

**AEC DISTRIBUTION FOR PART 50 DOCKET MATERIAL  
(TEMPORARY FORM)**

CONTROL NO: 3656

<b>FROM:</b> Carolina Power & Light Co. Raleigh, N. C. 27602 J. A. Jones		<b>DATE OF DOC:</b> 6-4-73	<b>DATE REC'D</b> 6-4-73	<b>LTR</b> X	<b>MEMO</b>	<b>RPT</b>	<b>OTHER</b>
<b>TO:</b> Mr. O'Leary		<b>ORIG</b> 1 signed	<b>CC</b>	<b>OTHER</b>	<b>SENT AEC PDR</b> X <b>SENT LOCAL PDR</b> X		
<b>CLASS:</b> <u>U</u> PROP INFO		<b>INPUT</b>	<b>NO CYS REC'D</b> 40		<b>DOCKET NO:</b> 50-261		

**DESCRIPTION:**

Ltr re our 5-7-73 ltr.....requesting a 94% Thermal Power Authorization for the H. B. Robinson Unit 2.....

**ENCLOSURES:**

**Do Not Remove  
ACKNOWLEDGED**

**PLANT NAMES:** H. B. Robinson Unit 2

**FOR ACTION/INFORMATION**

6-6-73

AB

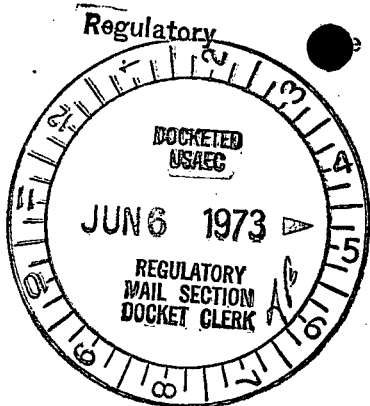
BUTLER(L) W/ Copies	SCHWENCER(L) W/ Copies	ZIEMANN(L) W/ Copies	YOUNGBLOOD(E) W/ Copies
CLARK(L) W/ Copies	STOLZ(L) W/ Copies	ROUSE(FM) W/ Copies	REGAN(E) W/ Copies
GOLLER(L) W/ Copies	VASSALLO(L) W/ Copies	DICKER(E) W/ Copies	W/ Copies
KNIEL(L) W/ Copies	✓ SCHEMEL(L) W/9 Copies	KNIGHTON(E) W/ Copies	W/ Copies

**INTERNAL DISTRIBUTION**

✓ REG FILE	TECH REVIEW	DENTON	F & M	WADE	E
✓ AEC PDR	HENDRIE	GRIMES	SMILEY	BROWN	E
✓ OGC, ROOM P-506A	SCHROEDER	GAMMILL	NUSSBAUMER	G. WILLIAMS	E
MUNTZING/STAFF	MACCARY	KASTNER		SHEPPARD	E
CASE	KNIGHT	BALLARD	LIC ASST.		
GIAMBUSSO	PAWLICKI	SPANGLER	SERVICE	L	A/T IND
BOYD	SHAO		WILSON	L	BRAITMAN
V. MOORE-L(BWR)	STELLO	ENVIRO	GOULBOURNE	L	SALTZMAN
DEYOUNG-L(PWR)	HOUSTON	MULLER	SMITH	L	
✓ SKOVHOLT-L	NOVAK	DICKER	GEARIN	L	PLANS
P. COLLINS	ROSS	KNIGHTON	DIGGS	L	MCDONALD
	IPPOLITO	YOUNGBLOOD	TEETS	L	DUBE
REG OPR	TEDESCO	REGAN	LEE	L	
✓ FILE & REGION(2)	LONG	PROJ LEADER	MAIGRET	L	INFO
MORRIS	LAINAS		SHAFFER	F & M	C. MILES
STEELE	BENAROYA	HARLESS			
	VOLLMER				

**EXTERNAL DISTRIBUTION**

✓ 1-LOCAL PDR Hartville, S. C.	(1)(2)(9)-NATIONAL LAB'S	1-PDR-SAN/LA/NY
✓ 1-DTIE(ABERNATHY)	1-R. CARROLL-C, GT-B227	1- GERALD LELLOUCHE
✓ 1-NSIC(BUCHANAN)	1- R. CATLIN,E-256-GT	BROOKHAVEN NAT. LAB
1-ASLB-YORE/SAYRE	1- CONSULTANT'S	1-AGMED(WALTER KOESTER,
WOODWARD/H ST.	NEWMARK/BLUME/AGABIAN	RM C-427, GT)
✓ 16-CYS ACRS HOLDING SENT TO LIC ASST,	1- GERLAD ULRIKSON....ORNL	1- RD...MULLER...F-309GT
S. Teets on 6-6-73		



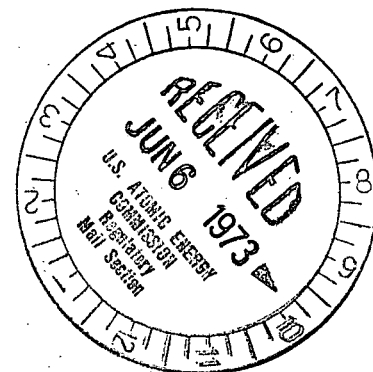
Cy.

**CP&L**

Carolina Power & Light Company

June 4, 1973

50-261



Mr. John F. O'Leary, Director  
Directorate of Reactor Licensing  
U. S. Atomic Energy Commission  
Washington, D. C. 20545

H. B. ROBINSON UNIT 2  
LICENSE DPR-23  
REQUEST FOR 94% THERMAL POWER AUTHORIZATION

Dear Mr. O'Leary:

The Commission's letter of May 7, 1973, restricted operation of the H. B. Robinson Plant to 75% of thermal power pending Regulatory Staff review of the fuel densification analysis submitted by Carolina Power & Light Company on April 20, 1973. It is our understanding that the Staff has favorably acted on the densification analysis submitted for the lead plant, Point Beach 1, and that Point Beach 1 has been licensed for 100% power.

As discussed with the Staff on May 31, the power reserves on the CP&L system are less than the 18% that is considered minimum from a power supply reliability standpoint. Weather to date has been mild; however, with the onset of summer, it is expected that system load will increase substantially in the immediate future.

Recognizing the favorable staff determination of fuel performance at Point Beach, and to help ensure continuity of reliable service to the public, it is requested that H. B. Robinson, Unit 2, be authorized to operate at a maximum thermal power of 94% pending final review of our densification report. It is proposed that such operation be in accordance with the Technical Specifications submitted April 20, 1973, with our densification analysis.

Your prompt attention to this matter will be appreciated.

Yours very truly,

J. A. Jones  
Executive Vice-President

JAJ:IG

9:35 am  
Rec'd 6/5/73  
Mr. Woodruff

June 4, 1973

Mr. John F. O'Leary, Director  
Directorate of Reactor Licensing  
U. S. Atomic Energy Commission  
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As discussed with the Staff on May 31, the power reserves on the CP&L system are less than the 15% that is considered minimum from a power supply reliability standpoint. Weather to date has been mild; however, with the onset of summer, it is expected that system load will increase substantially in the immediate future.

Recognizing the favorable staff determination of fuel performance at Point Beach, and to help ensure continuity of reliable service to the public, it is requested that H. B. Robinson, Unit 2, be authorized to operate at a maximum thermal power of 94% pending final review of our densification report. It is proposed that such operation be in accordance with the Technical Specifications submitted April 20, 1973, with our densification analysis.

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Yours very truly,

J. A. Jones  
Executive Vice-President

IAJ:IG

5-31-73.

TECHNICAL BACKGROUND ON R. E. ADAMSOak Ridge National Laboratory

- 1956-1958     Researcher: krypton and xenon adsorption by activated carbon;  
Homogeneous Reactor Project
- 1958-1960     Researcher: trapping of  $I_2$  by activated carbon and other  
materials; support for ORNL reactor projects
- 1960-1965     Researcher: Nuclear Ship SAVANNAH Project; iodine trapping  
studies, development of in-place testing techniques,  
application of technique in actual testing of SAVANNAH systems.
- Application of activated carbon in power reactor off-gas system
- Trapping of methyl iodide by impregnated activated carbons
- 1965-1970     Group Leader: Directed research on:
- Aerosol behavior
  - Aerosol filtration
  - Aerosol sampler development
  - Iodine sampler development
  - Methyl iodide formation
  - Methyl iodide trapping in reactor off-gas
  - Organic iodide trapping in fuel reprocessing plant off-gas
  - Ignition studies on activated carbon
  - Aging and weathering of activated carbons
  - In-place testing technique for carbon systems
  - Field studies of ORNL reactor off-gas systems

The purpose of my presentation is to trace the history of the application of activated carbon in the nuclear field for the trapping of radioactive iodine from off-gas streams. During the late 1950's it was recognized that, from a hazards standpoint, radioactive I-131 was to be the controlling isotope in gaseous discharges from nuclear plants. Prior to this period in time, periodic releases from fuel reprocessing plants were controlled by application of caustic scrubbers and silver reactors. These systems were not attractive for iodine control applications in nuclear reactor off-gas because of their specific operating characteristics. Consequently, an investigation was initiated by the AEC to evaluate the application of carbon filters for control of iodine releases. Early R&D efforts indicated that, under most conditions, activated carbon has a very high efficiency for trapping elemental iodine. Carbon filters were installed on off-gas systems of many AEC-owned reactors (Savannah River, Hanford, Brookhaven, Oak Ridge) and on off-gas systems of the Puerto Rico Research Reactor and the Nuclear Ship Savannah.

In the mid 1960's, as more investigators entered the iodine trapping field and as lab techniques became more sophisticated, it was discovered that I-131 could, and does, exist both as the element,  $I_2$ , and as an organic compound,  $CH_3I$ . This organic form of iodine could not be trapped efficiently under high humidity conditions by conventional activated carbon, even though this carbon was highly efficient for trapping elemental iodine under this condition. Further R&D produced the impregnated form of activated carbon which does trap methyl iodide by a mechanism quite different from that by which  $I_2$  is trapped.

#### SLIDE 1

Elemental iodine tends to form a bond with the carbon surface and is efficiently trapped with little interference by operating variables such as humidity, temperature, air velocity, etc. Methyl

iodide is trapped (or maybe a better word, decontaminated) by isotopic exchange where the radioactive I-131 atom of the methyl iodide molecule is exchanged with the I-127 molecule of the impregnant molecule. This trapping mechanism is sensitive to operating variables such as humidity, air velocity, contaminants adsorbed on the carbon surface, etc. I will discuss these effects shortly.

At this point in time, R&D was continuing to evaluate and substantiate the isotopic exchange mechanism while, at the same time, the first generation of large nuclear power reactors was under design and construction. The AEC directed that some of the lab effort be directed to obtain design data rather than additional evaluation of the trapping mechanism. Safety philosophy was concerned with the hazards of large accidents with release of radioactive iodine rather than with small releases during routine power operations. Consequently most of the R&D effort was consumed in looking at the processing of containment contents of PWR's following a DBA where conditions of high temperatures, high humidities, and high pressures would be present. The advent of containment spray technology served to reduce the experimental effort directed toward carbon trapping technology. Then, about 1970, the AEC chose to phase out practically all R&D on iodine trapping by carbon.

Now, I shall turn to the application of laboratory data to the design and operation of full-scale carbon systems for nuclear reactors. We know through lab studies that the trapping of elemental iodine is efficient under most operating conditions, while the trapping of methyl iodide is sensitive to operating conditions. Design is therefore carried out from the standpoint of methyl iodide trapping rather than I<sub>2</sub> trapping. The effect of air velocity can be handled through design; sufficient surface area and depth of carbon are provided to produce the desired residence time of 0.25 seconds. Provisions for controlling the relative humidity have been provided in some installations; for example, the heating coils contained in BWR Standby Gas

Treatment Systems. Generally, no provisions for humidity control are provided and a reduced value for efficiency is selected to compensate for the effects of high humidity operation. No special provisions are made to prevent the surface contamination of carbon by trace organics in the air being processed. This variable is handled by replacing the exposed carbon with new carbon when lab tests show that the methyl iodide efficiency has dropped below a preselected value.

Several types of carbon systems are currently in use; the principal types are:

1. Once-through systems operating continuously; such as those on AEC-owned reactors.
2. Once-through systems on standby for accident operation; such as BWR Standby Offgas Systems.
3. Once-through systems on standby for intermittent operation; such as those on fuel handling buildings and containment purge.
4. Recirculating systems on standby for use in PWR containment under accident conditions.

Design, construction, and operation of some carbon systems were concurrent with lab R&D. Some data exist for each type of application, but it is by no means comprehensive. So, under the circumstances, one is forced to use what data exist and extrapolate to the particular conditions of interest. In the absence of knowledge one tends to introduce safety factors for compensation. As an example, suppose that one is interested in determining the methyl iodide efficiency for a once-through, ambient temperature carbon system at various conditions of relative humidity - a collection of applicable published data from several investigators might look like this:

#### SLIDE 2

Some difficulty might be encountered in fitting the best line through these data points. But, to accomplish our objective one is forced to place such a line. With these, and other data,

a carbon system is designed, constructed, and placed into the service for which it is intended. Although the efficiency of the new carbon maybe known through lab tests, attention must be given, and tests applied, to demonstrate that the mechanical construction of the system is up to the applicable standards or specifications; no bypassing of air can be allowed if the integrity of the system is to be maintained. The basic operation of an inplace test is to introduce a test agent upstream of the carbon filter and secure samples both upstream and downstream for analysis; by comparing these quantities one can determine the presence or absence of leakage pathways. Three test agents are used for leak testing of carbon systems:

### SLIDE 3

Radioactive iodine is used at ORNL and at Hanford for inplace testing of iodine efficiency. Radioactive methyl iodide is used at ORNL for inplace testing of methyl iodide exchange trapping efficiencies. These test agents do provide somewhat of a quantitative indication of system efficiency. Data from ORNL and from Germany indicate that inplace tests using radioactive test agents tend to give higher results than lab tests on samples of carbon removed from the system. Nonradioactive Freon 112 is used as the test agent at Savannah River and at nuclear power stations. This test agent does not produce an efficiency value for the carbon - the value obtained is a measure of the freedom the system has from leakage pathways. Lab analysis of used carbon with radioactive  $I_2$  or  $CH_3I$  is the only way to obtain the true value of trapping efficiency.

It has been determined that impregnated carbons gradually suffer a loss of efficiency for methyl iodide trapping upon continued exposure to flowing air. The primary cause is thought to be the adsorption of trace organics from the flowing air. The efficiency for elemental iodine is also lost, but a much slower rate. Activated carbon maintains a high efficiency for  $I_2$  in continuous flow systems at ORNL and Savannah River for periods of 3 to 4 years.



To illustrate the loss of methyl iodide trapping efficiency I have selected some data from ORNL:

SLIDE 4

Impregnated carbon samples were treated in three ways: (1) simple aging unexposed to the atmosphere, (2) exposed to clean, humid air flow in the laboratory, and (3) exposed to flowing air from the interior of the ORR reactor building. We see, from these data, that simple aging has little noticeable effect; clean air flow produces a slight loss of efficiency; "dirty" air flow produces a significant loss of methyl iodide efficiency. These data have been supplemented and confirmed by the behavior of carbon samples exposed to the exhaust air flow from the BSR and HFIR reactors at Oak Ridge.

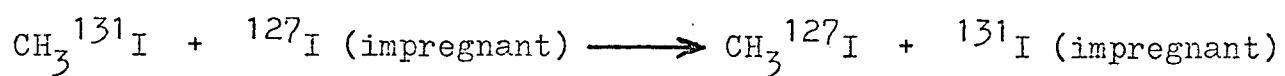
Therefore, recognizing that our knowledge of the efficiency of carbon for iodine and iodine compounds, under all possible conditions of application and all possible conditions of environment, is incomplete, we utilize conservatism in the choice of design parameters and operating conditions. We test the wisdom of our choices by a surveillance program on the operating system consisting of various lab and field tests. The quality or condition of the carbon is monitored by periodic lab tests on samples removed from the system and in-place tests are applied to monitor any possible mechanical deterioration of carbon cells, welds, gaskets, etc., which could produce bypass air leakage. If the carbon quality falls below a predetermined value, it is replaced with new carbon; if bypass leakage occurs, the source is found, and the pathway closed.

The application of activated carbon in exhaust systems of AEC-owned reactors is only some 10 years old; our experience and knowledge of the behavior of fullscale carbon systems of the various types used in nuclear power stations only covers a very few years. Field experience is now being acquired by the owners and operators of nuclear power stations and I feel that there is

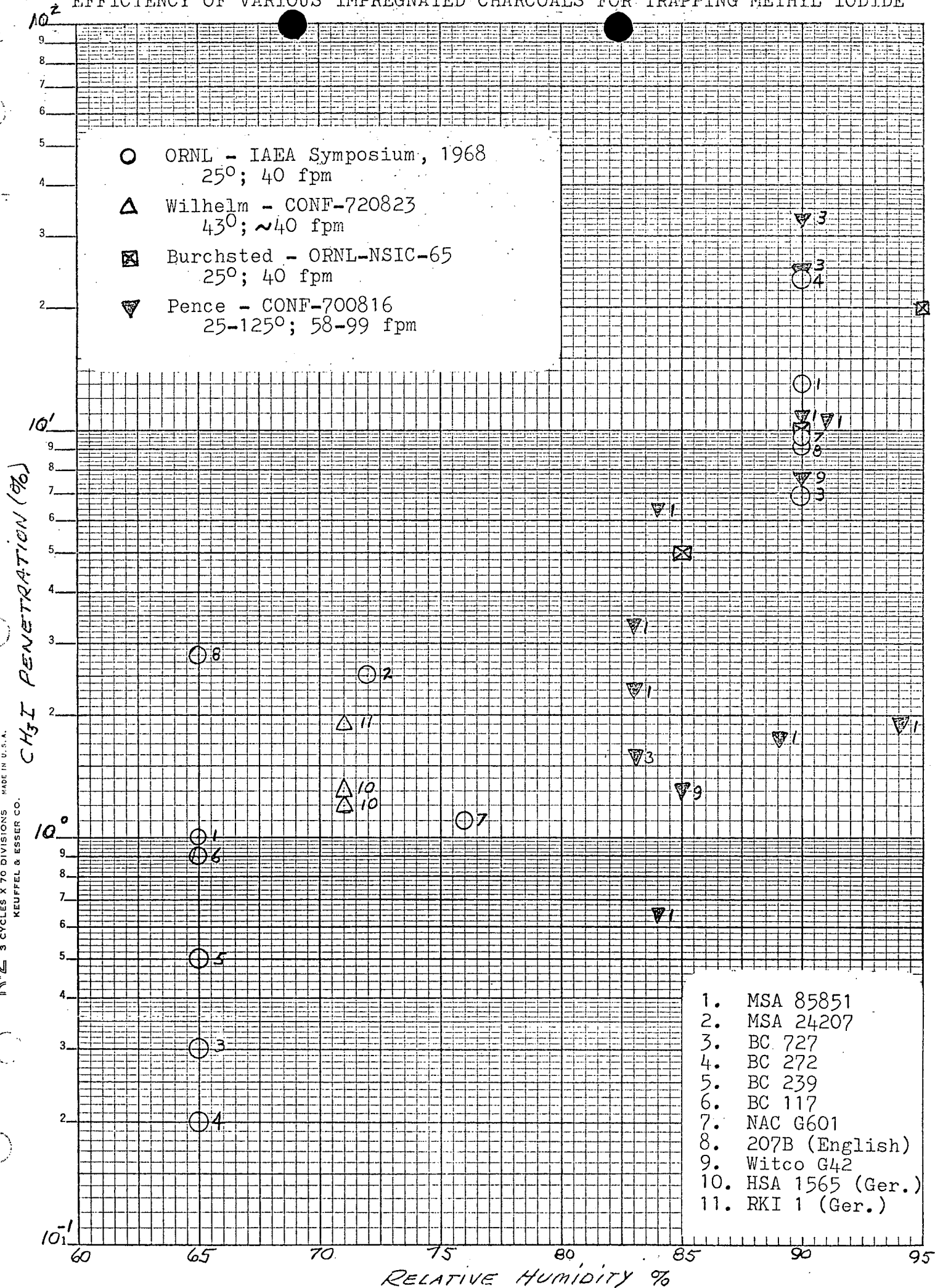
much yet to be learned by all parties concerned with the design, operation, and evaluation of these carbon systems.

With this presentation as a background, I will now call upon Mr. \_\_\_\_\_ of CP&L to discuss the application, operation, and testing of carbon systems from an operator's point of view.

# TRAPPING MECHANISMS FOR RADIOACTIVE IODINE



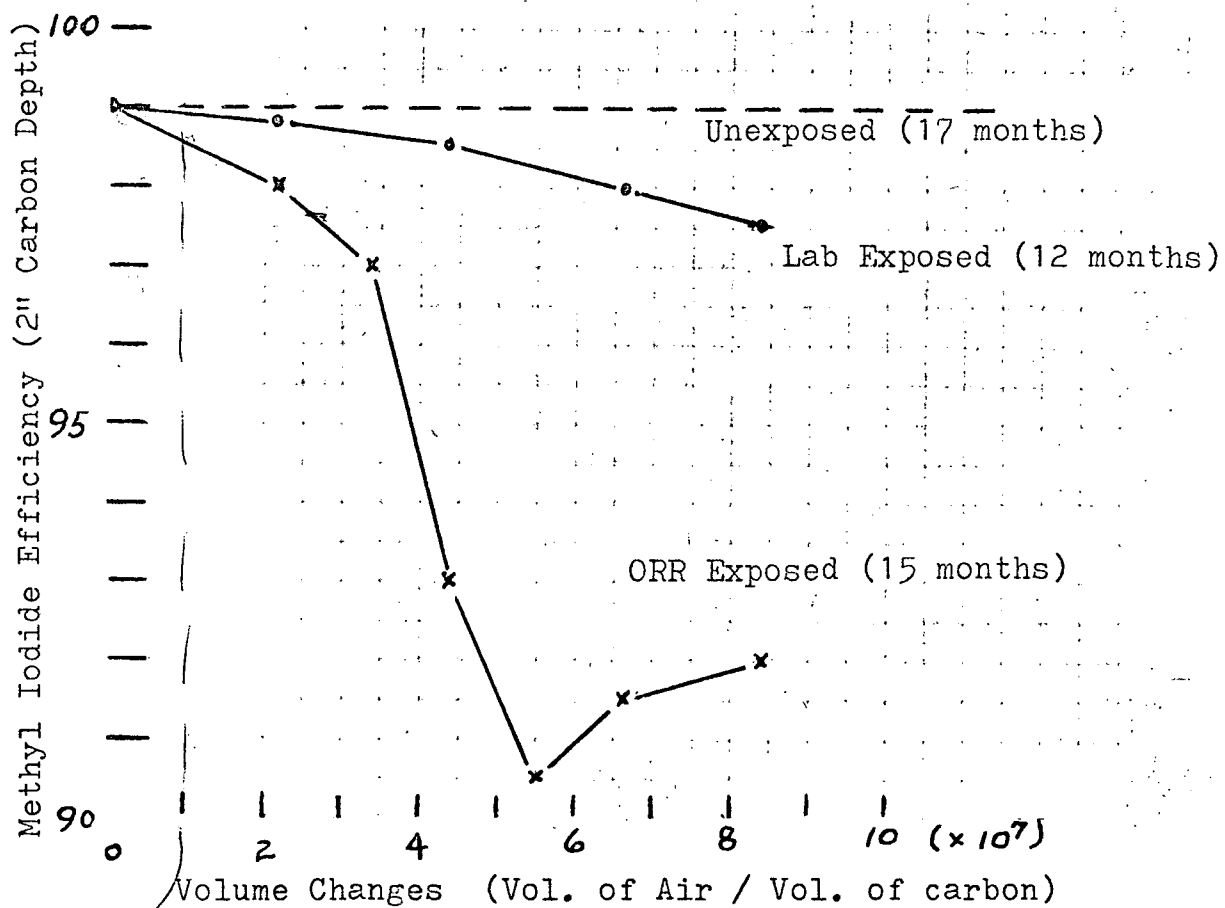
**K<sup>+</sup>** SEMI-LOGARITHMIC 46 5490  
3 CYCLES X 70 DIVISIONS MADE IN U.S.A.  
KEUFFEL & ESSER CO.



# INPLACE TEST AGENTS FOR ACTIVATED CARBON SYSTEMS

<u>Agent</u>	<u>Used By</u>	<u>Test Results Efficiency</u>	<u>Define: Leakage</u>
I <sub>2</sub> <sup>131</sup>	ORNL, HANFORD	(YES)	YES
CH <sub>3</sub> I <sup>131</sup>	ORNL	(YES)	YES
FREON 112	SRL, UTILITIES	NO	YES

# EFFECT OF EXPOSURE TO CONTINUING AIR FLOW ON METHYL IODIDE EFFICIENCY



(Ref: ORNL-TM-2860)

*CPL  
one month  
continuous operation.*

CAROLINA POWER & LIGHT COMPANY

### DAILY OPERATING REPORT

ENDING MN

DAY

DATE \_\_\_\_\_

8:00 AM

DAY

/ DATE /

PLANTS AND TIE LINES	MIDNIGHT				8:00 AM					
	MWH	DISCH.	PRECIP.	ELEV.	BY PASS	BARO.	TEMP-F	PRECIP.	MW	
BIG EAST FORK										
CHARLOTTE										
CANTON										
HIGH ROCK				654.91						
NARROWS				540.81						
SALUDA				358.7						
KERR DAM				302.14	CFS					
TILLERY				239.5	14000				22	
BLEWETT				142.1	25152				19	
WALTERS				2258.6					108	
MARSHALL		COAL ON HAND-TONS			WEEKS SUPPLY		(WALTERS DAM)			
CAPE FEAR					9.5				170	
WEATHERSPOON					11.6	(GAS)	0		75	
LEE					7.6	(GAS)	0		257	
SUTTON					6-2.3 0-2.6	(GAS)	0		275	
ROBINSON					11.8	(GAS)	22, 100		156	
ROBINSON NU.									358	
ASHEVILLE					8.6				280	
ROXBORO					7.6				475	
MOREHEAD I.C.		TOT.			1,559,539					
CP & L CO. GEN.		MAX MW - TIME		L. F.	LAST YR-MWH	GAIN	MW	GAIN		
FROM FOREIGN CO.										
APP. SYS. TOT.										
TO FOREIGN CO.										
CP & L CO. LOAD	70977	3568	4P	.23	59772	15.7	2957	17.1	2909	
PEAK FIRM DEMAND	3572	MW AT	530P	M	ADDITIONAL CAPACITY AVAILABLE			434	MW	
AVG. TEMP.	81					WET BULB		76		
LAST YEAR	74	MWH RECEIVED FROM FOREIGN COMPANIES				LAST YEAR		70		
	TOTAL METERED	TOTAL TRANS- ACTIONS	FIRM	LIMITED TERM	RESERVE	NON- DISPL.	LOSS COMP.	TRANS.	MW 8:00 AM	
AP CO.		3275							150	
VE & P CO.										
DUKE POWER CO.		985							30	
SCE & G CO.		1736							52	
YADKIN, INC.										
TVA										
KERR DAM		405								
MISC.										
OPER. REG.		293								
TOTAL		6694							223	
MWH DELIVERED TO FOREIGN COMPANIES										
	TOTAL METERED	TOTAL TRANS- ACTIONS	FIRM	LIMITED TERM	RESERVE	NON- DISPL.	LOSS COMP.	TRANS.	MW 8:00 AM	
AP CO.		1200							50	
VE & P CO.		6118								
DUKE POWER CO.		1609							59	
SCE & G CO.		485								
YADKIN										
TVA		225								
KERR DAM										
OPER. REG.		755	(Carried by V.E.P. Co. - Government contract)							
TOTAL		10392							109	
HEP.CO.	2325	CFS	AT 6PM AND		1900	CFS	AT 3AM			

\* ESTIMATED

CAPACITY NOT AVAILABLE AT PEAK

### ADDITIONAL CAPACITY AT PEAK

ADDITIONAL CAPACITY AT PEAK	
2 Blue #6	12 <sup>34</sup> P Rox 3H Boiler - Hu
1 477ar	furnace process. - cut load to
99 CF 1,2,3,4	300 MW - coming back ramp at
82 Sxy 1	1 <sup>35</sup> P
195 Rob 2 PC	4 <sup>43</sup> P Unit 3 - Retired - MFT -
374 Rox 2H 13FP	Hu vib on 3H ID Fan -
455 Unit 1 & 3	back @ 40P.
50 ND to VEP	
	2 Wal
	2 Ashtr PC
	9 Sxy PC
	630 Rox 3
	2 Weather PC
	30 Kern
	52 SC LT

# DAILY STATUS REPORT

(At time of estimated daily peak)

10:35 AM  
Time

Wed. May 30, 1973  
Day Date

CP&L CO.

DUKE

SCE&G CO.

VEPCO

## 1. TRANSACTIONS

none

none

none

none

## 2. UNAVAILABLE CAPACITY

A. Scheduled - List  
by unit name  
and number

Rel. 2 Rel 200  
Sutton 1 104  
Lee 1 82

Buck 9 TC 31  
Rel. 3 Boiler 169  
Allen 5 297  
Buck 9 TC 22

none

mtst 2 533  
Christ 3 100  
Buck 3 75  
Nash 2 175  
Kirt 1 100  
Sutton 1 723  
Rel 12 TC 25  
Buck 9 TC 25  
Kirt 4 25

B. Unscheduled -  
List by name  
and unit number

Blunt 6 5  
Rel 2 Rel 370

Buck 11 TC 18  
mtst 11 38  
Nash 145

Watt 1 356  
Comm 1 & 2 Rel 10  
Comm 3 Rel 50  
May 1 & 2 Rel 12  
Buck 7 TC 11  
Buck 11 TC 30

Buck 6 & 7 TC 45  
Kirt 1 TC 25

## 3. CAP. AVAIL.-OFF LINE

Identify by Unit  
No. except  
I. C. Turbines

Rel 1-2-3-4 99  
Watt 1 & 2 98  
TC 15 215

Texas 78  
Nash 440  
Buck 3 161  
Buck 1 33

none

none

## 4. EST. 60 MIN. PEAK & TIME

3600 6 PM

6200 2 PM

1445 5 PM

4650 4 PM

## 5. EST. SPINNING RESERVE\*

661 1.8

598 9.6

258 17.8

340 7

## 6. WEATHER

PC 84°  
13%

PC 80°  
20%

PC 82°  
17.8

CL 85°  
7

\*List only capacity that can be made available on Reserve.





# DAILY STATUS REPORT

(At time of estimated daily peak)

10<sup>00</sup> AM  
Time

Tue. May 29, 1973  
Day Date

	CP&L CO.	DUKE	SCE&G CO.	VEPCO
1. TRANSACTIONS	None	None	None	CP&L ND +300?
2. UNAVAILABLE CAPACITY				
A. Scheduled - List by unit name and number	Rmt. 2 Rd 215 System 1 104 Rec 1 82	Bmp 9 TC 31 Rec 7 Bldg 119 Allen 5 297 Bldg 9 TC 22 Wat 2 14	None	m+st. 2 533 Crest 3 100 Bldg 3 75 Bldg 2 125 Bldg 1 100 Bldg 1 723 Bldg 1 VTC 25 Bldg 9 TC 25
B. Unscheduled - List by name and unit number	Bldg 6 5 Rmt. 2 Rd 370	Mica 1 38 Mica 2 95	Wat. 1 356 Cam. 1+2 Rd 16 Cam. #3 Rd 50 Mica 1+2 Rd 12 Bldg 2 TC 11 Bldg 9 TC 30	Summ 2 723 Bldg 3 110 Bldg 2 45 M+St 1 Rd 70
3. CAP. AVAIL. OFF LINE Identify by Unit No. except I. C. Turbines	ME 1-2-3-4 99 ICS 215	Turb. 78 Bldg 1-23 114 Bldg 1 33 Mica TC 443	None	None
4. EST. 60 MIN. PEAK & TIME	3775 5PM	6309 2PM	1345 5PM	4850 5PM
5. EST. SPINNING RESERVE*	298 78	500 19	258 19.2	0 0
6. WEATHER	PC 85°	Sunny 85°	CL 84°	CL 80°

\*List only capacity that can be made available as Reserve.

6.4%

MONDAY MORNING REPORT

CP&L CO. LOAD

Week May 26, 1973 427,913 MWH 3,541 MW

Comparable Week 378,180 MWH 2,857 MW

% Gain 13.15 23.94

% Gain 1972 6.43

December 31, 1972 to date (Complete weeks) 9,466,261 MWH

Comparable Period 8,521,044 MWH

% Gain 11.09

% Gain 1972 9.82

Received shipping notices on 1,507 cars of coal during week - Larry Tippet

JEB:jab

5/29/73