June 10, 1985

Docket No. 50-293

LICENSEE: Boston Edison Company (BECo)

FACILITY: Pilgrim Nuclear Power Station

SUBJECT: MEETING ON MAY 29, 1985 WITH BOSTON EDISON COMPANY REGARDING HYDROGEN WATER CHEMISTRY

On May 29, 1985, a meeting was held with representatives of the Boston Edison Company (BECo) and the General Electric Company (GE) to learn the results of adding hydrogen to the Pilgrim reactor coolant during a test at the plant early in May 1985. Enclosure 1 is a list of the meeting attendees. Enclosure 2 provides copies of the viewgraphs presented by the BECo participants.

During the test, hydrogen was added to the reactor coolant at various flowrates up to approximately 51 SCFM. The results indicate that injection of hydrogen at 15 SCFM is sufficient to reduce the oxygen concentration in the coolant to approximately 11 parts per billion (ppb). This meets a recommendation by GE that the oxygen concentration should be less than 20 ppb to mitigate crack growth in recirculation system pipes and nozzles. However, a further increase in hydrogen injection to approximately 23 SCFM was necessary to achieve a reduction of the reactor water conductivity to 0.100 S/cm, which is currently achieved at the Dresden plant.

The test also showed that the main steam line radiation levels resulting from the above hydrogen injection rates of 15 and 23 SCFM were approximately 1.6 and 2.9 millirem per hour (mR/hr). The latter is nearly five times the level from operation without hydrogen addition. However, the higher level does not violate the present Technical Specifications. BECo is still considering whether a Technical Specification change is necessary for hydrogen addition during normal (i.e., other than test) operation.

Radiation measurements taken in the turbine building and on the site during the test were higher than normal, as expected. These results will be used by BECo to determine appropriate mitigation measures.

8506200492 850610
PDR ADOCK 05000293
P PDR

BECo plans to install an electrolytic system to generate the hydrogen and oxygen necessary for improved hydrogen water chemistry prior to restart from the next refueling outage in the Fall of 1986. Conceptual information for its design is shown in the viewgraphs. Further details are expected later this year.

Original signed by/

Paul H. Leech, Project Manager
Operating Reactors Branch #2
Division of Licensing

Enclosures:
As stated

cc w/enclosures:
See next page

DISTRIBUTION
Docket File
NRC PDR
Local PDR
ORB#2 Reading
ORB#2 Mtg Summary File
DVassallo
PLeech
OELD
ELJordan
BGrimes
ACRS (10)
NRC Participants

DL:ORB#2	DL:ORB#2
PLeech:ajs	DVassallo
06/10/85	06/[illegible]/85

Mr. William D. Harrington
Boston Edison Company
Pilgrim Nuclear Power Station

cc:

Mr. Charles J. Mathis, Station Mgr.
Boston Edison Company
RFD #1, Rocky Hill Road
Plymouth, Massachusetts 02360

Resident Inspector's Office
U. S. Nuclear Regulatory Commission
Post Office Box 867
Plymouth, Massachusetts 02360

Mr. David F. Tarantino
Chairman, Board of Selectman
11 Lincoln Street
Plymouth, Massachusetts 02360

Office of the Commissioner
Massachusetts Department of
Environmental Quality Engineering
One Winter Street
Boston, Massachusetts 02108

Office of the Attorney General
1 Ashburton Place
19th Floor
Boston, Massachusetts 02108

Mr. Robert M. Hallisey, Director
Radiation Control Program
Massachusetts Department of
Public Health
150 Tremont Street
Boston, Massachusetts 02111

Thomas A. Murley
Regional Administrator
Region I Office
U. S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, Pennsylvania 19406

Mr. A. Victor Morisi
Boston Edison Company
25 Braintree Hill Park
Rockdale Street
Braintree, Massachusetts 02184

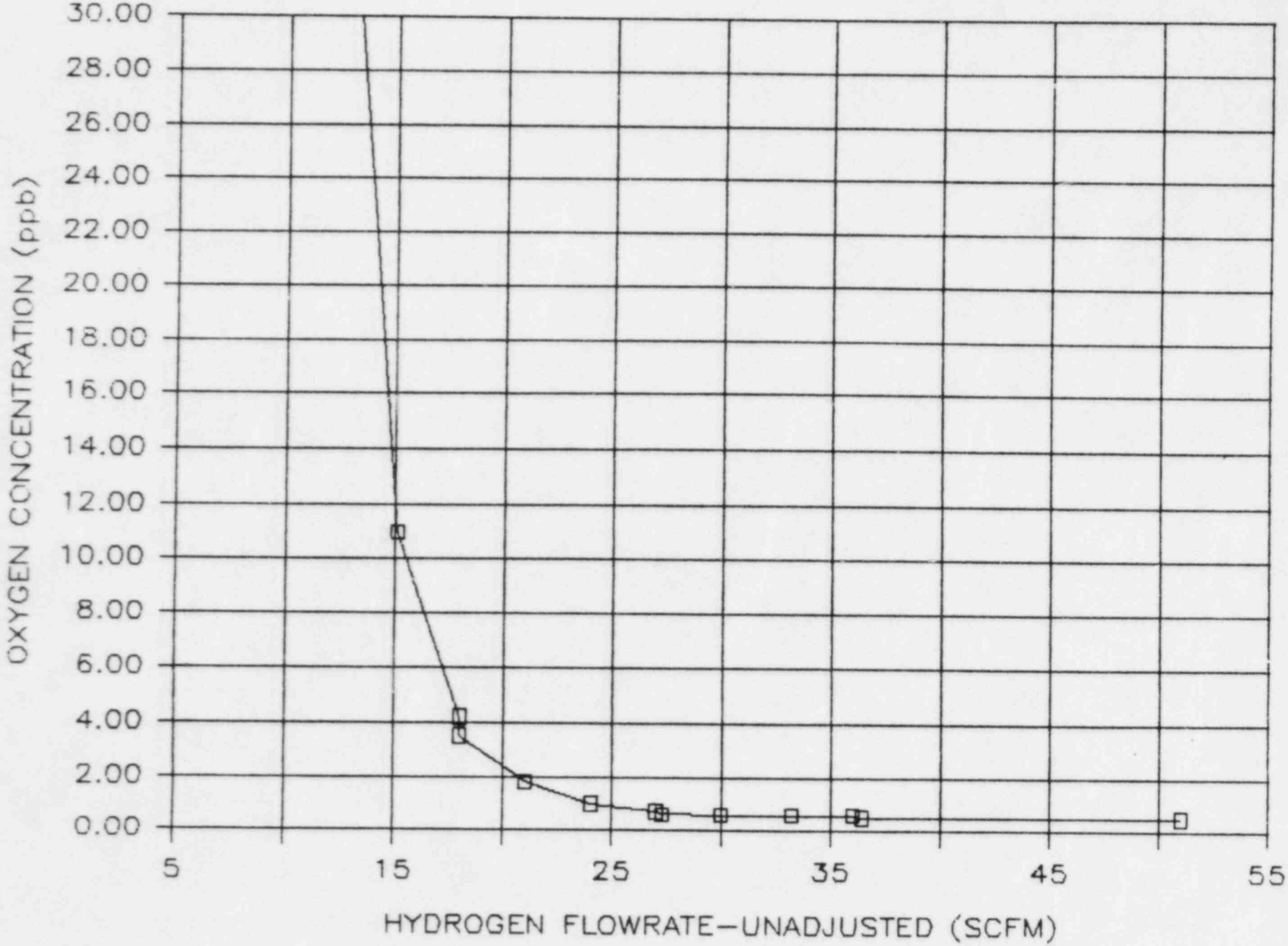
ENCLOSURE 1

ATTENDANCE LIST FOR MAY 29, 1985 MEETING WITH BECo

ON HYDROGEN WATER CHEMISTRY AT PILGRIM STATION

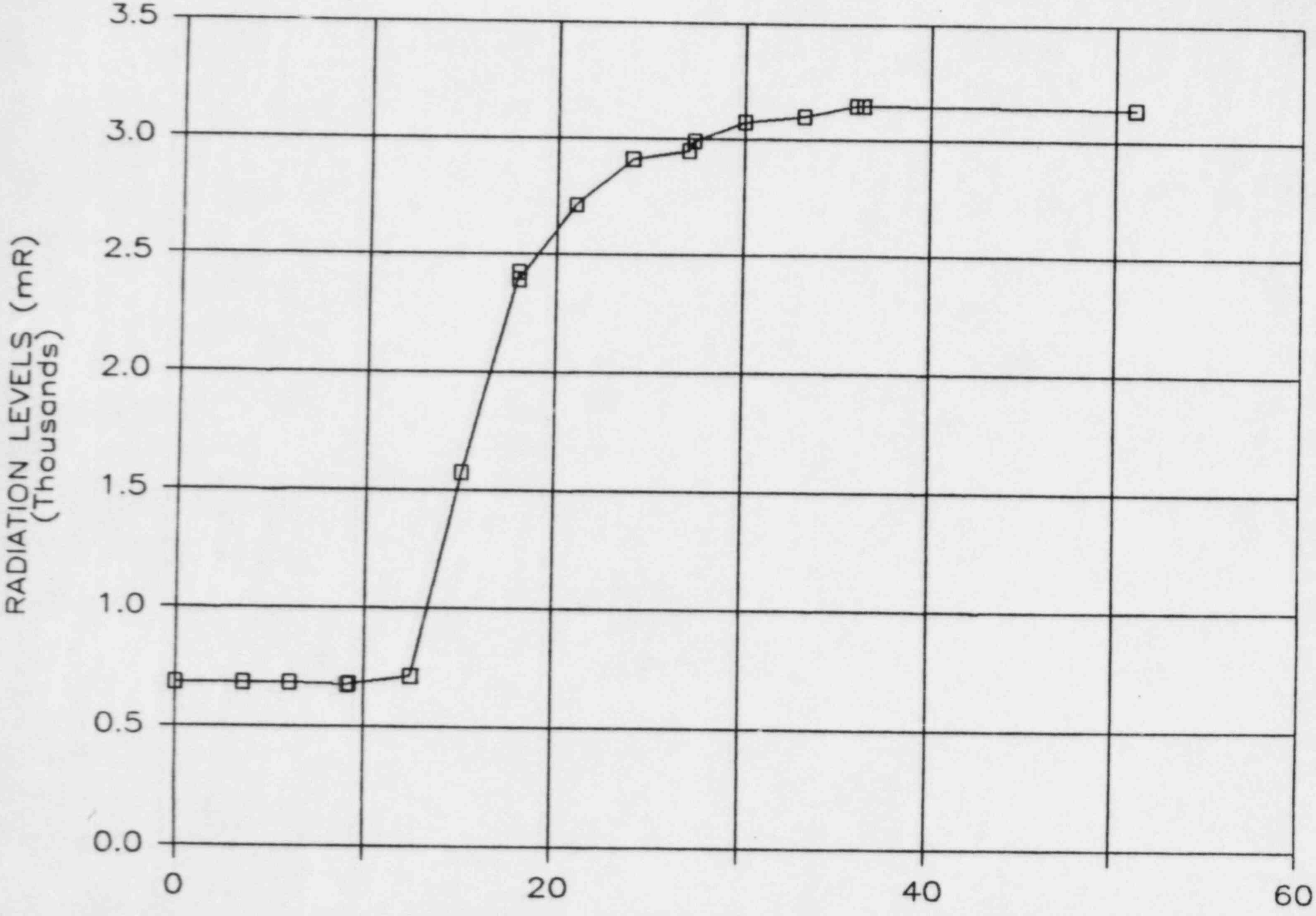
Name	Affiliation
P. H. Leech	NRC/DL
G. G. Whitney	BECo
O. I. Ford	GE
C. Ferrell	NRC/DE
J. Klapproth	GE
J. W. Nicholson	BECo
L. C. Chan	BECo
E. F. Kearney	BECo
W. H. Koo	NRC/DE
V. Benaroya	NRC/DE
F. P. Felini	GE
J. E. Larsen	GE
R. J. Law	GE
H. F. Conrad	NRC/DE
J. J. McClellan	BECo
R. A. Hermann	NRC/DL
F. J. Witt	NRC/DE
M. Lamastra	NRC/DSI

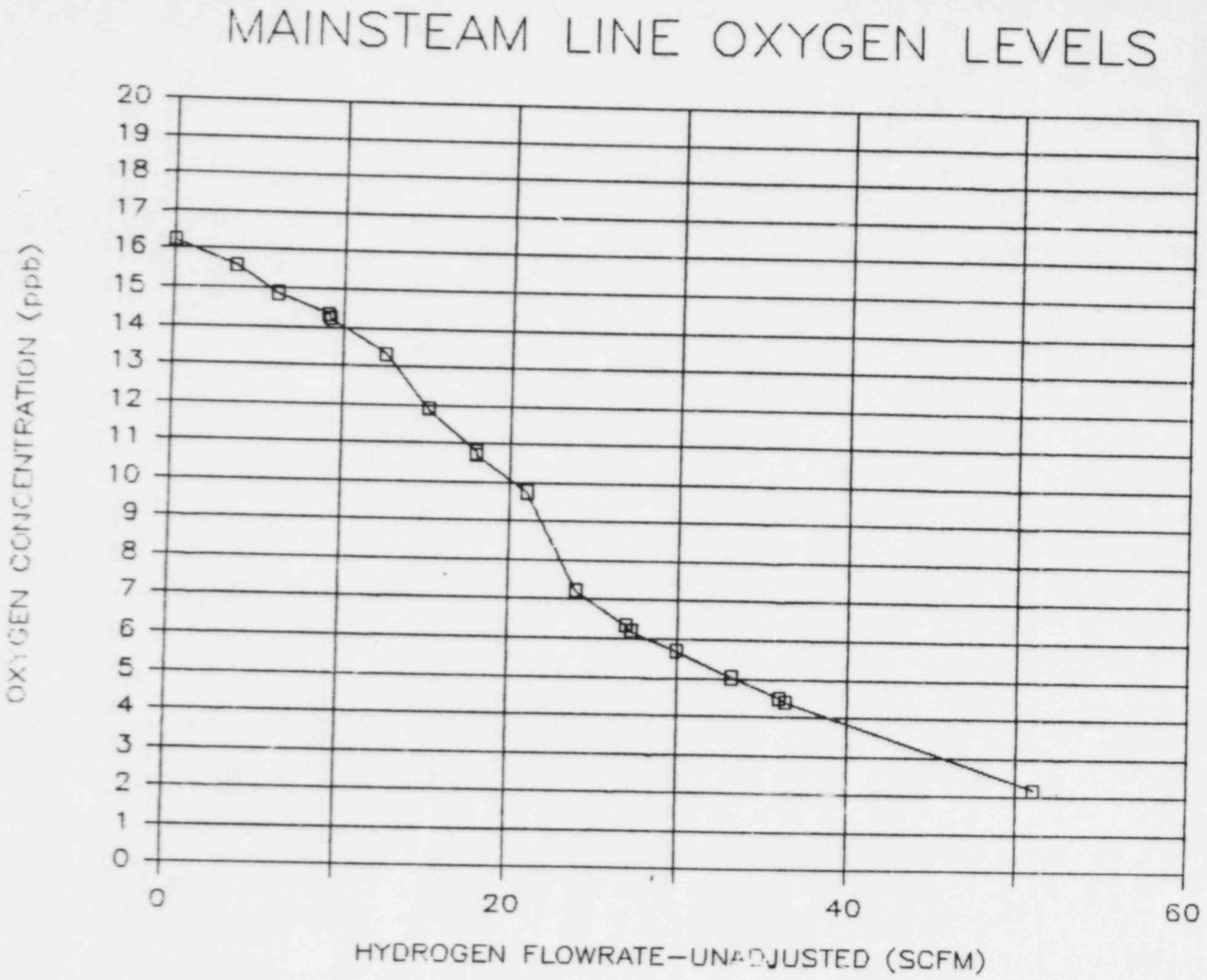
RECIRC SYSTEM OXYGEN LEVELS



ENCLOSURE 2

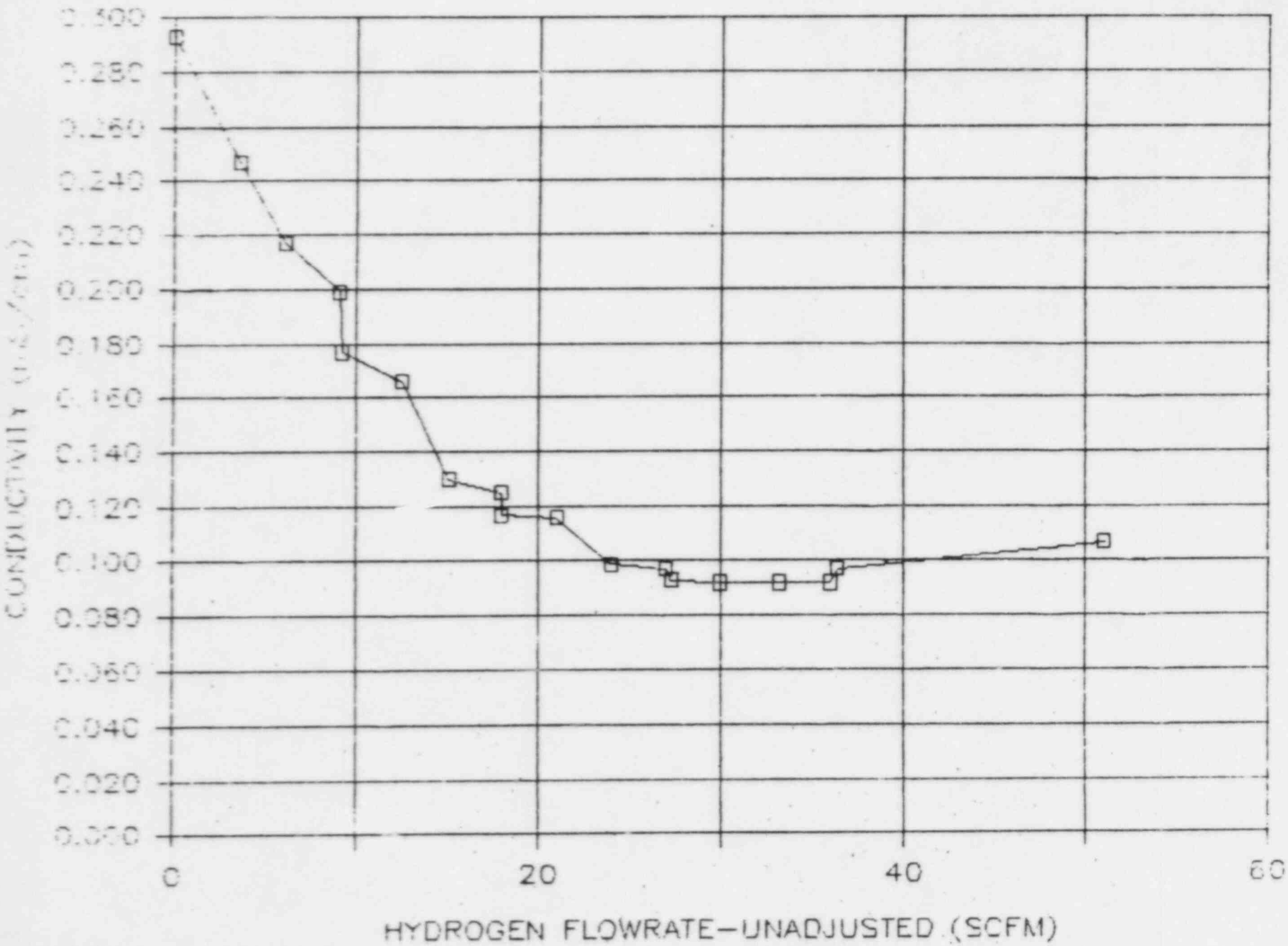
MAIN STEAM LINE RADIATION LEVELS



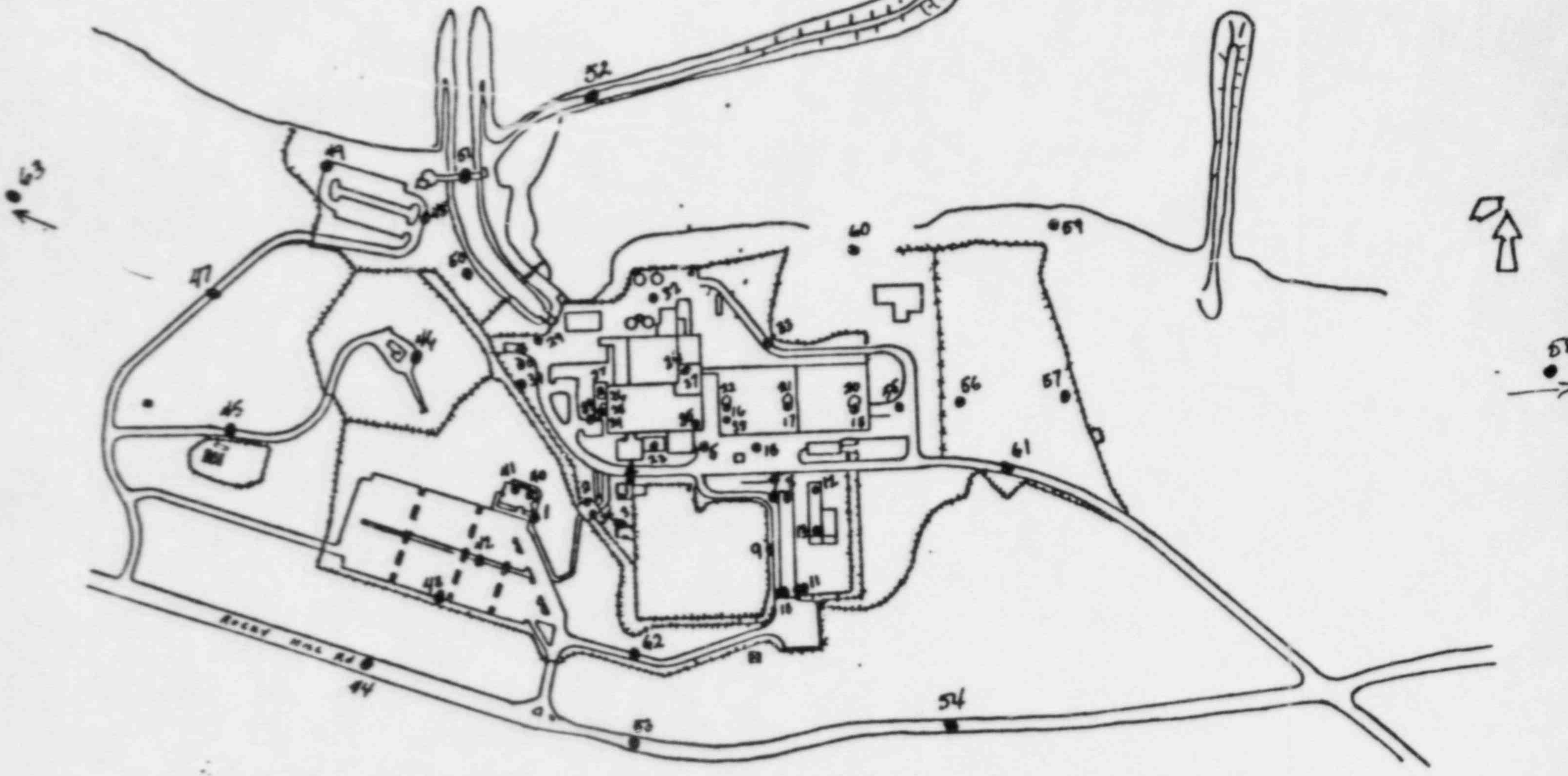


MAINSTEAM LINE OXYGEN LEVELS
OXYGEN CONCENTRATION (ppb)
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
0
20
40
60
HYDROGEN FLOWRATE—UNADJUSTED (SCFM)

REACTOR WATER CONDUCTIVITY CHANGES



DIX C1



ENVIRONMENTAL SURVEY MAP

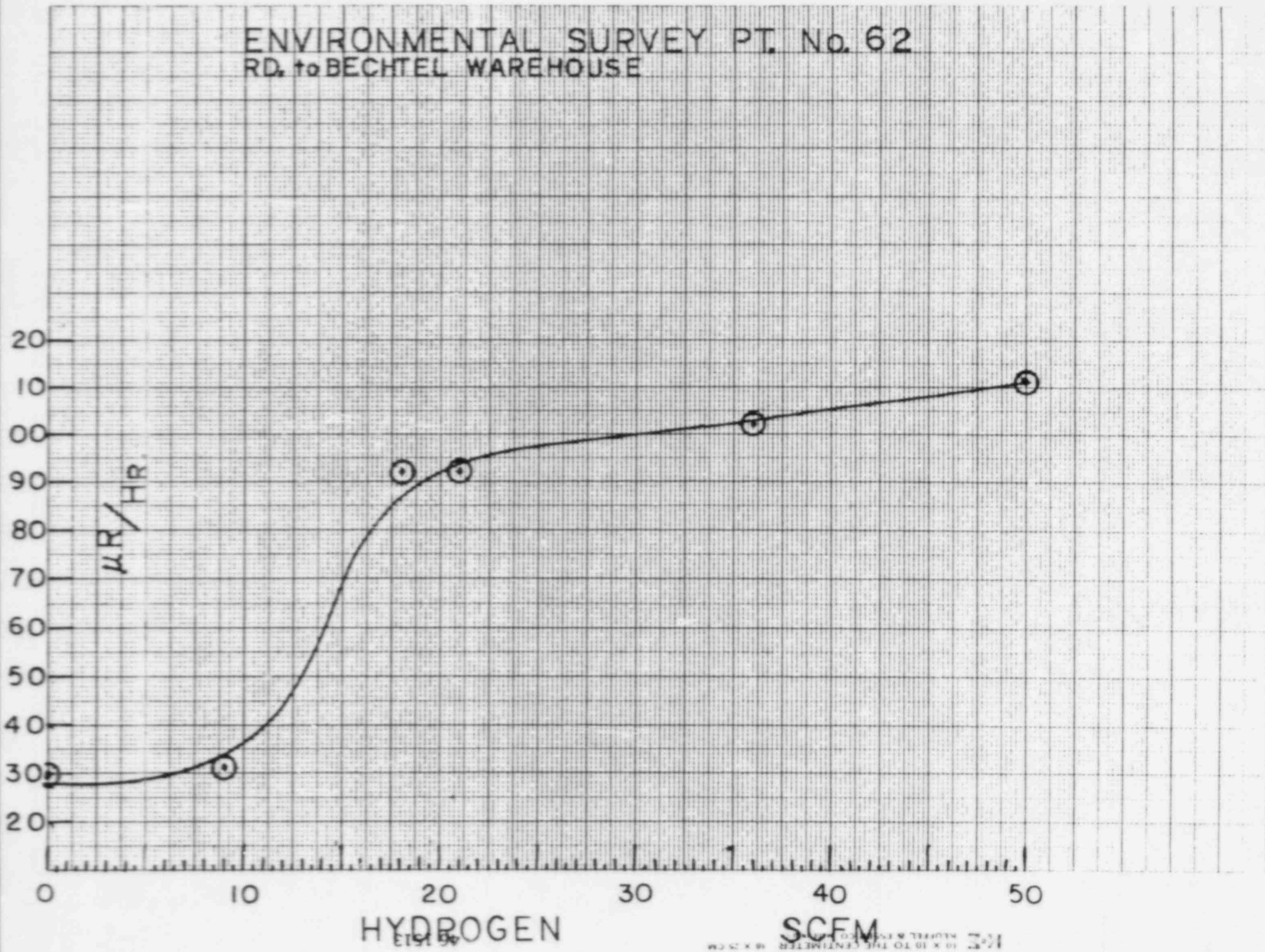
TIME/DATE: 11:00a → 6:00pm 5/7/85

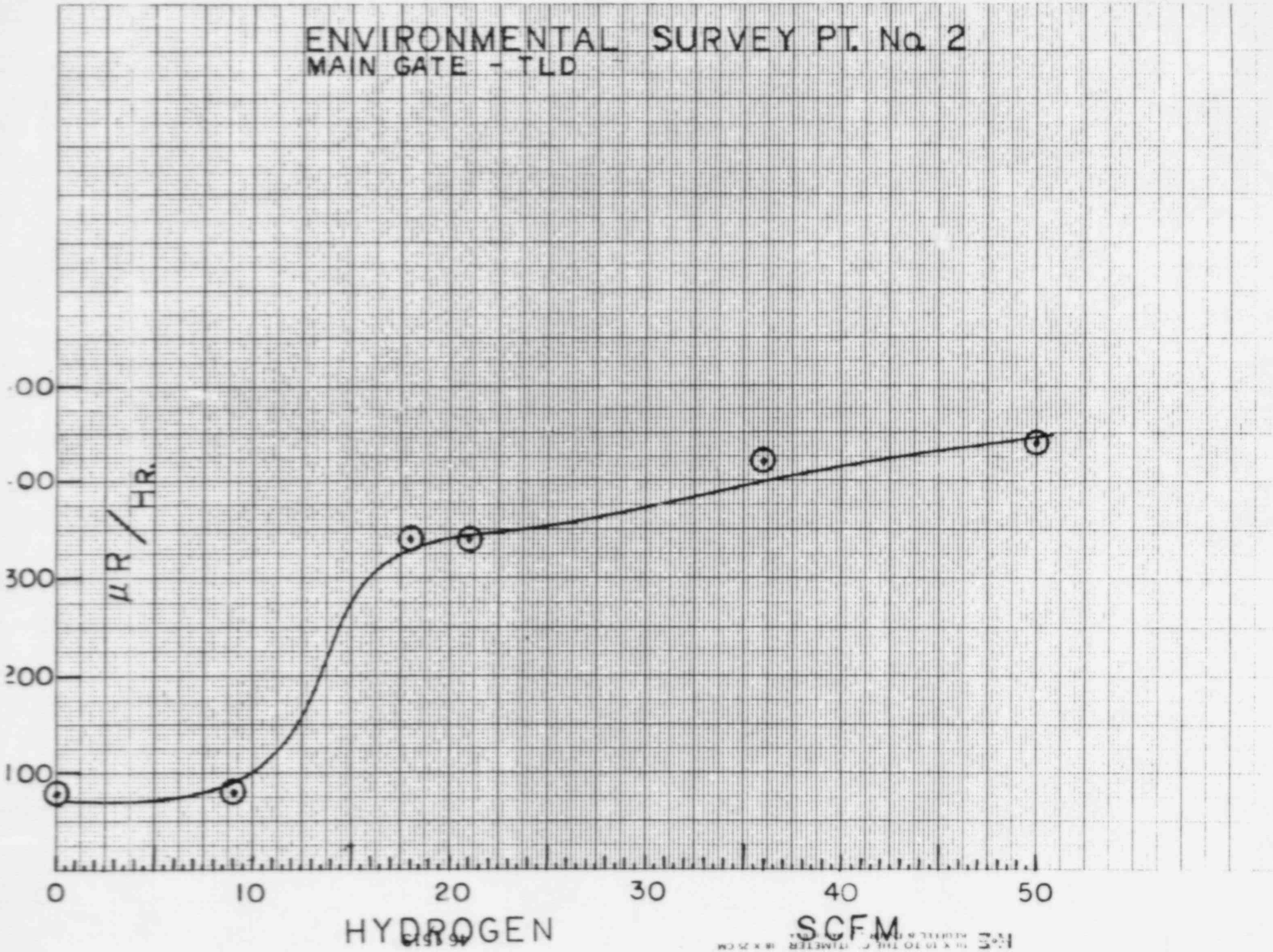
PERFORMED BY: [signature]

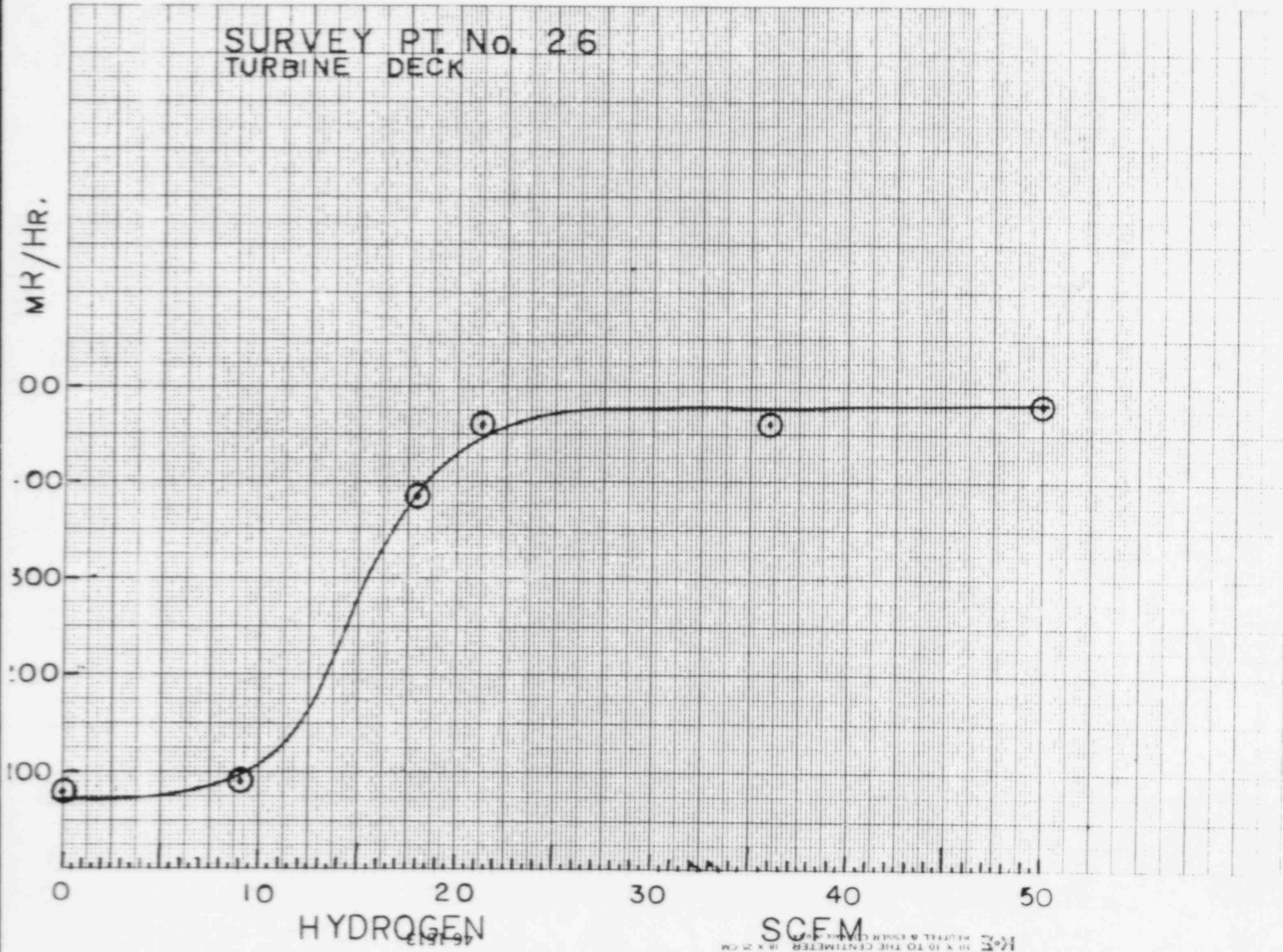
A.P.T.

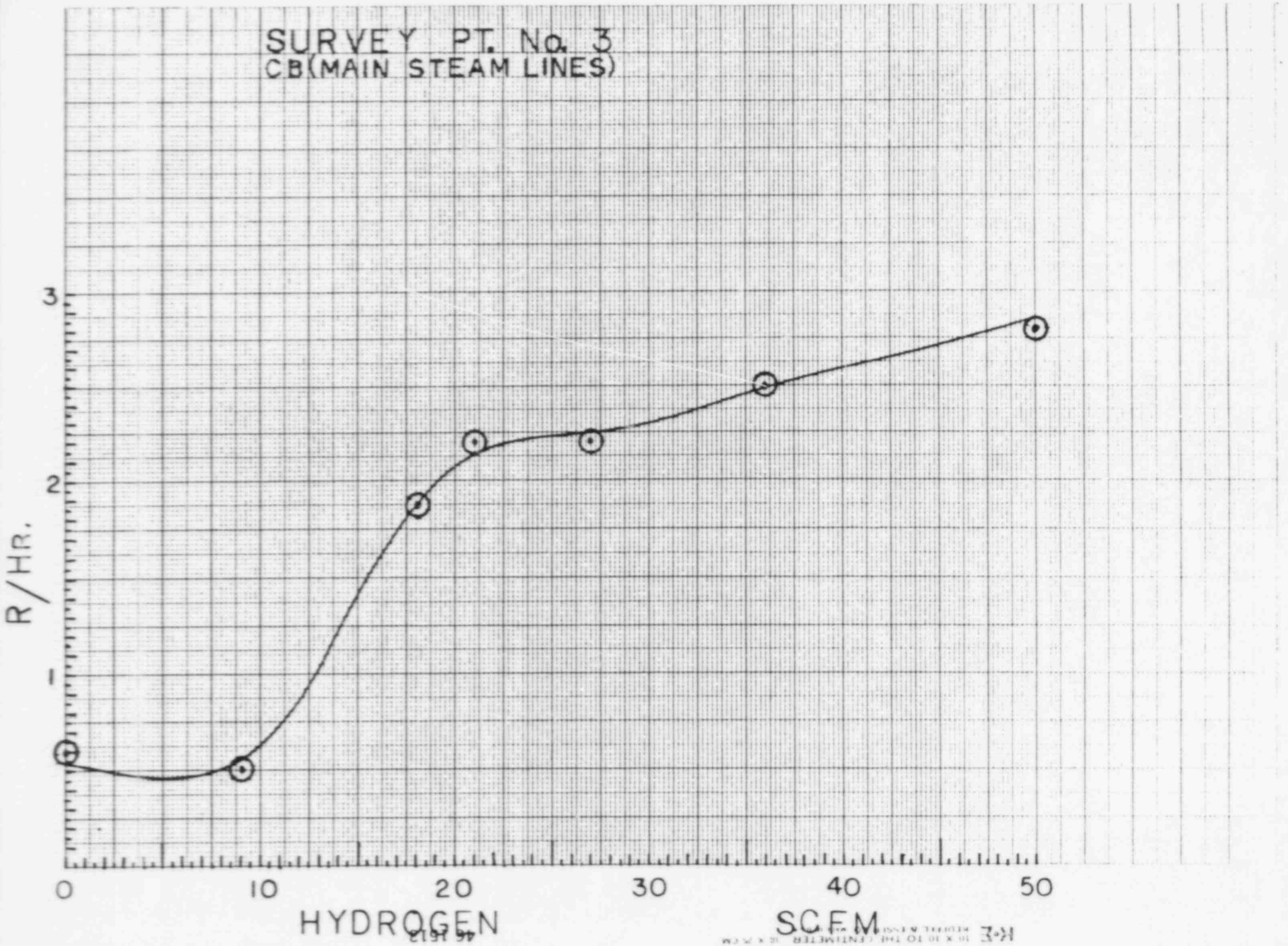
NOTE: Map, with marked survey points, to accompany survey data sheets.

TP85-30-1g Rev. 1


ENVIRONMENTAL SURVEY PT. No. 62
RD. to BECHTEL WAREHOUSE
μR/HR.
20
10
00
90
80
70
60
50
40
30
20
0
10
20
30
40
50
HYDROGEN
SCFM


ENVIRONMENTAL SURVEY PT. No. 2
MAIN GATE - TLD
μR / HR.
·00
·00
300
200
100
0
10
20
30
40
50
HYDROGEN
SCFM


SURVEY PT. No. 26
TURBINE DECK
MR/HR.
00
·00
300
:00
100
0
10
20
30
40
50
HYDROGEN
SCFM


SURVEY PT. No. 3
CB(MAIN STEAM LINES)
R/HR.
3
2
1
0
10
20
30
40
50
HYDROGEN SCFM

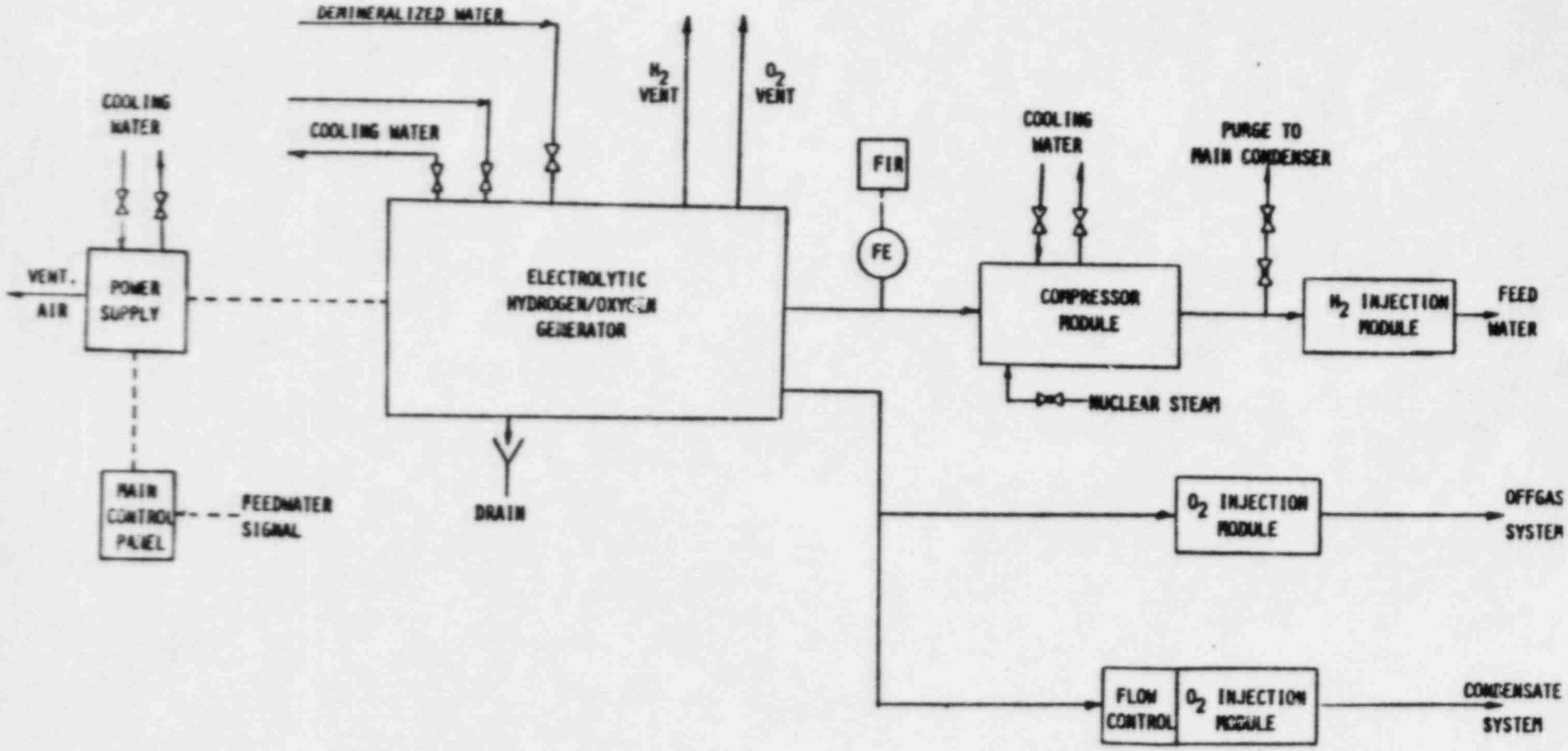
PROPOSED HYDROGEN WATER SYSTEM

DESIGN PARAMETERS

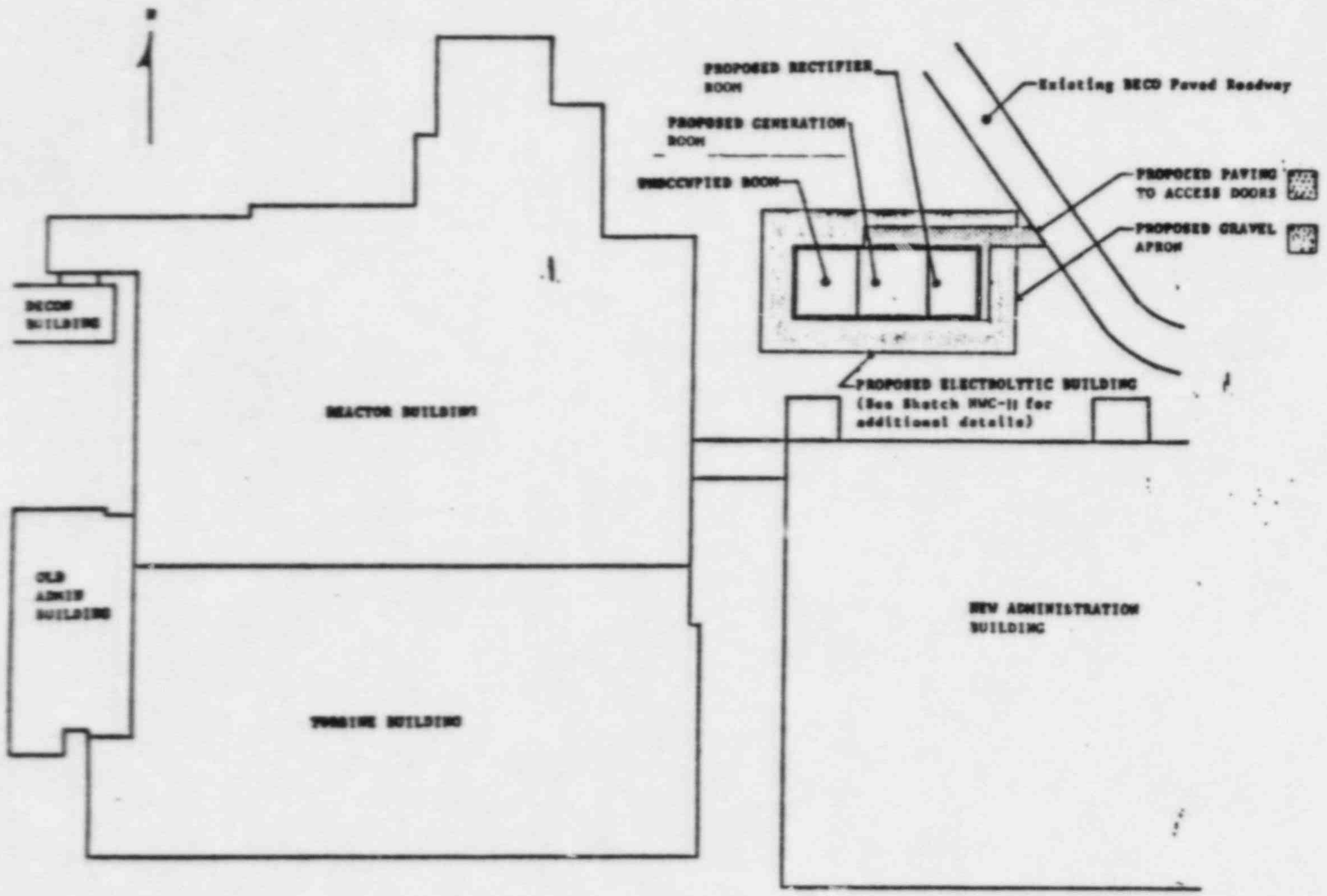
A. HYDROGEN AND OXYGEN SUPPLY

1. ELECTROLYTIC GENERATION AT RATES THAT MATCH DEMAND (STEAM OR FEEDWATER FLOW INDEX) - GENERATION CAPACITY - 50 SCFM - HYDROGEN - 25 SCFM OXYGEN

2. POSSIBLE MINIMUM GAS SUPPLY FOR 2 - 3 DAYS OF OPERATION



ELECTROLYTIC GENERATION SYSTEM


N
PROPOSED RECTIFIER ROOM
PROPOSED GENERATION ROOM
UNOCCUPIED ROOM
Existing BECO Paved Roadway
PROPOSED PAVING TO ACCESS DOORS
PROPOSED GRAVEL APRON
PROPOSED ELECTROLYTIC BUILDING (See Sketch HWC-II for additional details)
DECON BUILDING
REACTOR BUILDING
OLD ADMIN BUILDING
TURBINE BUILDING
NEW ADMINISTRATION BUILDING

B. COMPRESSION METHOD

1. THERMAL JET COMPRESSORS (NON-IGNITION).

   A. HYDROGEN MULTI-STAGE TO 350-400 PSIG

   B. OXYGEN SINGLE STAGE TO < THAN 10 PSIG

C. INJECTION LOCATION

1. HYDROGEN - SUCTION OF REACTOR FEED PUMPS (3)
2. OXYGEN - OFFGAS SYSTEM SUCTION OF AIR EJECTOR
3. OXYGEN - SUCTION OF CONDENSATE PUMP

D. EQUIPMENT SHELTER

1. MODIFY EXISTING STRUCTURE AS SHELTER FOR GENERATION, POWER RECTIFIER AND BUILDING SERVICE ROOMS.
2. PASSIVE STRUCTURE DESIGN FOR GENERATOR ROOM
   A. FIXED OPEN INLET AND OUTLET VENTS
   B. BLOW-OUT PANELS AT 1 SQ. FT. PER 30 CU. FT. OF VOLUME - SET AT 25 PSI
   C. GAS TIGHT WALLS BETWEEN GENERATOR ROOMS AND OTHER ROOMS
   D. ACCESS FROM OUTSIDE ONLY
   E. VENTS FOR HYDROGEN AND OXYGEN
   F. FIRE PROTECTION SPRINKLER SYSTEM
   G. AREA MONITORING FOR HYDROGEN LEAKAGE

E. CONTROL

MAIN CONTROL ROOM MANUAL/AUTOMATIC CONTROL STATION IN ADDITION TO RECORDERS, INDICATION ALARMS, EMERGENCY SYSTEM SHUTDOWN SWITCH AND INSTRUCTION NECESSARY FOR REMOTE SYSTEM CONTROL.

F. INSTRUMENTATION

1. MULTI-CHANNEL HYDROGEN MONITOR ALARM AT 1% AND AUTOMATIC SHUTOFF AT 2%
2. GAS CONCENTRATION AND STREAM CONTINUOUSLY MONITORED
   A. HYDROGEN AND OXYGEN PURITY IN STREAM
   B. OXYGEN CONCENTRATION IN OFFGAS
3. OXYGEN CONCENTRATION IN FEEDWATER, REACTOR RECIRCULATION AND MAIN STEAM SYSTEMS
4. HYDROGEN AND OXYGEN FLOW MEASUREMENTS

G. CODES AND STANDARDS

1. ASME BOILER AND PRESSURE VESSEL CODE, SECTIONS II, VIII DIVISION 1, AND IX.
2. AMERICAN SOCIETY FOR TESTING MATERIALS (ASTM) STANDARDS
3. ANSI B31.1
4. NATIONAL ELECTRICAL CODE (NEC)
5. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS
6. TUBULAR EXCHANGER MANUFACTURERS ASSOCIATION (TEMA) STANDARDS
7. AMERICAN WELDING SOCIETY (AWS) SPECIFICATIONS
8. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) STANDARDS
9. COMMONWEALTH OF MASSACHUSETTS BUILDING CODE

H. ISSUES REQUIRING ANALYSIS/EVALUATION

1. THE EFFECT ON EFFLUENT RELEASES PER APPENDIX I
2. THE EFFECT ON THE LIMITS OF 10 CFR 20
3. THE EFFECT ON RADIATION CONTROL PROCEDURES
4. THE EFFECT ON ALARA PROGRAM.
5. THE EFFECT OF INJECTING HYDROGEN INTO THE FEEDWATER SYSTEM WHICH COULD RESULT IN DISCHARGE OF FLUIDS TO SUMPS, PACKING LEAKAGE, HIGH POINT VENTS, ETC.
6. HYDROGEN GENERATION FOR THE FOLLOWING EVENTS:
   - A. PIPE BREAK
   - B. SEISMIC
   - C. TORNADO
   - D. FIRE
   - E. CONSTRUCTION ACTIVITIES
   - F. TRUCK ACCIDENTS
7. OVERPRESSURIZATION, PURGING AND VENTING CONSIDERATIONS
8. EFFECTS ON REACTOR INTERNALS AND FUEL