG&E, Ca.
Calcine Conversion Facility, INEL, Idaho
Retrievable Surface Storage Facility, Hanford, Wa.

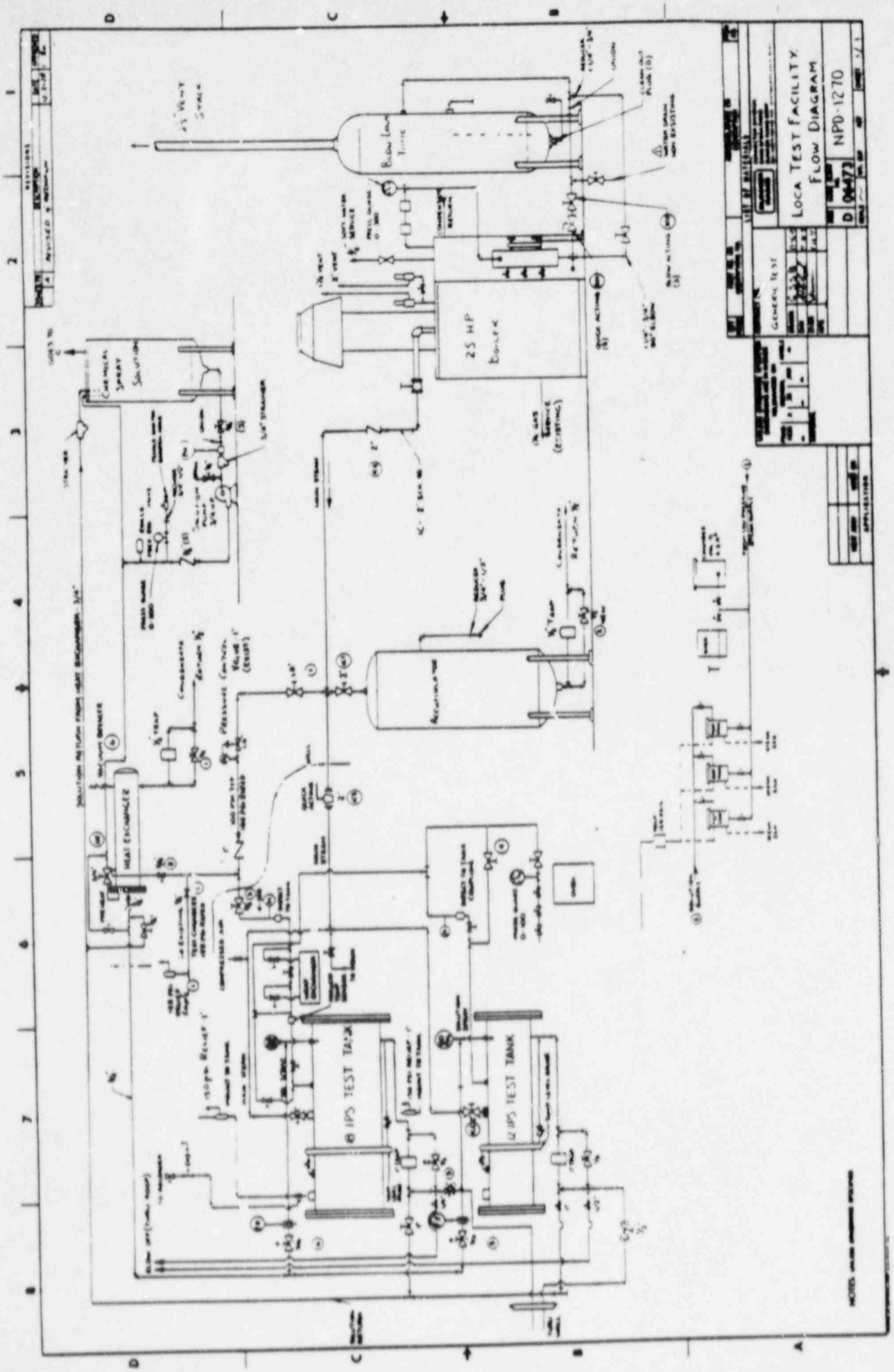
1972 to 1976 — Instructor, UCLA Engineering Extension
Responsible for the presentation of a three quarter sequence of classes in nuclear engineering covering nuclear physics, nuclear engineering technology, safety and environmental protection. This class sequence plus two electives satisfied the requirements for UCLA's Engineering Certificate Program and was attended by practicing engineers new to the nuclear industry.

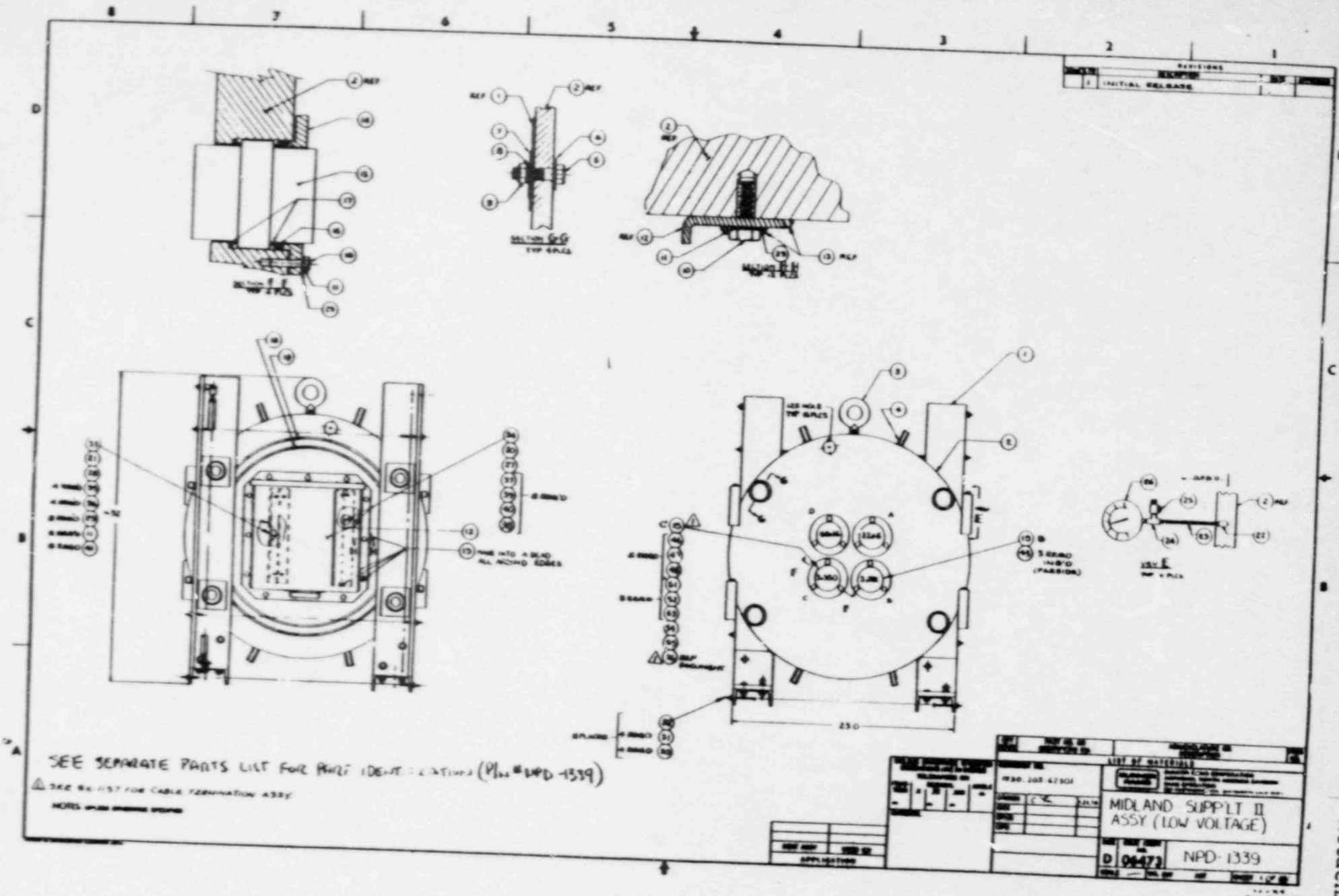
1972 to 1974 — Lecturer, Nuclear Energy Laboratory, UCLA
Subject matter dealt with nuclear safety and the environmental implications of nuclear systems. This position was part of an AEC Trainee Program which was national in scope and was funded and coordinated through the Oak Ridge National Laboratories. Participants conducted experimental nuclear engineering studies at ORNL.

1970 to 1972 — Research Assistant, Energy and Kinetics, UCLA
Conducted computer aided engineering studies involving fast reactor fuel element modeling; light water reactor, fast breeder reactor and nuclear materials environmental and safety analysis; performed experimental activation analysis, etc..

1967 to 1970 — Research Engineer, Microsemiconductor Corp, Ca
Thermo-chemical process technique development involving the use of highly toxic chemicals at temperature and pressure extremes.

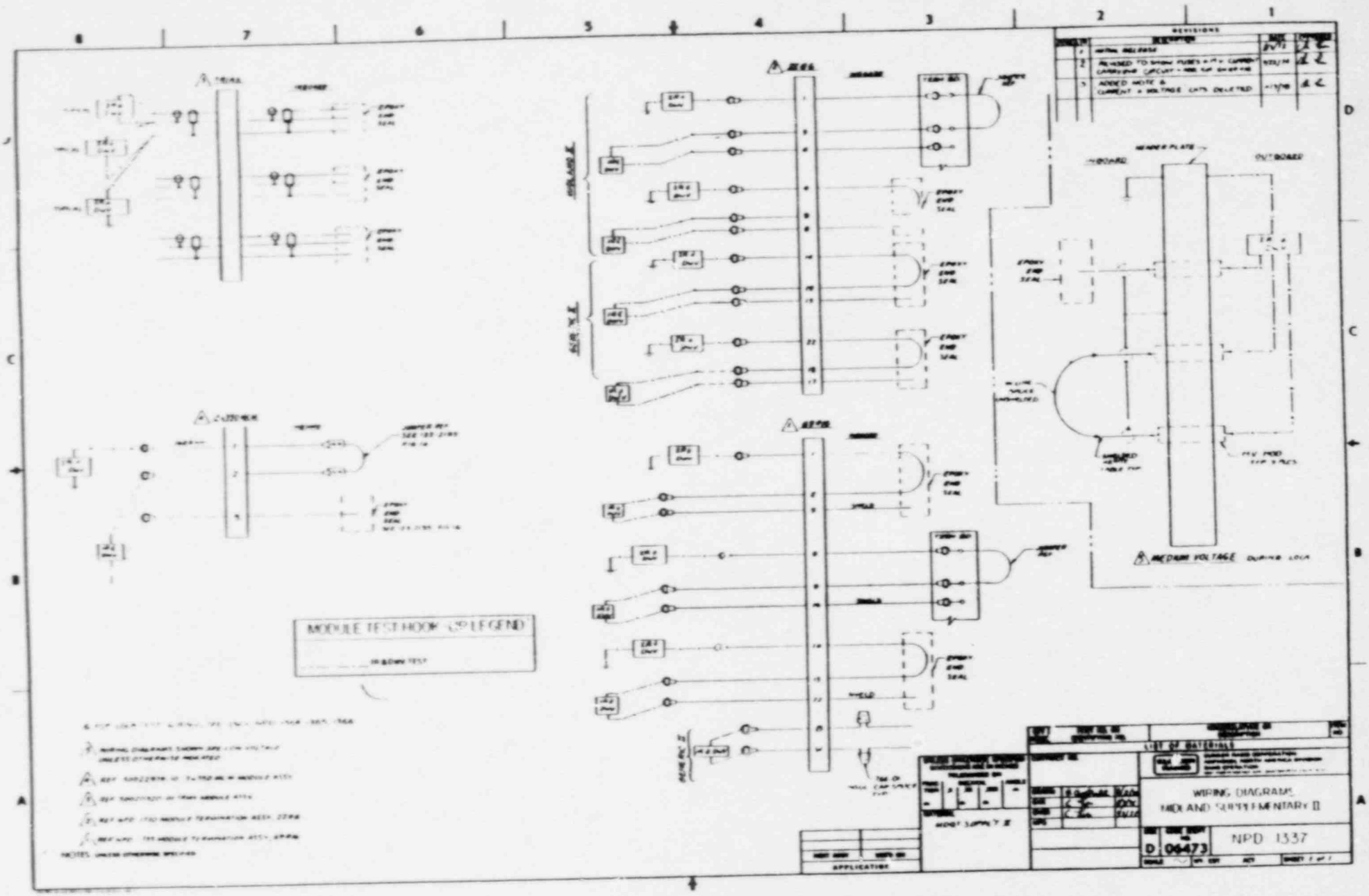
Attachment 2





Attachment 3

Attachment 4



COMPONENT & SEMICONDUCTOR MEASUREMENT

Milliohmmeter/High Resistance Meter

Model 4328A/4329A

225

- 20 µΩ resolution on 1 mΩ range
- Four terminal measurement
- Low test voltage

HP 4328A

Description

HP's 4328A Milliohmmeter is a high sensitivity portable instrument for measurement of low resistances. The 1 mΩ to 100 Ω measuring range and 20 µΩ resolution make the HP 4328A ideal for measuring the contact resistance of switches, relays, and connectors and the resistivity of conductors and semiconductors. Series reactances of up to twice the full scale resistance will not affect the accuracy. The maximum voltage across a sample, with the instrument at the proper range, is less than 200 µV peak. Even at incorrect range settings, the voltage across the sample will not exceed 20 mV peak.

The special probes that allow four-terminal measurement in two probes are furnished with the HP 4328A.

The basic HP 4328A is line operated but Opt 001 permits operation from rechargeable batteries for 15 continuous hours.

Specifications

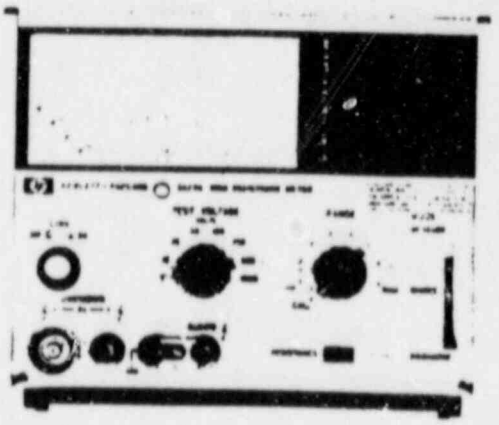
Range: 0.001 to 100 ohms full scale in a 1, 3 sequence.
Accuracy: ±2% of full scale. No additional error is caused by series reactance of samples up to two times full scale.
Measuring frequency: 1000 Hz ±100 Hz.
Voltage across sample: 200 µV peak at full scale.
Maximum voltage across sample: 20 mV peak.
Superimposed dc: 150 V dc maximum (external source).
Recorder output: 0.1 V dc output at full scale, output resistance approx. 1 kΩ.
Applied current (mA): constant by range, 150/(full scale value in milliohms).

General

Power requirements: 115/230 V ±10%, 50 to 60 Hz, 1.5 VA.
Weight: 3.2 kg (7 lb).
Size: 155 mm H x 130 mm W x 280 mm D (6⅛" x 5⅛" x 11").
Accessories furnished: HP 16005A Probe, HP 16006A Probe, HP 16007A/B Test Leads and HP 16143A Probe Cable.

Ordering Information	Price
HP 4328A Milliohmmeter	$1470
Opt 001: Rechargeable battery operation	$90
Opt 910: extra manual	$15

- Wide range: 500 kΩ to 2 × 10^{16} Ω
- Selectable test voltages: 10 V to 1000 V



HP 4329A

Description

The HP 4329A is a solid-state insulation resistance meter designed for easy, accurate and direct readings of the very high resistance values typically found in synthetic resins, porcelain, insulating oils and similar materials. It is also useful for measurements in electrical components such as capacitors, transformers, switches and cables. Seven fully regulated dc test voltages (between 10 and 1000 Vdc) are provided as test sources.

The HP 4329A is instantly convertible from ungrounded-to-grounded-sample operation via a simple relocation of the front panel ground strap from "guard" to "+" position.

The HP 4329A also has a current measurement capability. Minute currents as low as 0.05 pA can be readily measured.

The HP 16008A Resistivity Cell, designed for use with the HP 4329A, can safely, rapidly and conveniently measure the volume and surface resistivity of sheet insulation materials (maximum sample size: 125 mm W x 125 mm D x 7 mm H).

Specifications

Resistance Measurement

Range: 500 kΩ to 2 × 10^{14} Ω. (Depends on the test voltage).
Accuracy: total accuracy is determined by test voltage and range used. At low resistance end of each scale, accuracy is ±3%, near center scale ±5%, and near the specified upper limit on the meter scale (a quarter of full scale), accuracy is ±10%. Accuracy is not specified above these limits. On all voltage ranges, if multiplier is set to Rmax., an additional ±3% is included.
Test voltages: 10 V, 25 V, 50 V, 100 V, 250 V, 500 V and 1000 V ±3%.

Current Measurement

Range: 5 × 10^{-14} to 2 × 10^{-3} A in 8 ranges.
Accuracy: ±5% of full scale deflection (there can be an additional ±3% error at the top decade).

General

Recorder output: 0 to 100 mV dc, proportional to meter deflection; 1 kΩ output resistance.
Power: 115/230 V ±10%, 50-60 Hz, approximately 3 VA.
Size: 155 mm H x 198 mm W x 204 mm D (6⅛" x 7¹³/₃₂" x 8¹³/₃₂").
Weight: 3.5 kg (7.7 lb).
Accessory furnished: HP 16117A Low Noise Test Leads.
Accessory available: HP 16008A Resistivity Cell.

Ordering Information	Price
HP 16008A Resistivity cell	$755
HP 4329A High resistance meter	$1985
Opt 910: extra manual	$15

ANCO ENGINEERS
PRODUCTS GROUP, INC.

ATTACHMENT 6

ANCO

Telex 182378 Cable ANCOENG

9937 Jefferson Boulevard
Culver City
California 90232-3591
(213) 204-5050

March 11, 1988

Sargent and Lundy Engineers
55 Monroe Street
Chicago, Illinois 60602

Attention: D.P. Galanis

Subject: (1) Bunker Ramo Report 123-2201, Rev. A

Reference: (1) Minimum Insulation Resistance Value of #16AWG Twisted Pair Shielded and Triax Module Instrumentation Penetration

(2) Sargent & Lundy P.O. 47141.

Dear Dean:

Based on review of the test log and an examination of the actual test specimen of the referenced test report, the following information is provided regarding (a) the test specimen configuration and (b) the insulation resistance values recorded periodically during the LOCA for the #16AWG - twisted pair shielded instrumentation module pigtail assembly:

Date	L.V. EPA Modules	Page No.	IR Values in ohms During LOCA	
10-25-78	#16AWG-TPS	4	1.5×10^6	Conductor to conductor (Note 1)
			1.0×10^6	Conductor to ground (Note 1)
			4.2×10^3	Conductor to conductor (Note 2)
			7.2×10^3	Conductor to ground (Note 2)
10-27-78	#16AWG-TPS	7	4.7×10^6	Conductor to conductor (Note 1)
			3.6×10^6	Conductor to ground (Note 1)
			1.6×10^5	Conductor to conductor (Note 2)
			1.8×10^5	Conductor to ground (Note 2)

Note 1: Module pigtail conductors within the containment included intermediate splices insulated with Raychem RFR tubing and end terminations to epoxy end seals. Outboard pigtails were terminated on terminal blocks.

Note 2: Module pigtail conductors within the containment included intermediate splices insulated with Raychem RFR tubing and end terminations to terminal blocks. Outboard pigtails were terminated on terminal blocks.

Sargent & Lundy
11 March 88

Please note that the Raychem RFR tubing does not provide an environmental seal to the splices.

Robert E. Godfrey
for ANCO Engineers Products Group, Inc.

Concurrence:

Manoharan Aaron
for ANCO Engineers Products Group, Inc.

ATTACHMENT 7

ANCO
ENGINEERS,
INC.

ANCO

Telex
182378

Telefax
(213) 202-6085

9937 Jefferson Boulevard
Culver City
California 90232-3591
(213) 204-5050

Job No. 101200

21 March 1988

SARGENT & LUNDY ENGINEERS
55 Monroe Street
Chicago, Illinois 60602

Attention: Dean Galanis

Subject: IR Values, Temperature Measurements during Midland II LOCA Test.

Dear Mr. Galanis:

Referencing our letter to your attention dated 3/'1/88, your question on the temperatures during which the IR values were measured is answered as follows:

> Review of the temperature chart records for the LOCA test shows that during the entire day of 10/25/78 and the entire day of 10/27/78, the temperature was constant at 200°-250° F except for 4 very short (less than 5 minutes) drops to 175°-220° F. The Midland II LOCA log book shows that the IR measurements were taken sometime between 3:12 am and the end of the day on 10/25/78. From Mano Aaron's recall, it was probably done prior to 7:00 am. From 12:00 am to 7:00 am, the temperature range of 200°-250°F was held without any drops. In addition, assuming from the logbook that the LOCA test started 10/24/78 @11:02 am, these IR measurements on 10/25/78 were 16.25-20 hrs into the test.
>
> The logbook specifically notes that the IR values on 10/27/78 were measured at 10:00 am. At this time, the temperature range was 200°-250° F. Assuming a start time as above, these measurements were made 71 hours into the LOCA test.

Very truly yours,

John C. Stoessel

John Stoessel
Vice President - QA

JS/fg

ATTACHMENT B

SUFFICIENCY OF AN AFFIDAVIT FOR PURPOSES OF SATISFYING ENVIRONMENTAL QUALIFICATION REQUIREMENTS

INTRODUCTION

This memorandum addresses the issue of whether information attested to in an affidavit should be considered by the NRC Staff in its determination of whether a licensee has provided reasonable assurance that equipment is environmentally qualified. This issue arose during the August 4, 1988 meeting with the NRC Staff pertaining to Bunker Ramo penetrations.

SUMMARY AND CONCLUSION

NRC case law clearly shows that an affidavit may provide an evidentiary basis for establishing environmental qualification requirements. Indeed, both NRC and federal court practice recognize the admissibility and utility of affidavits, especially where primary evidence is inadvertently lost or destroyed. Because an affidavit contains the affiant's sworn testimony, the Staff must consider it to be probative evidence of qualification, weighing it with other evidence of record, unless circumstances suggest that the underlying data has been intentionally destroyed.

DISCUSSION

In various proceedings where equipment qualification has been an issue, the Atomic Safety and Licensing Board has admitted -- and even requested -- affidavits as part of the evidentiary record on whether equipment is environmentally qualified. Thus,

faced with the contention that Georgia Power had failed to assure that certain models of solenoid valves used to perform safety-related functions at the Vogtle plant were environmentally qualified, the Board in Georgia Power Co. (Vogtle Electric Generating Plant, Units 1 and 2), 24 NRC 901 (1986), requested the Company to submit information, in affidavit form, that would provide assurance that the valves had been satisfactorily qualified. Specifically, the Board asked for information about the accuracy and adequacy of temperature margins (differences between qualification test temperatures and anticipated post-accident temperatures at Vogtle) for three models of the valves, and subsequently admitted the affidavits into the evidentiary record. 24 N.R.C. at 923 (1986). The Staff also provided an affidavit responding to the Board's concerns. Id. at 924.

These affidavits described the method of measurement for the qualification test temperatures, and stated the affiants' conclusions regarding the testing results. The information in the affidavits "satisfie[d] the Board's uncertainty about the credibility of the temperature margins" stated in hearing testimony. 24 NRC at 926. "The affidavits of Applicants and the Staff convince us that temperature margins and uncertainties are acceptable and appropriate. . . . "Id. at 928. Thus, the Board accepted the affidavits as sufficient evidence regarding the qualification of safety-related equipment.[1]

1/ Of course, the Board accepts affidavits as proof of performance of requirements other than qualification
(Footnote 1 continued on next page.)

Similarly, in Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-891, 27 N.R.C. 341 (1988), the issue was whether, as the applicants argued, a mere memorandum in the file memorializing a telephone conversation provided an adequate evidentiary basis for establishing the environmental qualification requirements for coaxial cable used for data transmission at Seabrook. The memorandum concerned the color-coding of electrical cable used at Seabrook, and the applicants argued that it showed that the Seabrook coaxial RG58 cable served no function in the mitigation of the consequences of an accident and, accordingly, need only withstand an adverse environment to the extent necessary to ensure that the cable did not compromise the safety function of other components. They further argued that the results of a high potential test performed on RG59 cable demonstrated that the RG58 met that standard. 27 NRC at 344-45.

Intervenors contested that claim, but the Staff supplied the Board with an affidavit supporting the applicants' argument sponsored by Harold Walker, who had served as a Staff witness on the environmental qualification issue during an earlier portion of the case. In his affidavit, Mr. Walker adopted the applicants' thesis that the RG58 cable performed no accident mitigation function, and referred to the telephone conversation

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(Footnote 1 continued from previous page.)
requirements. E.g., Commonwealth Edison Co., 23 N.R.C. 414, 457 (1986) (affidavits found to "establish convincingly" that Commonwealth Edison had performed substantial and timely audits of the installation of small-bore instrumentation and piping process).

that the applicants offered in support of that thesis. Id. at 345.[2] Also relying on the memorandum of the telephone conversation (and alluding to the Walker affidavit), the Licensing Board concluded that the evidence adequately established full environmental qualification of the cable. Id. at 346.

The Atomic Safety and Licensing Appeal Board, while holding that the Licensing Board had erred in relying on the memorandum to establish environmental qualification because of its vagueness,[3] indicated that the applicants could have had the memorandum sponsored by one of the participants in the telephone conversation who would be in a position to attest that the RG58 cable was in fact within the scope of the memorandum, and to explain the basis for representations made in the memorandum regarding the color-coding scheme. Id. at 351. 27 NRC at 349-51. The Appeal Board in essence suggested that had the applicant submitted the affidavit of a witness with the requisite familiarity with the telephone conversation to eliminate doubt respecting the scope of the discussion of color-coding for

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2/ The Appeal Board points out that the Staff, in its affidavit, had at least implicitly endorsed the use of the memorandum documenting the conversation to demonstrate qualification, 27 NRC at 347, but that without explanation, the Staff later changed its position to say that environmental qualification should instead be based on excerpts from the Seabrook FSAR. Id. at 347-48.

3/ The memorandum did not specifically mention RG58 cable and there was no explanation for the statement in the memorandum that certain color-coded electrical cable need only remain intact during and following an accident. 27 NRC at 347, 350.

identification purposes, qualification might have been established. Id. at 350. Remanding the issue to the Board, the Appeal Board said that "[a]ll new evidence on these questions . . . must be sponsored by a competent affiant or witness." Id. at 351-52. Like the decision of the Licensing Board in the Georgia Power proceeding, this decision indicates that an affidavit, without more, may provide sufficient evidence of aspects of qualification.[4]

In another context, the Atomic Safety and Licensing Board has determined that a witness' testimony recounting a particular event properly should be considered in a proceeding where a document known or alleged to have recorded the event is missing or has been destroyed. See Long Island Lighting Co., Docket No. 50-322-OL-3 (May 7, 1987) (that the original document was no longer in existence went to the weight the testimony was to be given, not to admissibility; because testimony is not independently supported does not mean it should be stricken). The NRC's practice in this regard comports with long-standing

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4/ Indeed, in an earlier portion of the case the Licensing Board had rested its conclusion that equipment qualification was established on a mere letter written by the cable vendor to Seabrook's Architect/Engineer that was in the EQ file. The Appeal Board, while not ruling out establishing qualification on such a basis, found that this letter made statements that seemed on their face clearly erroneous in light of other evidence in the record. 27 NRC at 343, 348. Likewise, the Appeal Board seems to suggest in this later stage of the case that it might have accepted the memorandum of the telephone conversation as probative evidence of qualification had other evidence in the record not been blatantly inconsistent. 27 NRC at 351.

federal practice allowing the admission of secondary evidence when better forms of evidence have been lost or destroyed. See 5 J. Weinstein and M. Berger, Weinstein's Evidence ¶ 1004(1) [01]-[02] (1983). Thus, federal practice would allow the admission of an affidavit describing test results in lieu of a report that has been inadvertently lost or destroyed. The weight given to it would depend on other conflicting or supporting evidence in the record.

THE INSTANT CASE

The Staff has before it an affidavit regarding IR readings taken during the supplemental testing of a Bunker Ramo penetration for Midland, sponsored by Raymond Perez, a reliable and competent witness. Mr. Perez's testimony (on a report that no longer exists) is supported by all existing data, and contradicted by none. In accordance with both NRC and federal court practice, the Staff should consider the affidavit as relevant evidence of qualification.