VOID SHEET

TO: License Fee Management Branch

FROM: Region III

SUBJECT: VOIDED APPLICATION

Control Number: 89649

Applicant: Harris Semiconductor

Date Voided: 2-27-91

Reason for Void: Failure of licensee to adequately respond to requested information after two requests. Licensee RSO agreed to this action stating he may reapply later after coordinating with the vendor of their unit who is also contracted to supervise the planned release, before being able to adequately address deficiency items.

Loren J. Hueter 2-27-91
Signature Date

Attachment:
Official Record Copy of
Voided Action

FOR LFMB USE ONLY

Final Review of VOID Completed:

- ☐ Refund Authorized and processed
- ☒ No Refund Due after review
- ☐ Fee Exempt or Fee Not Required

Comments: ______

Log completed ☒ ML30
Processed by: [initials]

120101
9103150489 910227
REG3 LIC30
MATLS LICENSING PDR

BETWEEN:

LICENSE FEE MANAGEMENT BRANCH, ARM
AND
REGIONAL LICENSING SECTIONS

(FOR LFMS USE)
INFORMATION FROM LTS

PROGRAM CODE: 03124
STATUS CODE: 0
FEE CATEGORY: 3P
EXP. DATE: 19930331
FEE COMMENTS:

LICENSE FEE TRANSMITTAL

A. REGION

1. APPLICATION ATTACHED
APPLICANT/LICENSEE: HARRIS SEMICONDUCTOR
RECEIVED DATE: 900620
DOCKET NO: 5011015
CONTROL NO.: 389649
LICENSE NO.: 34-16429-01
ACTION TYPE: AMENDMENT

2. FEE ATTACHED
AMOUNT: $150.00
CHECK NO.: 1054454

3. COMMENTS

SIGNED P Lieblapp
DATE 6-26-90

B. LICENSE FEE MANAGEMENT BRANCH (CHECK WHEN MILESTONE 03 IS ENTERED /s/)

1. FEE CATEGORY AND AMOUNT: 3P $150

2. CORRECT FEE PAID. APPLICATION MAY BE PROCESSED FOR:
AMENDMENT ✓
RENEWAL
LICENSE

3. OTHER

SIGNED
DATE 6/29/90

CONVERSATION RECORD

TIME: | DATE: 2-27-91

TYPE: ☐ VISIT ☐ CONFERENCE ☑ TELEPHONE ☐ INCOMING ☑ OUTGOING

Location of Visit/Conference:

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU: Ray Law, RSO

ORGANIZATION (Office, dept., bureau, etc.): Harris Semiconductor

TELEPHONE NO: 419-423-0321

ROUTING	
NAME/SYMBOL	INT

SUBJECT: CN 89649

SUMMARY

Licensee still failed to adequately describe or provide procedures on how release rate is controlled to ensure concentrations are not unacceptable, including the actuation or control measures in event of loss of dilution due to power failure to exhaust blower.

Roy then had George Neff of Isorac Engineering call me to discuss the problems. George stated that Isorac has a specific release procedure in the form of a report which has been previously approved by NRC. He plans to provide that to Harris to respond to our questions. I also learned from him that the procedure for the release involves a controlled slow rate leak off rather than a series of batch releases as described previously by Roy. Roy called back after the Neff telecon and agreed to hold this action while they get things act together and then they will probably respond later.

ACTION REQUIRED

NAME OF PERSON DOCUMENTING CONVERSATION: | SIGNATURE: L. Hunter | DATE: 2-27-91

ACTION TAKEN

SIGNATURE | TITLE | DATE

HARRIS
SEMICONDUCTOR
HARRIS GSA RF INTERSIL

February 14, 1991

United states Nuclear Regulatory Commission
Region III
799 Roosevelt Rd.
Glen Ellyn, Il. 60137

Attn: Loren Hueter

Subject: Control Number 89649 - Supplementary Information

Gentleman:

Thank you for your telephone call on 2/5/91. Supplementary information requested by the commission is provided below:

1. Velocities of the exhaust stacks venting the Mark V and Minirad units are:

   Stack #17 (Mark V) - 654 CFM
   Stack #31 (Minirad) - 506 CFM

2. The Mark V and Minirad plumbing systems are identical with respect to the dilution of the gas and venting the gas/air mixture. The mixing and venting process is a manual controlled procedure.

3. There is a very low probability that mechanical exhaust would fail when diluted gas is vented. If such an event were to occur, the gas in the exhaust stack would be vented by natural drafting up the stack since the inside building pressure is positive with respect to the outside atmosphere. In addition, this air is much warmer than outside air and thermal currents would assist in the venting process.

4. The vent procedure is controlled by the Isovac Engineer. Manual control of the valves results in immediate shut off of gas flow to the exhaust system if mechanical exhaust is lost.

5. Harris' radiation safety officer and the Isovac Engineering representative will continuously monitor wind velocity and direction during the venting procedure. A display terminal will be at each site for continuous viewing of mentioned parameters. The display will alarm if wind velocity falls

RECEIVED
FEB 19 1991
REGION III

FEB 19 1991

HARRIS CORPORATION SEMICONDUCTOR SECTOR 1700 FOSTORIA ROAD FINDLAY, OHIO 45840-6287 TELEPHONE 419-423-0321 FAX 419-424-4434

HARRIS SEMICONDUCTOR

below 5 mph or direction varies outside the acceptable direction path.

6. The storage pressure is raised as high as possible to dilute the gas and then the gas is vented from the activation tank by the engineer using manual control mode.

   For the Minirad system, gas will be diluted to 153 microcuries per atmospheric cc plus or minus 10 % and vented in a controlled manner.

   For the Mark V system, gas is diluted to 82 microcuries per atmospheric cc plus or minus 10 % and vented in a controlled manner.

   This procedure has been used by Isovac worldwide for the past 30 years. Past permission has been given by region III (Chicago) office to conduct this vent procedure by B. J. Holt.

7. A roof map is attached showing stack and air handler locations. The safe wind direction area is also shown. Venting will be terminated if the wind velocity is less than 5 mph or the direction shifts outside the safe wind direction area.

8. No one will be permitted on the roof during venting. Penthouse access will be denied by locking the hatches. Roof access doors will be locked. If locking is not feasible, an individual will be posted at the point of access to deny access to the roof. A sign will also be posted at the access points to inform individuals that venting is occurring and access to the roof is denied.

9. Ohio radiation authority will be informed that a U.S.N.R.C. approved release of Krypton-85 will be made. A courtesy notification sent to Ohio authority is attached. A second reminder notification will be sent 2 days prior to the scheduled venting.

10. Anticipated waste oil volume is 2 liters. The oil will be allowed to degas in a controlled exhaust environment. The activity will be measured with a Ludlum 2000 scaler and beta probe to verify that activity is equal to or less than background.

Contact me if you have questions at 419-423-0321. Regards,

Ray Lau

Ray Lau, RSO
Harris Semiconductor
Findlay Operations

HARRIS SEMICONDUCTOR

February 14, 1991

Ohio Department of Health
Supervisor - Radioactive Materials Sect.
1224 Kinnear Rd., Suite 120
Columbus, Ohio 43212

Subject: Controlled Release of Krypton-85 Gas - Courtesy Notification

Gentleman:

This letter is to advise that Harris Semiconductor, located in Findlay, Ohio, will use a dilution and vent procedure to remove from service two leak test systems that utilize Krypton-85 gas. This action will take place in March or April 1991.

The U.S.N.R.C. region III office is working closely with Harris to insure that public safety is not compromised. The region III office contact is Loren Hueter (708-790-5500).

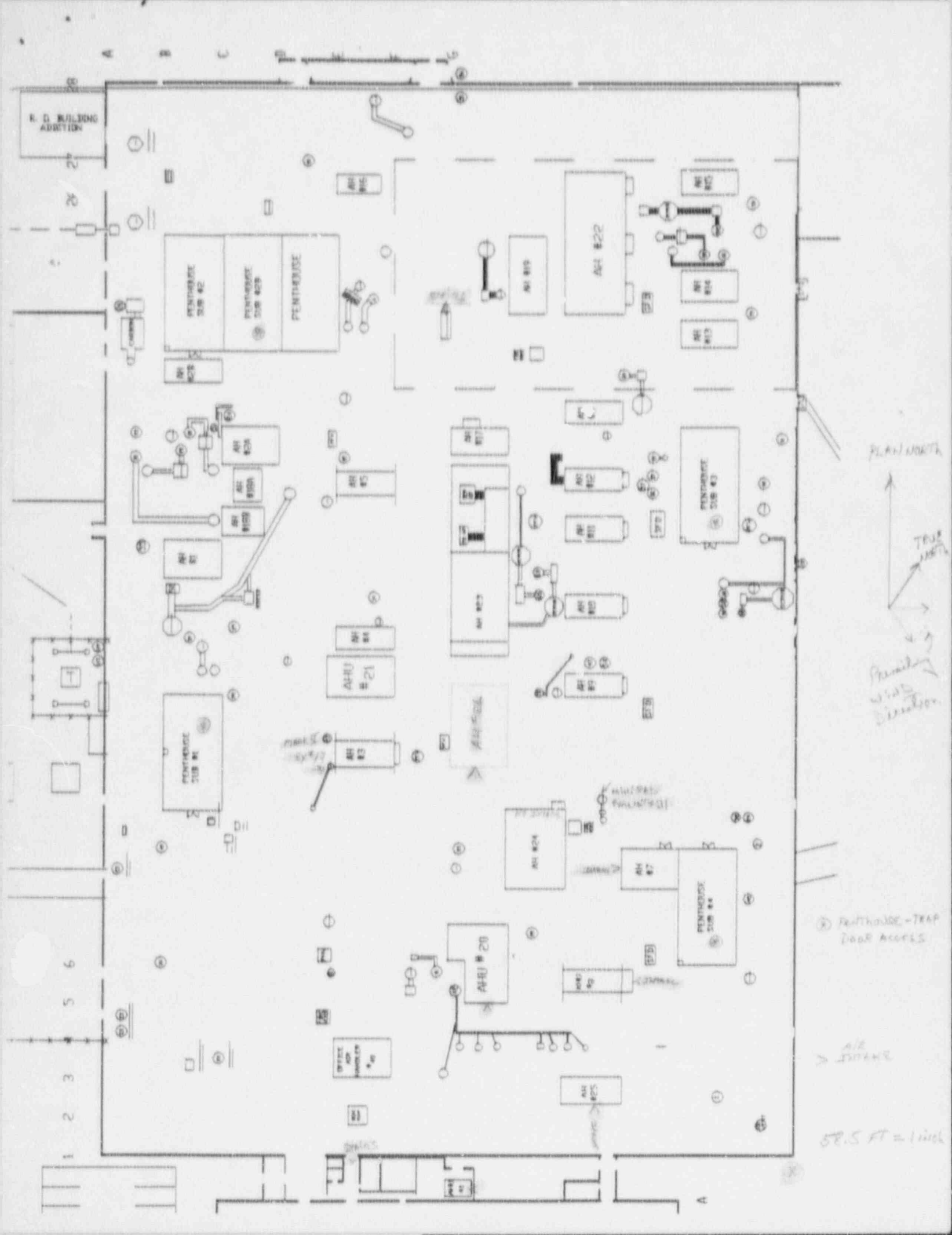
Each system has approximately 8.5 curies activity. The gas will be released in small increments to comply with the maximum permissible concentration requirements of 10 CFR Part 20, Appendix B, Table II, Column I for Krypton-85 gas.

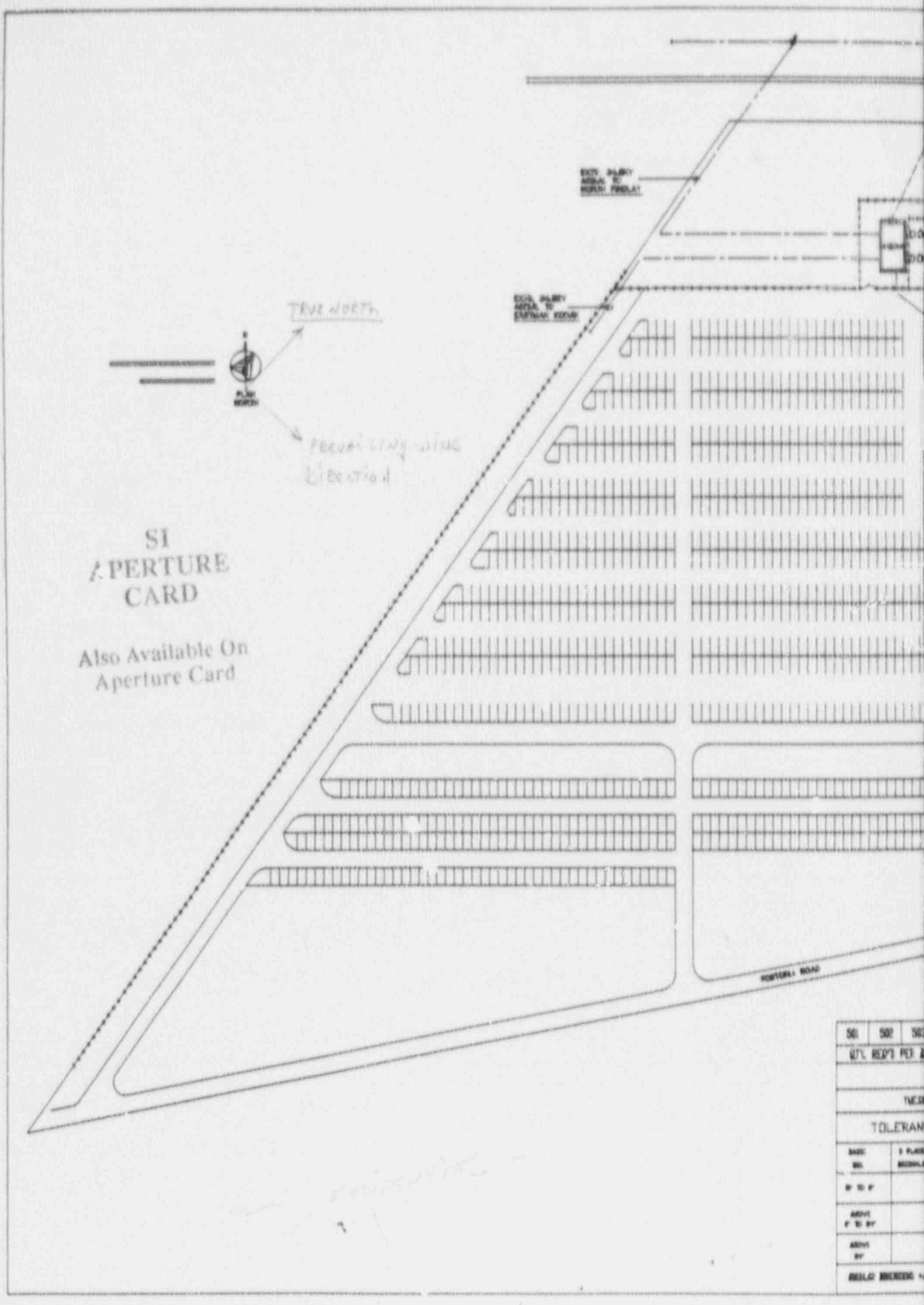
This notification letter is supplied to your office at the request of U.S.N.R.C. Your office will receive a second notification two days before the release.

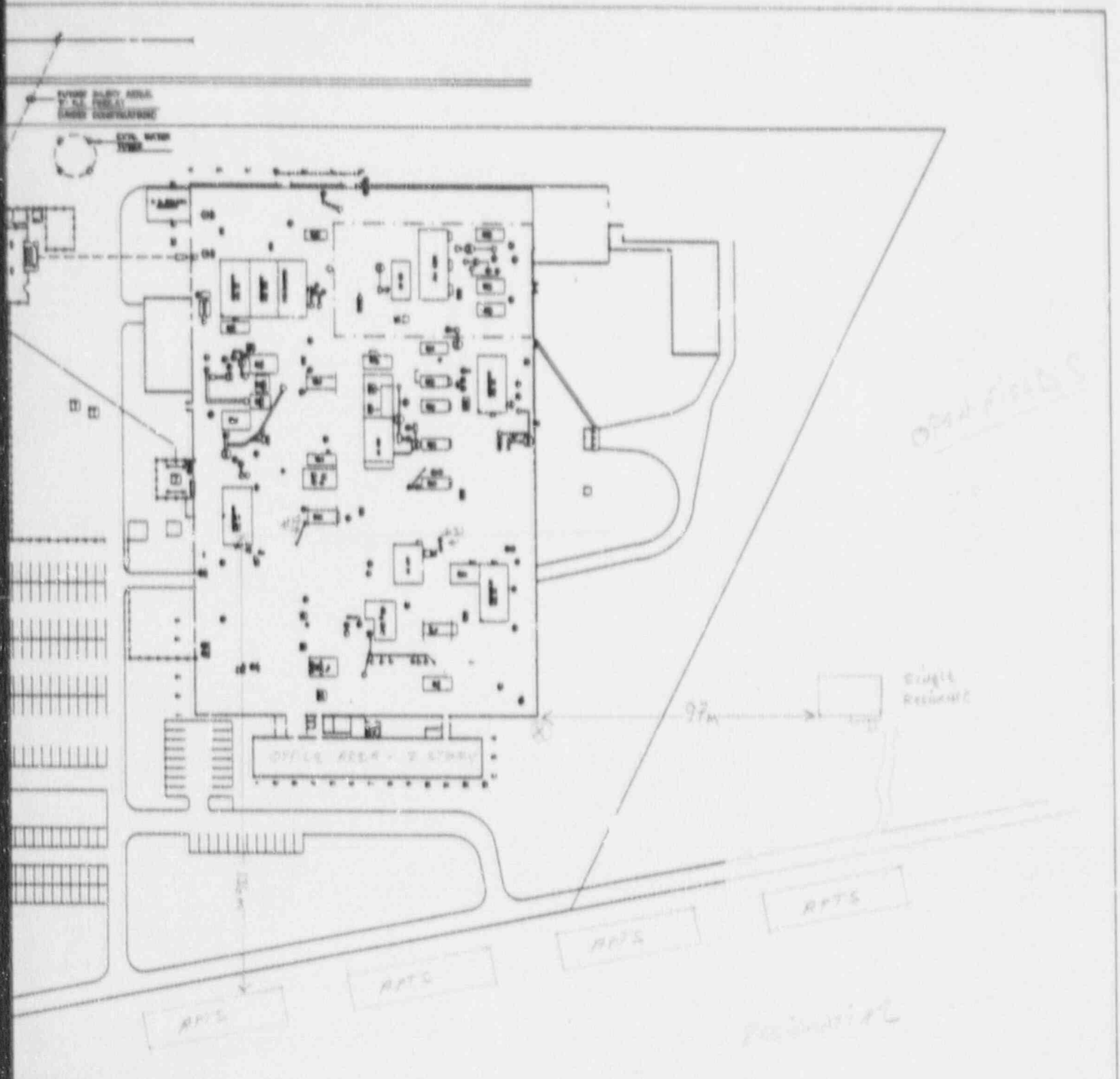
Contact me if you have questions at 419-423-0321. Regards,

Ray LAU, RSO
Harris Semiconductor
Findlay Operations

HARRIS CORPORATION SEMICONDUCTOR SECTOR 1700 FOSTORIA ROAD FINDLAY, OHIO 45840-6287 TELEPHONE 419-423-0321 FAX 419-424-4434


R. D. BUILDING ADDITION
PENTHOUSE
AHU #21
AHU #22
PLAN NORTH
TRUE NORTH
58.5 FT = 1 inch





SH. / ASU NO.	ITEM NO.	SYMBOL	PART NO.	DESCRIPTION	SPECIFICATION	SEE NOTE NO.

APPLICABLE MATERIALS AND SPECIFICATIONS

MATERIAL: N/A			DWG. TITLE: HARRIS SEMICONDUCTOR - FINDLAY, OH SITE PLAN & MAIN BLDG. ROOF DETAIL
PATTERN NO.: N/A	SCALE: 1" = 150'	USED ON: N/A	
HARRIS SEMICONDUCTOR HARRIS · RCA · GE · INTERSIL	FINDLAY, OH	DESIGN BY	DATE	MODEL NUMBER: F4460AF
		DRAWN BY: K. PARKER	DATE: 02/06/91	SIZE: B	DWG. NO.: 2491930	REV.: 0

9103150489-01

CONVERSATION RECORD

TIME

DATE 2-06-91

TYPE ☐ VISIT ☐ CONFERENCE ☑ TELEPHONE ☐ INCOMING ☑ OUTGOING

Location of Visit/Conference:

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU Ray Law

ORGANIZATION (Office, dept., bureau, etc.) Harris Semiconductor

TELEPHONE NO. 419-423-0321

ROUTING

NAME/SYMBOL	INT

SUBJECT CN 89649 34-16429-01
34-16429-02

SUMMARY

In response to my question, Ray confirmed that it was their intent to terminate the Ka-85 license after they dispose of the Ka-85 gas.

Ray further stated that they have recently disposed of both Co-60 sources under Lic No. 34-16429-02 and they plan to terminate it also right away.

He further indicated they planned to withdraw the Decommissioning funding Plan / financial assurance amount at that time

ACTION REQUIRED

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
	Leon Hunter	2-06-91

ACTION TAKEN

SIGNATURE	TITLE	DATE

50271-101 CONVERSATION RECORD OPTIONAL FORM 271 (12-76) DEPARTMENT OF DEFENSE

CONVERSATION RECORD

TIME	DATE
	2-5-91

TYPE

- [ ] VISIT
- [ ] CONFERENCE
- [x] TELEPHONE
  - [ ] INCOMING
  - [x] OUTGOING

Location of Visit/Conference:

ROUTING	
NAME/SYMBOL	INT

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (Office, dept., bureau, etc.)	TELEPHONE NO.
Ray Law RSO	Harris Semiconductor	419-423-0321

SUBJECT
CN 89649

SUMMARY

1. Confirm exhaust stack flow rates for both units
2. Confirm that both [illegible] units are basically identical & describe any significant differences
3. Describe safety measures in event of loss of exhaust flow i.e. shut down of release into exhaust system, natural draft, etc.
4. Is closure of system release valve automatic on loss of stack flow? If not, describe procedure
5. Can the incremental releases (per cycle) be accurately determined and limited to some value? i.e. ½ ci per cycle.
6. Provide diagram of roof showing both exhaust stacks, all intakes and specify which will be sealed closed. Also show true north & the 150° arc of allowed wind direction for release to continue. Also specify minimum windspeed i.e. 5 mph.

ACTION REQUIRED Cover

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
	L. Kreter	2-5-91

ACTION TAKEN

SIGNATURE	TITLE	DATE

7. Confirm that both the RSO and the Osprey engineer will be present during the release to monitor wind speed & direction to supervise and direct entire release procedure including termination of release when problems develop.
8. Describe a more positive control mechanism to prevent access to any area during release i.e. posting of a guard locks and posted signs.

9. Confirm that instrument to be used for survey will be sensitive to beta emissions and describe a more sensitive method of counting dipped air sample to confirm it is at background.
10. Confirm notification of State of Ohio of planned release.

Ray would be wanted try to Fax approval later today or tomorrow, followed by hard copy.

HARRIS
SEMICONDUCTOR

January 10, 1991

United States Nuclear Regulatory Commission
Region III
799 Roosevelt Rd.
Glen Ellyn, Il. 60137

Attn: Loren Hueter

Subject: Response to Commission Letter dated 12/3/90 - Control Number 89649

Gentleman:

Thank you for your letter dated 12/3/90. The information requested by the commission relating to a Harris license amendment to add an authorized user and approval, pursuant to parts 20.106b and 20.302a, to vent to the environment 10 curies of krypton 85 gas from each of two leak test units is provided below:

Item 1: I do not understand why Mr. Shade's training certificate was not included with the amendment papers; however, this is no longer an issue. Mr. Shade was transferred to the Harris operation in Florida. Please disregard addition of Mr. Shade to the license.

Item 2: Approval to vent krypton 85 gas:

2a. Diagrams for the Mark V and Minirad units are attached showing storage tank, piping, isolation, and flow control valves. The units do not require modification in order to perform the vent function. Each unit has an exhaust flow sensor which will shut down the unit if air flow is lost. Should such an event occur, gas flowing in the system shall be returned to the storage tank until mechanical exhaust is re-established. Each unit has a containment cabinet at negative pressure relative to the surrounding room (restricted). A survey meter will be used to monitor activity in the room during the vent procedure.

2b. The vent procedure involves the addition of air to dilute a small amount of krypton gas in the activation chamber before venting the gas mixture to the exhaust stack. This procedure is repeated until all the krypton has been extracted from the storage tank. The amount of krypton diluted is small compared to the

amount present in the storage tank. At present, There is about 8.5 curies in each unit. If the total gas concentration in the storage tank were to be released in one vent cycle, the point of maximum concentration downwind from the stack discharge and the activity averaged over one year will be defined by the calculation in appendix I. This Value does not exceed tne maximum permissible value listed in 10 CFR Part 20, Appendix B, Table II, column I for krypton 85.

2c. The Mark V unit is exhausted via stack #17 and the Minirad unit is exhausted by stack #31. The nearest air handler with an air intake (#7) is 15 meters down wind in the prevailing wind direction. An estimation of the air concentration at this location is not necessary since this air intake will be blocked off with polyethylene sheet and the air handler set to full return air before any venting of diluted gas occurs.

The nearest offsite building is a single floor apartment complex in the prevailing wind direction and 136 meters distant. A calculation in appendix I is based on this scenario.

2d. The activity at the stack discharge will approximate 5.7E-07 microcuries/cc and does exceed the maximum permissible concentration listed in 10 CFR Part 20, Appendix B, Table II, Column I for unrestricted areas. The roof, however, is a restricted area and shall be treated accordingly. Access to the roof via the two points of entry will be denied to all personnel on days the krypton gas is released. Yellow safety warning tape will be installed at the stair entrance points. Safety tape will be installed on the roof on the windward side of the stacks to prevent intrusion on the down wind side of the roof.

2e. The wind vector can vary between 0 and 130 degrees from true north without the other air handler intakes becoming an issue. Fortunately, the prevailing wind direction lies well within this arc. Wind speed should be relatively constant with minimal inversion. If mentioned conditions cannot be achieved, the venting will not be initiated.

2f. The venting process is a controlled process and can be terminated at any point if stack flow is lost. The exhaust flow sensor, mentioned in 2a, will signal loss of stack flow. The operator can then recover any gas present in the activation chamber.

HARRIS SEMICONDUCTOR

2g. This facility has computerized capability for wind speed and direction. Wind speed and direction are continuously monitored relative to internal climate control. The venting operation will be terminated if wind vector would vary from the mentioned direction window and wind speed would suddenly change.

2h. Harris agrees that release from both the Mark V and Minirad units will not be made simultaneously.

ITEM 3: Residual krypton gas contained in vacuum pump oil will be collected in a separate container, transferred to an exhausted hood until the krypton has outgassed. When the activity, determined by survey meter, equals background level (0.05 mR/hr), the oil will be disposed of as ordinary oil waste.

Krypton gas is inert and does not penetrate the piping or storage tank walls. Both units will be evacuated to satisfy 49 CFR 173.421 requirements. No unit will ship from this facility if survey readings at the unit surface exceeds 0.5 mREM.

Contact me at 419-423-0321 if you have additional questions.

Regards,

Ray Lau, RSO
Harris Semiconductor
Findlay, Ohio

cc: J. Marshall
G. Neff - Isovac Engineering

rl/nrcom

HARRIS SEMICONDUCTOR

Appendix I. - Activity Calculations

Conditions: Activity = 8.5 curies = 8.5E06 microcuries
Mean wind speed = 10 MPH = 14.7 FPS = 4.5 m/sec.
Effective stack height = 43.6 ft. = 13.3 meters.

Emission rate = 8.5E06 microcuries/3.154E07sec./yr
= 2.7E-01 microcuries/sec.

Concentration at point of discharge:

Cdis=Qi/Vi, where Vi= exhaust flow rate

= 2.7E-01 microcuries per sec./4.96E05 cc per sec.
= 5.4E-07 microcuries per cc.

Point of Maximum concentration (Xm):

$$X_m = \left(\frac{h^2}{C^2}\right)^{\frac{1}{2-n}} = \left(\frac{176.9\ m^2}{1.32E-02\ m}\right)^{0.599} = 296 \text{ meters}$$

Maximum ground concentration (Kx) at Xm:

Where: Cdis = 5.4E-07 microcuries/cc
$\bar{u}$ = 4.5 meters/sec. windspeed
h = 13.3 meters effective stack height
n = 0.33 constant for moderate wind inversion
X = distance from discharge point
c = constant based on stack height vs wind factors

$$Kx = \frac{2\,C_{dis}}{\pi\, C_{n,}^2\, \bar{u}\, X^{2-n}}\, e^{-\frac{h^2}{C_{n,}^2 X^{2-n}}} = \frac{1.08E-06 \text{ uc/cc}}{(3.14)(0.115)^2(4.5\ m/sec)(296\ m)^{1.67}}\, e^{-\frac{(13.3\ m)^2}{(0.115)^2(296\ m)^{1.67}}}$$

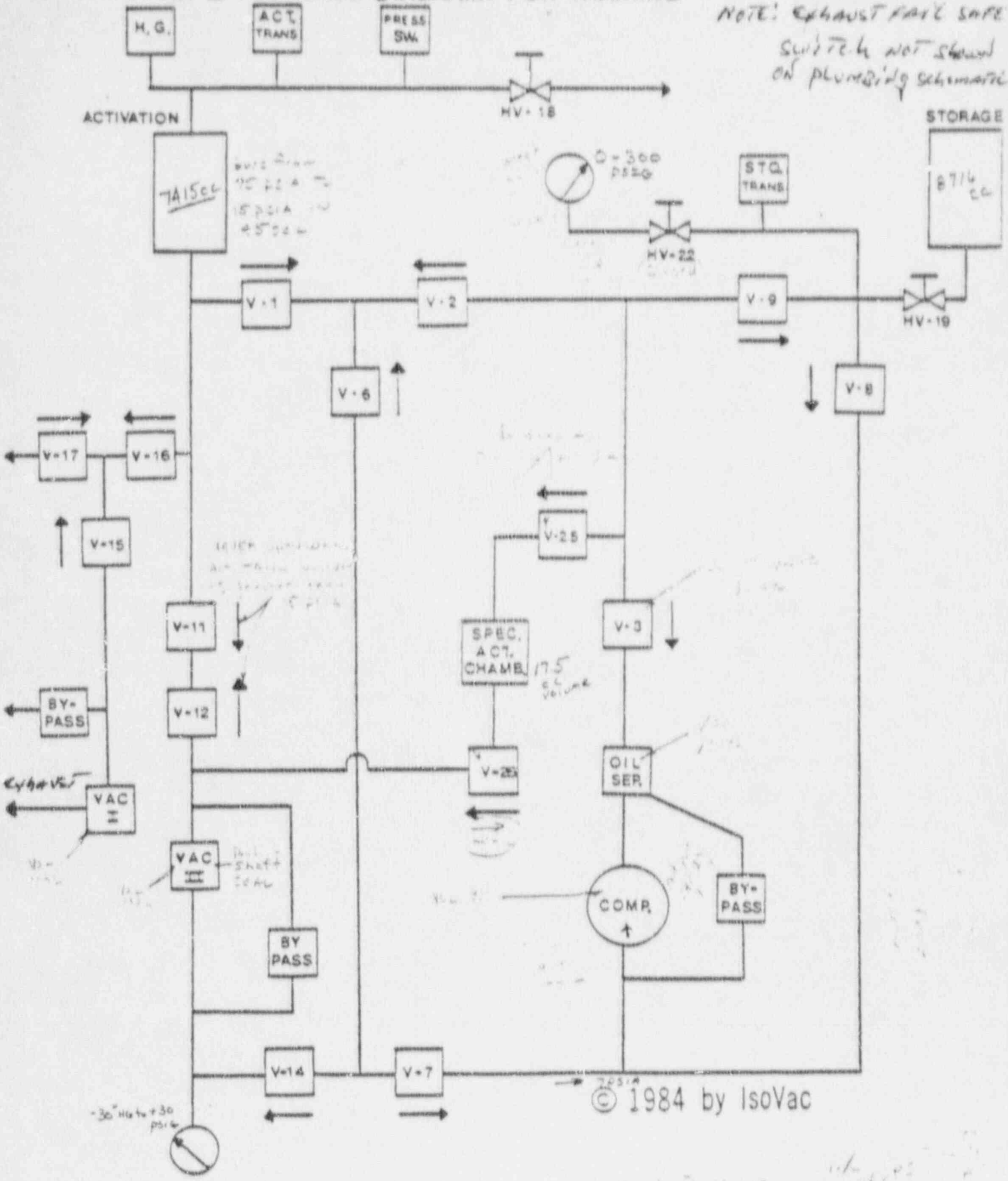
Kx (@ 296 meters - point of max. conc.) =

1.6E-10 microcuries/cc

Kx (@ 136 meters) = 4.8E-11 microcuries/cc

1/10/91
rl/nrcomapx

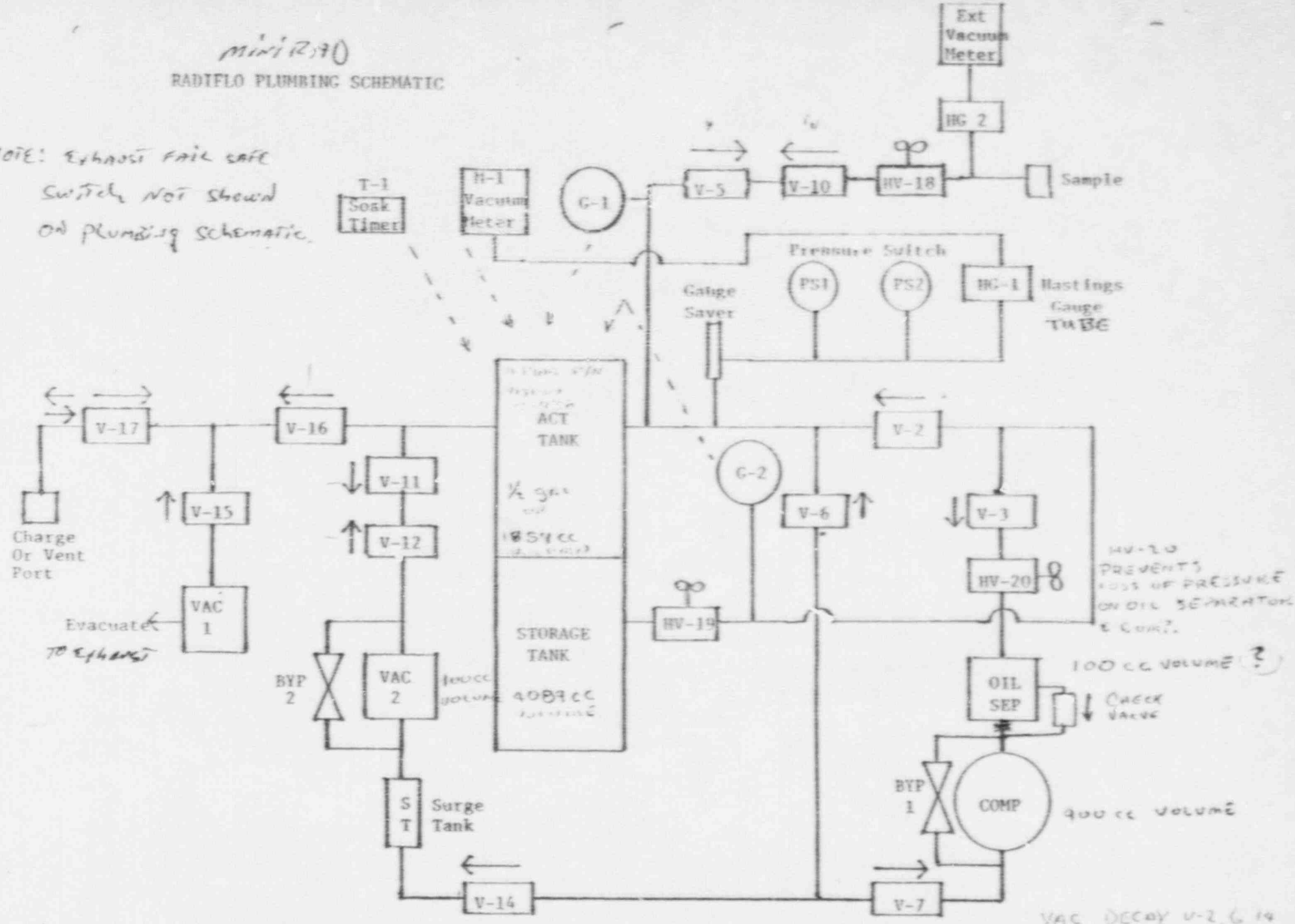
MARK V PLUMBING DIAGRAM / FOR TRAINING



mini R-70

RADIFLO PLUMBING SCHEMATIC

NOTE: Exhaust fail safe switch NOT shown on plumbing schematic.



HV-20 PREVENTS LOSS OF PRESSURE ON OIL SEPARATOR E COMP.

100 cc VOLUME (?)

400 cc VOLUME

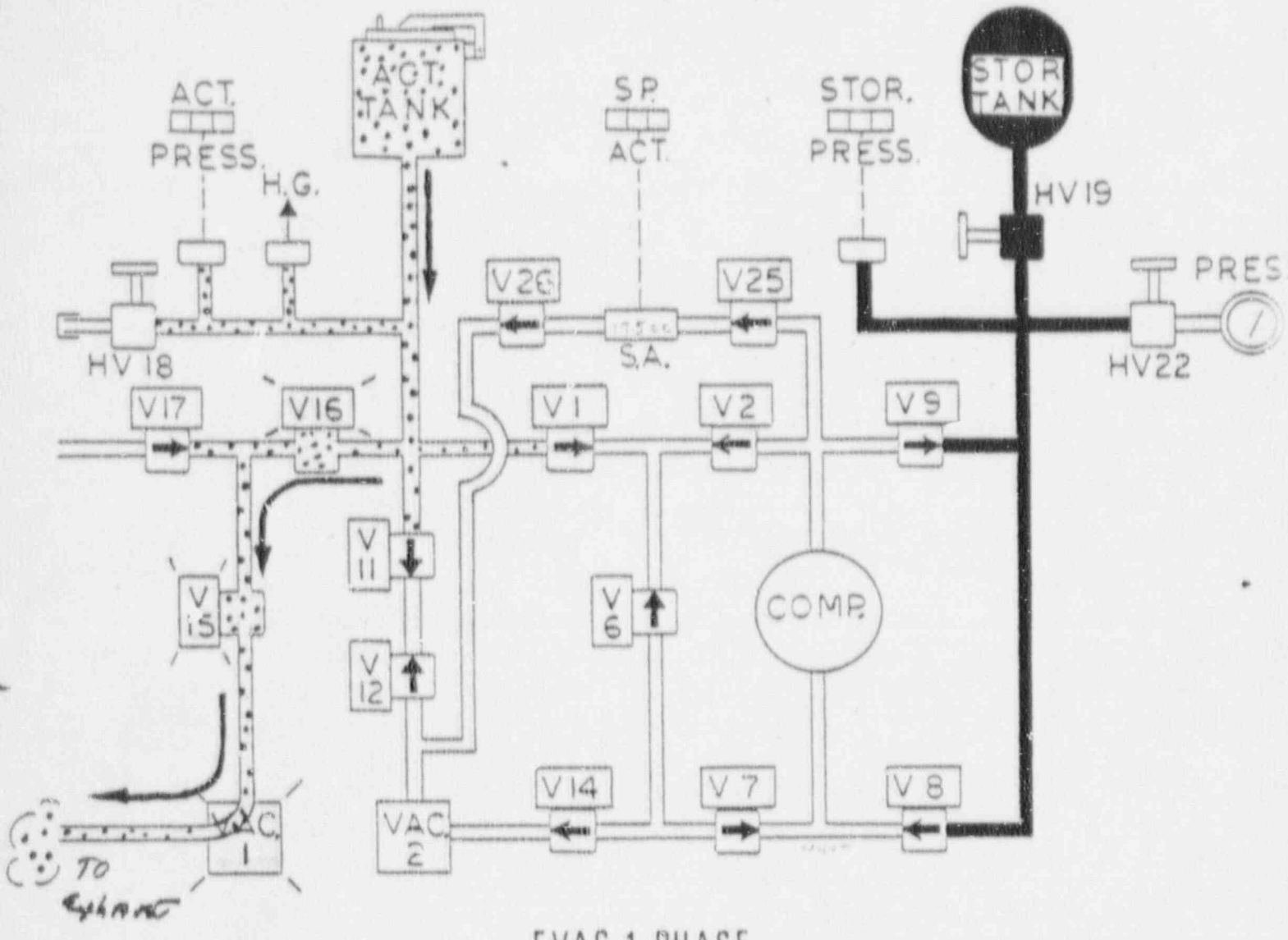
VAC DECAY V-2, G-14

7.3×10^{-4} ATM cc SEC

NOTE: 1) All solenoids except BYP 1 & 2 are normally closed until energized.

2) Valves seal best in direction of arrow (Pressure + High + -Low).

3) 1 ATM = 14.7 PSI = 29.92 in Hg = 760 mm Hg.



EVAC 1 PHASE

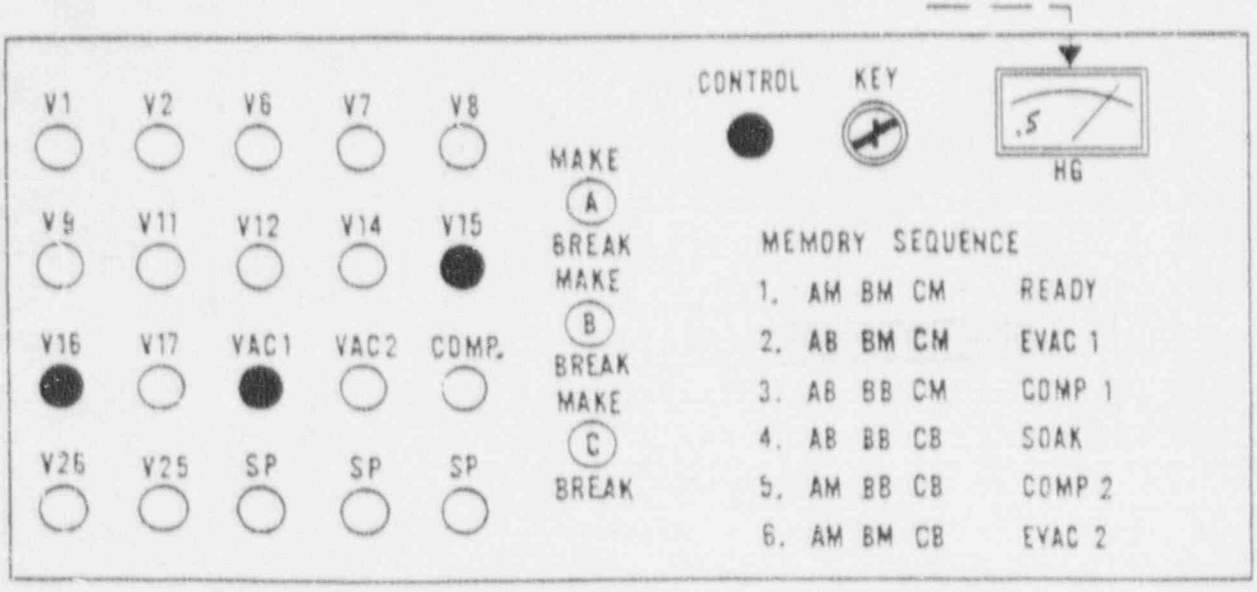
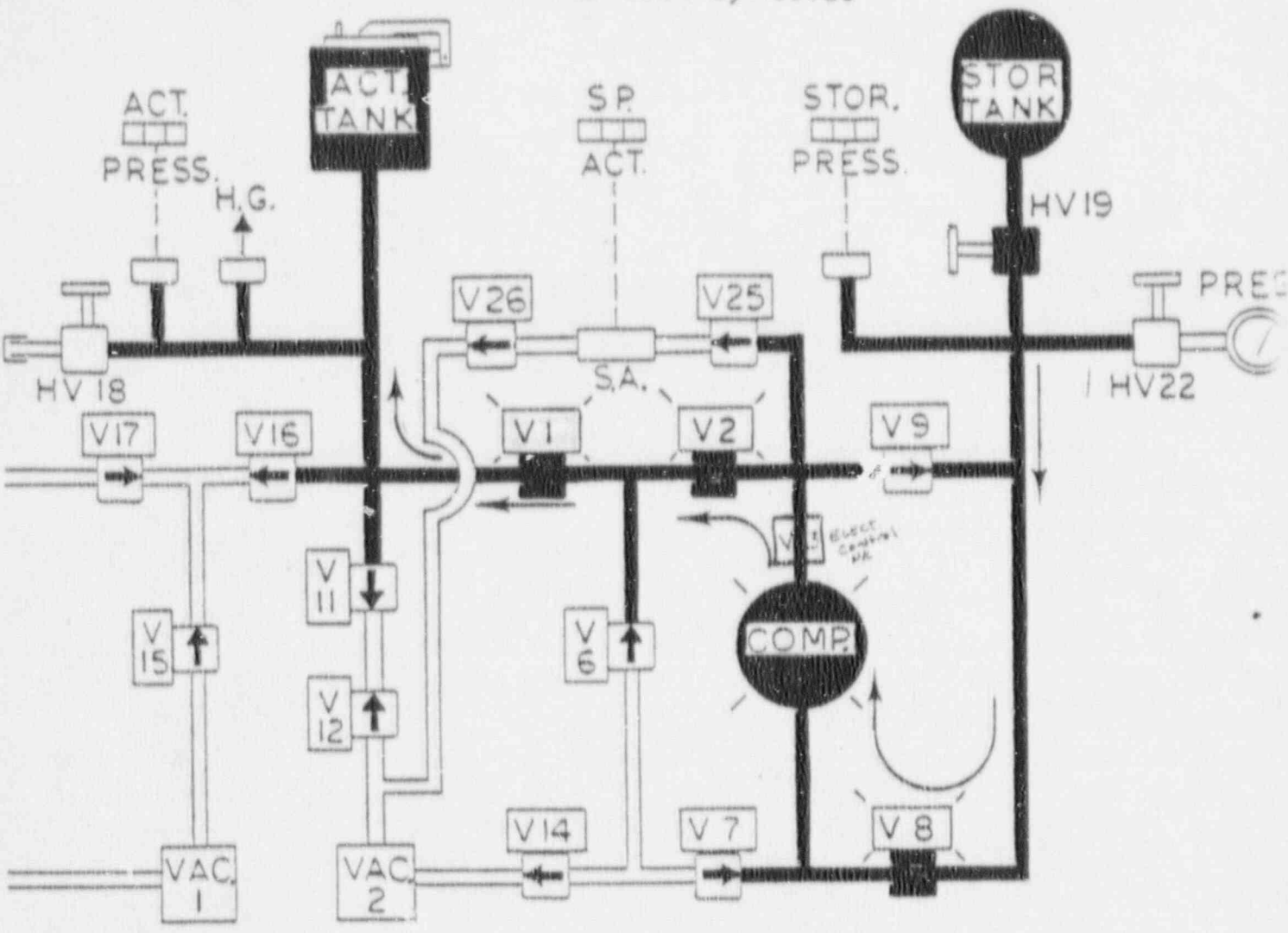


Figure 3



COMP 1 PHASE

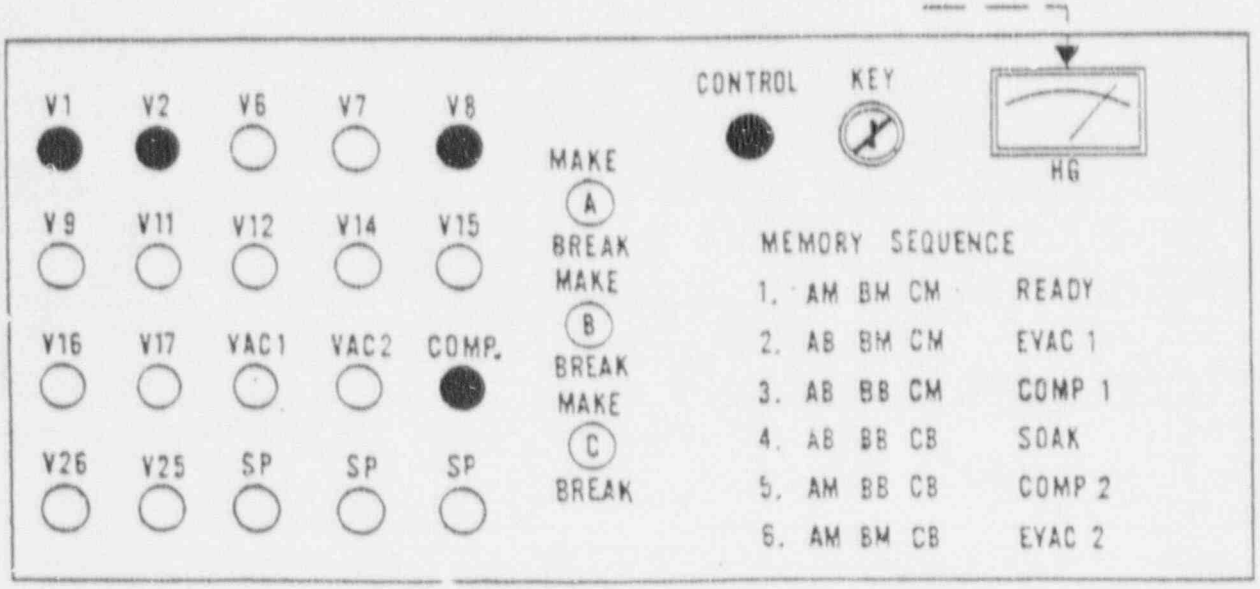
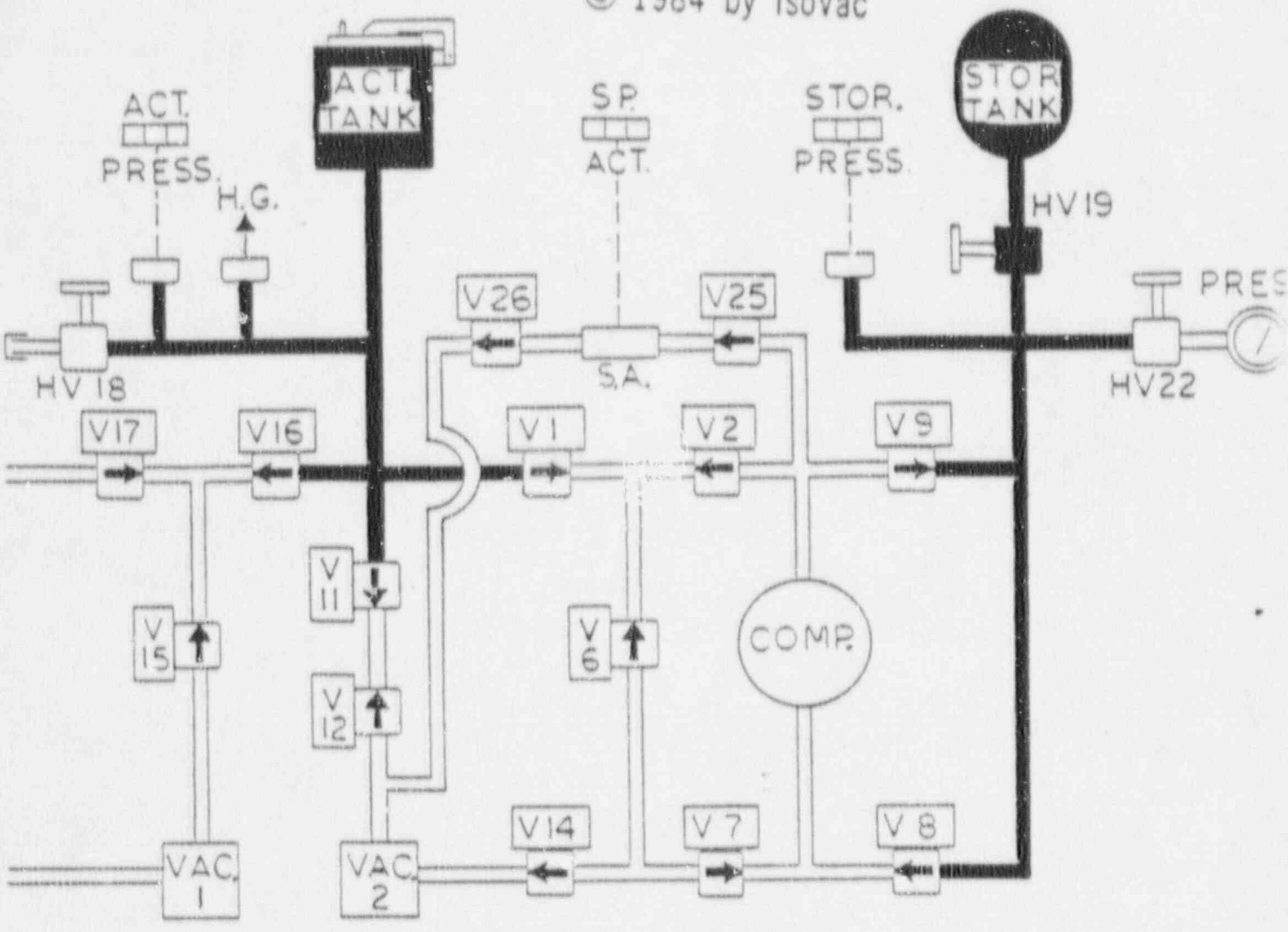


Figure 4



SOAK PHASE

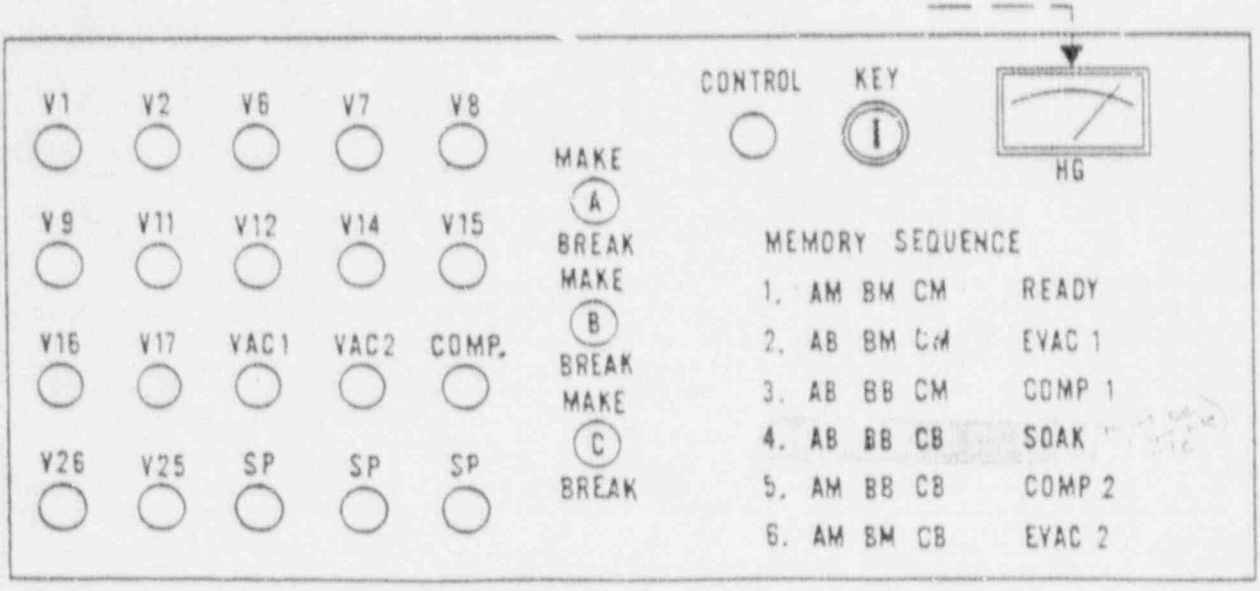
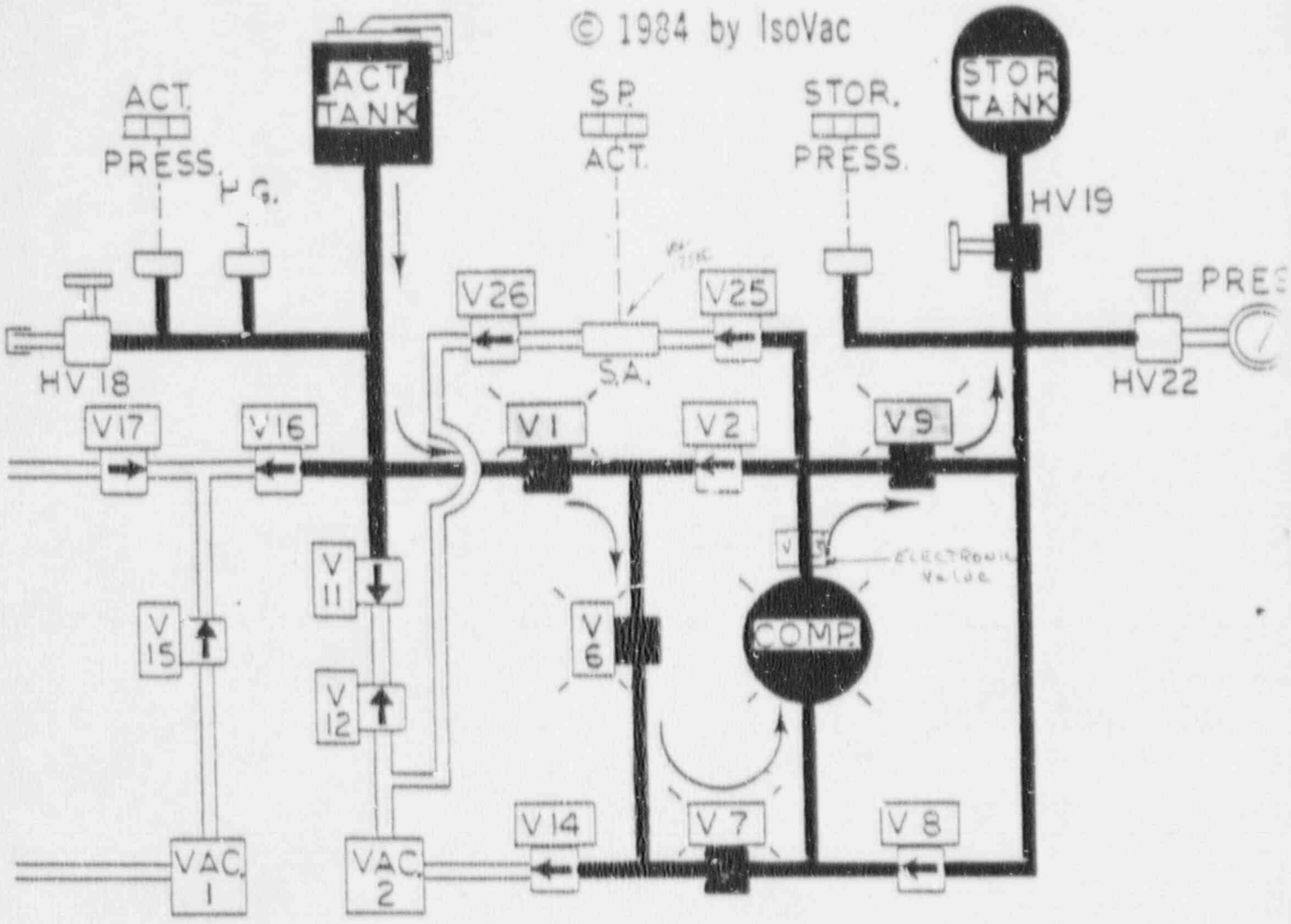


Figure 5



COMP 2 PHASE

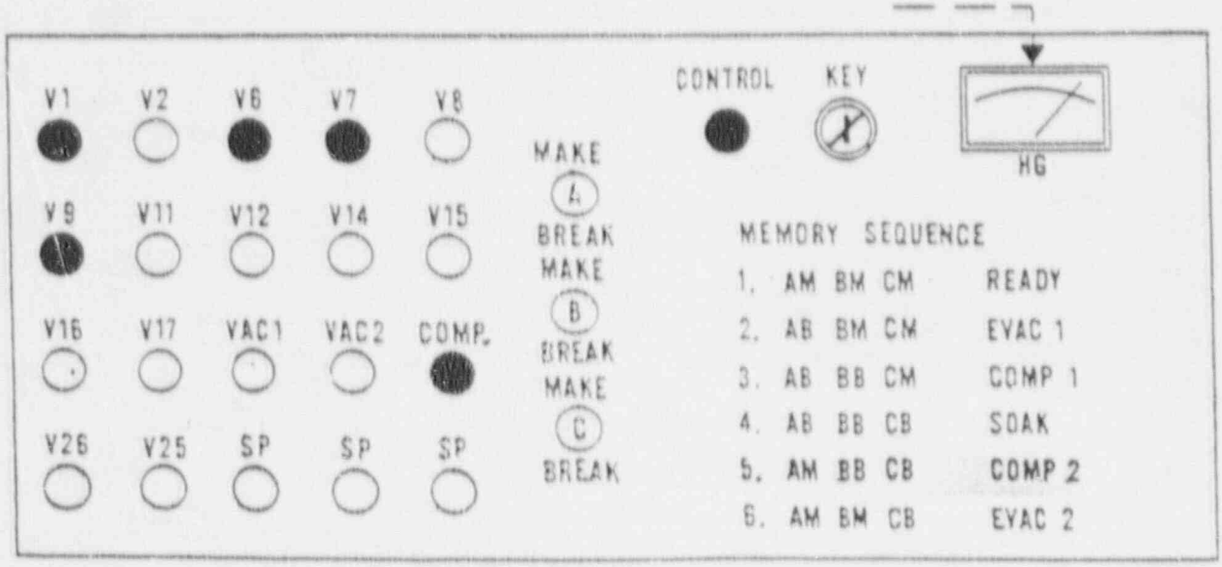
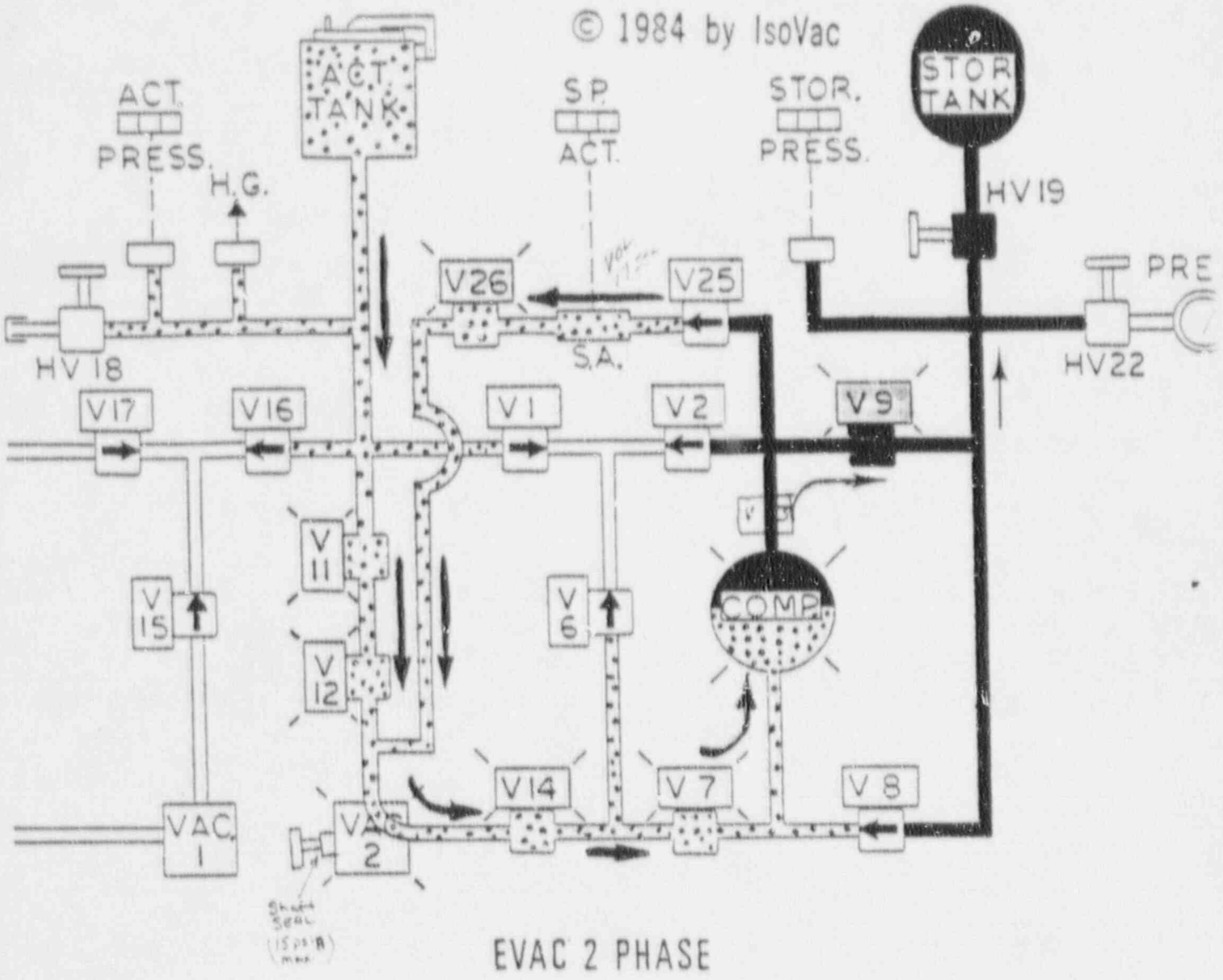


Figure 6


© 1984 by IsoVac
ACT. TANK
ACT. PRESS.
H.G.
SP. ACT.
STOR. PRESS.
STOR. TANK
HV 19
PRE
HV 18
V26
V25
S.A.
HV22
V17
V16
V1
V2
V9
V 11
V 15
V 6
COMP.
V 12
V14
V 7
V 8
VAC. 1
VAC. 2
Shaft Seal
EVAC 2 PHASE

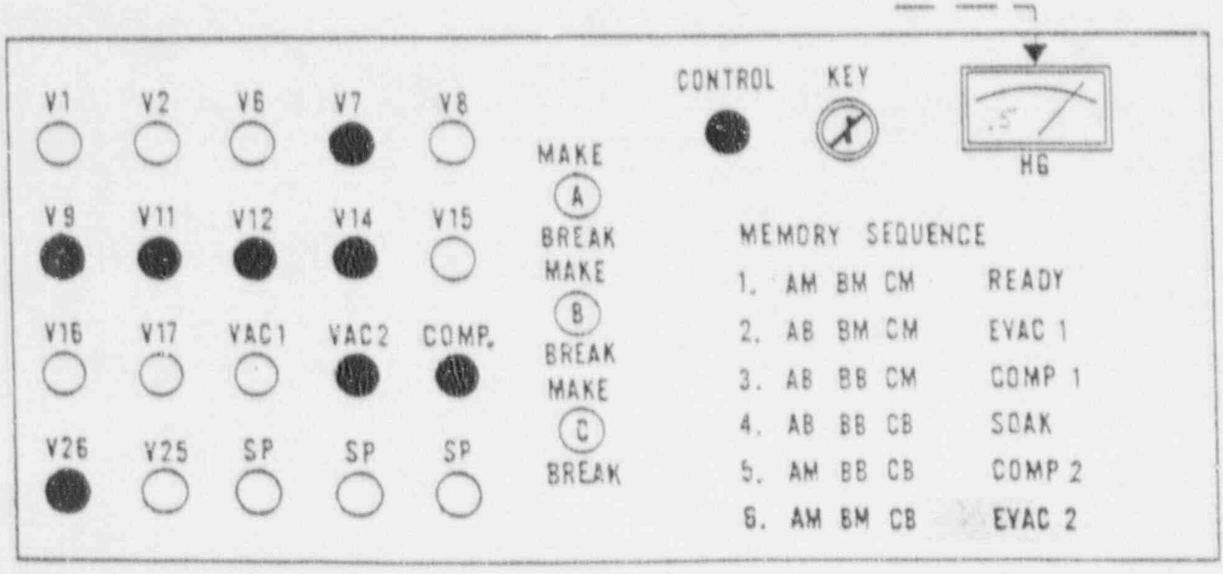
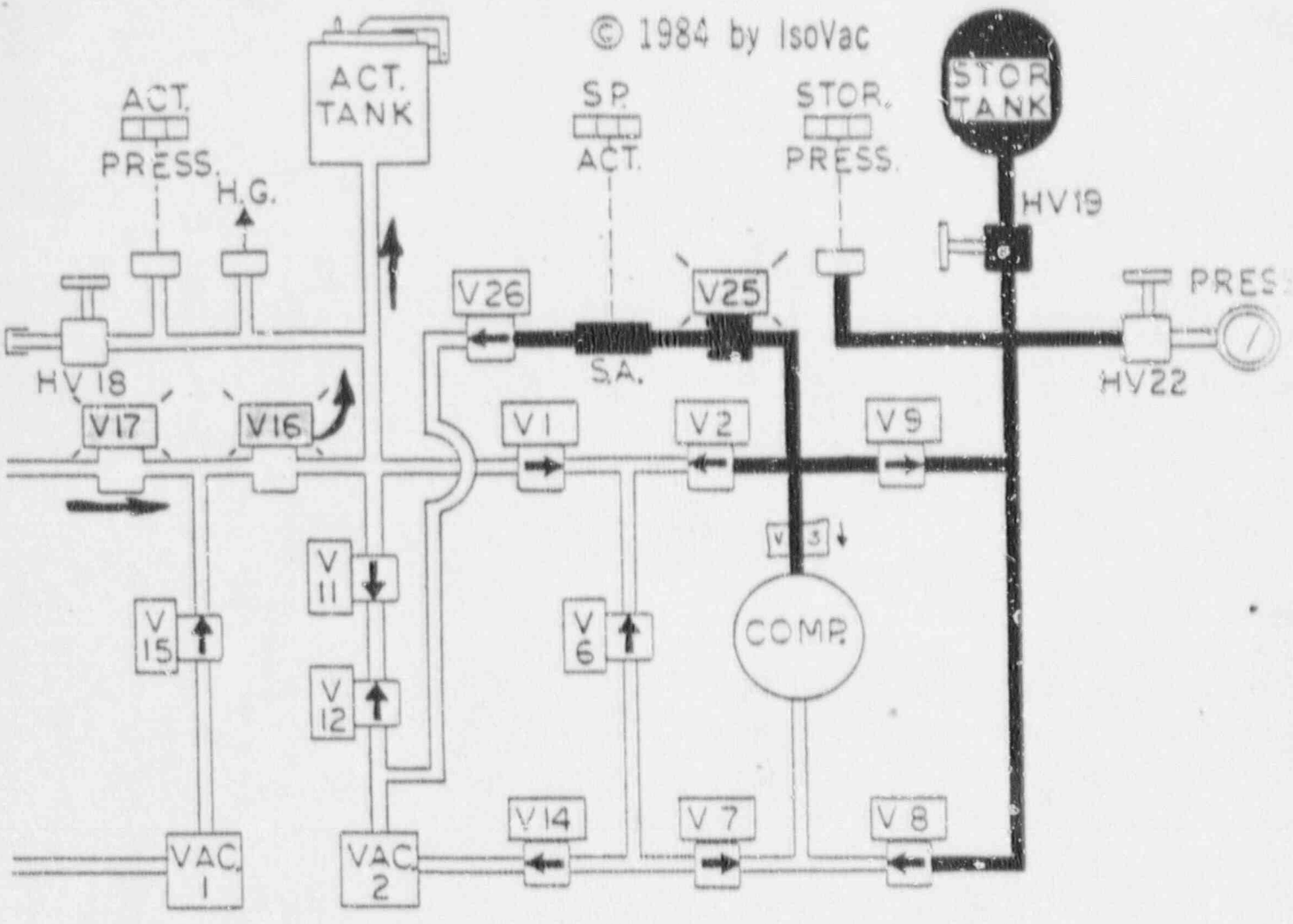

V1 V2 V6 V7 V8
V9 V11 V12 V14 V15
V16 V17 VAC1 VAC2 COMP.
V26 V25 SP SP SP
MAKE
A
BREAK
MAKE
B
BREAK
MAKE
C
BREAK
CONTROL
KEY
HG
MEMORY SEQUENCE
1. AM BM CM READY
2. AB BM CM EVAC 1
3. AB BB CM COMP 1
4. AB BB CB SOAK
5. AM BB CB COMP 2
6. AM BM CB EVAC 2

Figure 7



READY/VENT PHASE

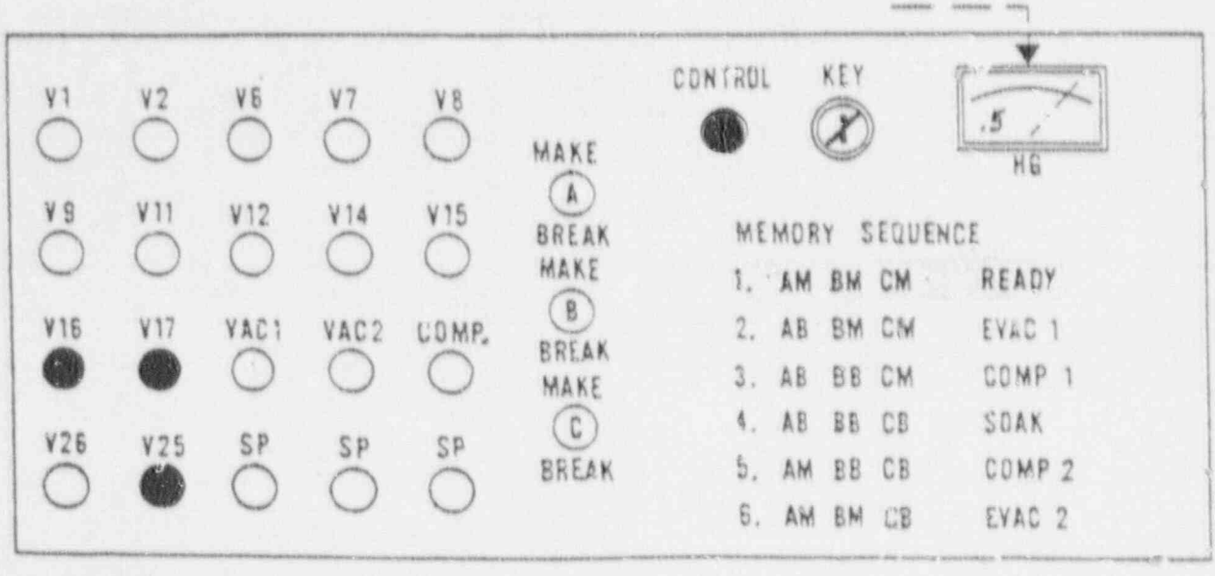


Figure 8

HARRIS SEMICONDUCTOR

December 18, 1990

United States Nuclear Regulatory Commission
Region III
799 Roosevelt Rd.
Glen Ellyn Il. 60137

Attn: Loren Hueter

Subject: Control Number 89649 - Extension of Response Time

Gentleman:

Per telephone conversation this date, Harris requests an extension for response time to the commission's letter dated 12/3/90. The reasons for the extension are:

1. Harris will shut down the factory for Christmas and new year holiday beginning Friday, 12/21/90 and resumes operation on 1/3/90. No one will be present at the facility to generate the information needed by the commission.

2. Additional information is needed from Isovac Engineering in order to prepare a proper response.

The commission should receive the information it requires by January 11, 1991.

Thank you for your co-operation in this matter.

Ray Lau, RSO
Harris Semiconductor
Findlay, Ohio 45840

rl/nrctime

CONVERSATION RECORD

TIME

DATE 12-18-90

TYPE ☐ VISIT ☐ CONFERENCE ☒ TELEPHONE ☒ INCOMING ☐ OUTGOING

Location of Visit/Conference:

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (Office, dept., bureau, etc.)	TELEPHONE NO.
Ray F.	Harris Semiconductor	407-724-3531

ROUTING

NAME/SYMBOL	INT

SUBJECT

CN 89649

SUMMARY

Ray called to inform that there plant was shutting down between holidays for a week and that they couldn't meet our requested 30 day response time due Jan 2nd. Requested extension to Jan 11th. Said part of evaluation was being performed by Sandard that test has not been completed yet & attempt pc to them. I granted request. He originally asked for 3 week extension but agreed to the 9 days after I suggested it.

ACTION REQUIRED

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
	L. Hunter	12-18-90

ACTION TAKEN

SIGNATURE	TITLE	DATE

DEC 03 1990

Harris Semiconductor
Findlay Operations
ATTN: Ray Lau,
Radiation Safety Officer
1700 Fostoria Road
Findlay, OH 45740-6287

Gentlemen:

We have reviewed your letters dated October 31, 1989, April 20, 1990 and June 15, 1990 requesting an amendment to License No. 34-16429-01 to add an authorized user and to request approval to release to the environment as a disposal mechanism about 10 curies of krypton-85 gas from each of two Isovac Engineering Radiflo leak test units. We find that we will need additional information as follows:

1. Please provide a copy of Mr. Shade's training certificate for the training he received by Isovac on February 26, 1987. Your June 15th letter stated that the training certificate was attached but the letter was received without the certificate.

2. In order to evaluate the release, please provide for each system the following information:

   a. Diagram of the system including storage tank, piping, isolation and flow control valves, monitoring devices including stack monitoring, etc. (If any modification of system is required please identify it in the diagram and provide a separate detailed description.)

   b. Procedures for release (including how release is controlled to assure it exhausts via the stack and provisions to control the release rate to ensure concentrations are not unacceptable).

   c. Identify for each stack the distance to the current nearest air intake and the nearest offsite building and its use, and provide an evaluation of air concentrations at these locations based on planned releases.

   d. If air concentrations at point of release from the stack will exceed the unrestricted area MPC listed in 10 CFR Part 20, Appendix B, Table II, Column I for Kr-85, describe your provisions for restricting access to the roof area where stack is located.

   e. Describe any meteorological restrictions that will be required during the releases.

f. Describe provisions for prompt termination of release in the event of loss of stack flow.

g. Describe procedures for ensuring meteorological conditions (e.g. low wind speeds or changes in wind direction) are such that concentration levels are not unacceptable).

f. Confirm that releases from both units will not be made simultaneously.

3. Please describe your means of evaluating the quantity of residual Kr-85 (in oil and metal surfaces) contained in each unit after the proposed release to atmosphere in order to demonstrate whether the license will be subject to certification of financial assurance (greater than 100 millicuries of Kr-85). Also, please note that the unit you plan to transfer will need to be considered a contaminated item.

If you have any questions or require clarification on any of the information stated above, you may contact us at (708) 790-5625.

We will continue our review of your application upon receipt of this information. Please reply in duplicate, within 30 days, and refer to Control Number 89649.

Upon failure to file an answer within the specified time, we will consider that you have abandoned your request and will void this action. This is without prejudice to resubmission of the application.

Sincerely,

Original Signed By
Loren J. Hueter
Materials Licensing Section

KIII

HUETER/da
11/ /90

HARRIS SEMICONDUCTOR

October 17, 1990

United States Nuclear Regulatory Commission
Region III
799 Roosevelt Rd.
Glen Ellyn, Il. 60137
Attention: Loren Hueter

Subject: **Status of NRC Approval for Release of Krypton Gas to Atmosphere**

Dear Mr. Hueter:

I am inquiring into the status of a formal Request by Harris Semiconductor to remove two leak test systems from service by release of small quantities of Krypton gas to atmosphere.

On April 30, 1990, the first request was submitted to your headquarters. On June 15,1990, Harris submitted an amendment to license 34-16429-01 to permit the release.

In early October, you indicated by telephone that the Harris amendment was sent to Washington Headquarters for further study and approval.

The two referenced leak test systems are now shut down and awaiting NRC approval to proceed with decommission plans. The Mark V system will be transferred to a Harris Melbourne Florida facility and the Minirad system will be dismantled.

Both systems are in rooms serving as restricted confines to unauthorized individuals. The rooms have now become obstacles to expansion of the manufacturing facility. The facility expansion will now be inhibited until NRC provides approval for further decommission actions.

I request that NRC take quick action to move the approval process along which will allow our facility expansion to continue in timely fashion.

Please contact the Washington office advising them of our concern and indicate that if they have questions, I can be contacted at telephone 419-423-0321. Thank you,

Ray Lau, RSO
Harris Semiconductor
Findlay Operations

HARRIS CORPORATION SEMICONDUCTOR SECTOR 1700 FOSTORIA ROAD FINDLAY OHIO 45840-6287 TELEPHONE 419-423-0321 FAX 419-424-4434

HARRIS SEMICONDUCTOR

June 15, 1990

United States Nuclear Regulatory Commission
Region III
799 Roosevelt Rd.
Glen Ellyn, Il. 60137

Log June 26
Remitter 105454
Check No. 760
Amount 3P
Fee Category Sand
Type of Fee
Date Check Rec'd
Date Completed 6/28/90

Subject: Amendment to License Number 34-16429-01.

Gentleman:

This letter requests amendment of the materials license issued to Harris Semiconductor as follows:

1. Add William D. Shade to the license (condition 11). Mr. Shade has been trained by Isovac Engineering in Radiological Safety, Radiflo equipment operation, and handling of radioisotopes pursuant to the requirements of USNRC and Isovac Engineering report R-3848-B. Mr. Shade was trained by Isovac 26 February 1987. His technical support for the Radiflo leak test equipment may be required during third quarter for relocation of the equipment to the Melbourne, Florida facility. Mr Shade's training certificate is attached.

2. Amend the license to allow for release to atmosphere of 10 curies Krypton gas from each of two leak test systems. Harris will shut down both systems during third quarter 1990. (Extended from July 1990) Removing the gas from the equipment by Cryo trapping is not a safe alternative. NRC's Kevin Null has a letter dated 4/30/90 concerning the release request. A copy of the letter is attached.

A check for the amendment fee is enclosed. Prompt response to this request by the commission is needed in order to meet the third quarter transfer date.

Contact me if you have questions at 419-423-0321. Thank you for your assistance in this matter.

RECEIVED
JUN 20 1990
REGION III

JUN 20 1990

CONTROL NO. 89649

HARRIS
SEMICONDUCTOR

Ray Lau, RSO
Harris Semiconductor
Findlay Operations

cc: J. Marshall
W. Mertz
R. Emmons
J. Mainzer
G. Neff - Isovac Engineering

rl/nrcamen

HARRIS CORPORATION SEMICONDUCTOR SECTOR 1700 FOSTORIA ROAD FINDLAY OHIO 45840-6287 TELEPHONE 419-423-0321 FAX 419-424-4434

HARRIS
SEMICONDUCTOR

April 30, 1990

United States Nuclear Regulatory Commission
Region III
799 Roosevelt Rd.
Glen Ellyn, Il. 60137

Subject: Request For NRC Approval To Release A Small Quantity of Krypton Gas To Atmosphere.

Gentleman:

This letter requests NRC approval for release to atmosphere of 10 curies of krypton 85 gas from each of two leak detector systems. The commission was advised on November 2, 1989 that Harris will relocate an Isovac Mark V leak detection system to the Melbourne Florida facility and remove from service a Minirad leak detection system in 1990. The license number relating to the mentioned actions is 34-16429-01.

The Mark V system cannot be transferred to our Florida facility with Krypton gas in the storage chamber. It would not be practical to transfer the gas into a DOT approved storage vessel since this would require a shielded cylinder having a rather large volume.

10CFR20, Appendix B, Table II states that the maximum exposure permitted for an unrestricted area is 3×10^{-7} microcuries per cubic centimeter (air). The original license application has an appendix indicating that for a usage of 30 curies, the maximum ground level concentration (unrestricted area) would be about 6.3×10^{-10} microcuries per cc air averaged over one year. Using the same calculations, the proposed 10 curie release over two days would result in 4×10^{-8} microcuries per cc air ground level concentration. This is less than the mentioned table II limit. (Note: the stack point of discharge is considered a restricted area as the roof is restricted to normal access)

Prompt response to this request by NRC is needed in order to meet a July 1990 transfer date.

Contact me if you have questions at 419-423-0321. Thank you for your assistance in this matter.

MAY 10 1990

HARRIS CORPORATION SEMICONDUCTOR SECTOR 1700 FOSTORIA ROAD FINDLAY OHIO 45840-6287 TELEPHONE 419-423-0321 FAX 419-424-4434

HARRIS SEMICONDUCTOR

Ray Lau

Ray Lau, RSO
Harris Semiconductor
Findlay Operations

cc: J. Marshall
W. Mertz
R. Emmons
J. Mainzer
G. Neff - Isovac Engineering

rl/nrc

HARRIS CORPORATION SEMICONDUCTOR SECTOR 1700 FOSTORIA ROAD FINDLAY OHIO 45840-6287 TELEPHONE 419-423-0321 FAX 419-424-4434

F

DEC 03 1990

TAR Packet
TFR Response
Final Deficiency
Letter

Harris Semiconductor
Findlay Operations
ATTN: Ray Lau,
Radiation Safety Officer
1700 Fostoria Road
Findlay, OH 45740-6287

Gentlemen:

We have reviewed your letters dated October 31, 1989, April 30, 1990 and June 15, 1990 requesting an amendment to License No. 34-16429-01 to add an authorized user and to request approval to release to the environment as a disposal mechanism about 10 curies of krypton-85 gas from each of two Isovac Engineering Radiflo leak test units. We find that we will need additional information as follows:

1. Please provide a copy of Mr. Shade's training certificate for the training he received by Isovac on February 26, 1987. Your June 15th letter stated that the training certificate was attached but the letter was received without the certificate.

2. In order to evaluate the release, please provide for <u>each</u> system the following information:

   a. Diagram of the system including storage tank, piping, isolation and flow control valves, monitoring devices including stack monitoring, etc. (If any modification of system is required please identify it in the diagram and provide a separate detailed description.)

   b. Procedures for release (including how release is controlled to assure it exhausts via the stack and provisions to control the release rate to ensure concentrations are not unacceptable).

   c. Identify for each stack the distance to the current nearest air intake and the nearest offsite building and its use, and provide an evaluation of air concentrations at these locations based on planned releases.

   d. If air concentrations at point of release from the stack will exceed the unrestricted area MPC listed in 10 CFR Part 20, Appendix B, Table II, Column I for Kr-85, describe your provisions for restricting access to the roof area where stack is located.

   e. Describe any meteorological restrictions that will be required during the releases.

f. Describe provisions for prompt termination of release in the event of loss of stack flow.

g. Describe procedures for ensuring meteorological conditions (e.g. low wind speeds or changes in wind direction) are such that concentration levels are not unacceptable).

f. Confirm that releases from both units will not be made simultaneously.

3. Please describe your means of evaluating the quantity of residual Kr-85 (in oil and metal surfaces) contained in each unit after the proposed release to atmosphere in order to demonstrate whether the license will be subject to certification of financial assurance (greater than 100 millicuries of Kr-85). Also, please note that the unit you plan to transfer will need to be considered a contaminated item.

If you have any questions or require clarification on any of the information stated above, you may contact us at (708) 790-5625.

We will continue our review of your application upon receipt of this information. Please reply in duplicate, within 30 days, and refer to Control Number 89649.

Upon failure to file an answer within the specified time, we will consider that you have abandoned your request and will void this action. This is without prejudice to resubmission of the application.

Sincerely,

Original Signed By
Loren J. Hueter
Materials Licensing Section

RIII
HUETER/da
11/30/90

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

NOV 07 1990

MEMORANDUM FOR: John A. Grobe, Chief
Nuclear Materials Safety and Safeguards Branch, RIII

FROM: John E. Glenn, Chief
Medical, Academic, and Commercial
Use Safety Branch
Division of Industrial and
Medical Nuclear Safety, NMSS

SUBJECT: TECHNICAL ASSISTANCE REQUEST RE HARRIS SEMICONDUCTOR FOR RELEASE TO THE ENVIRONMENT OF KR-85 (MAIL CONTROL NO. 389649)

We have evaluated the information provided in a memorandum dated September 5, 1990, from Bruce S. Mallett, Ph.D., on the above subject. We have also coordinated this request with the Division of Low-Level Waste Management and Decommissioning (LLWM) and they have provided comments in the enclosed memorandum dated October 30, 1990, from John H. Austin, Chief, Regulatory Branch. We find Harris Semiconductor's request to release Kr-85 to the environment acceptable in accordance with 10 CFR 20.106(b) provided: (1) you modify your draft deficiency letter to include LLWM's comments, and (2) you receive a satisfactory reply to your modified letter.

John E. Glenn, Chief
Medical, Academic, and Commercial
Use Safety Branch
Division of Industrial and
Medical Nuclear Safety, NMSS

Enclosure:
Memo dtd 10/30/90
fm J. H. Austin

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OCT 2 0 1990

MEMORANDUM FOR: John E. Glenn, Chief
Medical, Academic, and Commercial
Use Safety Branch
Division of Industrial and
Medical Nuclear Safety, NMSS

FROM: John H. Austin, Chief
Regulatory Branch
Division of Low-Level Waste Management
and Decommissioning, NMSS

SUBJECT: TECHNICAL ASSISTANCE REQUEST FROM REGION III
RE HARRIS SEMICONDUCTOR PROPOSED RELEASE TO
THE ENVIRONMENT OF KR-85 (MAIL CONTROL NO. 389649)

This is in response to your September 26, 1990 memorandum that refers the subject technical assistance request to the Regulatory Branch for review. As your memorandum implies, the proposed release is really a Part 20 issue and, as such, the Regulatory Branch defers to you. However, we would suggest that the deficiency letter include, in paragraph 2.b, a request for information on how the licensee plans to control the release rate to ensure concentrations are not unacceptable; and , in paragraph 2.f or elsewhere, a request for information on procedures for ensuring meteorological conditions (e.g. low wind speeds or changes in wind direction) are such that concentration levels are not unacceptable.

John H. Austin

John H. Austin, Chief
Regulatory Branch
Office of Low-Level Waste Management
and Decommissioning, NMSS

CONVERSATION RECORD

TIME:

DATE: 11-2-90

TYPE: ☐ VISIT ☐ CONFERENCE ☑ TELEPHONE ☑ INCOMING ☐ OUTGOING

Location of Visit/Conference:

ROUTING

NAME/SYMBOL	INT

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU: Mike La Mastra

ORGANIZATION (Office, dept., bureau, etc.): NRC

TELEPHONE NO:

SUBJECT

Harris Semiconductor - TAR re: request to release residual Kr-85 gas to atmosphere

SUMMARY

Mike said he would be drafting response for John Glenn but that he probably would not get to it for a week or two and therefore suggested we may want to go ahead and send deficiency letter to Harris Semiconductor. Mike said he had obtained the required input from Low Level Waste. He provided a brief summary but not too clear. Therefore I discussed with Wm Adam, acting Section Chief & we decided to wait for written response.

ACTION REQUIRED

NAME OF PERSON DOCUMENTING CONVERSATION:

SIGNATURE: L. Hunter

DATE: 11-2-90

ACTION TAKEN

SIGNATURE:

TITLE:

DATE:

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

MEMORANDUM FOR: John E. Glenn, Ph.D., Chief, Medical, Academic, and Commercial Use Safety Branch, NMSS

THRU: William J. Adam, Ph.D., Acting Chief, Materials Licensing Section

FROM: Loren Hueter, License Reviewer, Materials Licensing Section

SUBJECT: STATUS OF EVALUATION OF REQUEST FROM HARRIS SEMICONDUCTOR FOR RELEASE OF KRYPTON-85 GAS TO ATMOSPHERE (MAIL CONTROL NO. 389649)

In response to the subject licensee's request for expeditious resolution of their proposed plan for disposal of residual krypton-85 gas by release to the atmosphere, I have enclosed a copy of their October 17, 1990, letter expressing the urgency of that request. You will note that the letter contains a direct licensee contact which may aid you should you have any questions.

If I may be of service, please contact me at FTS 388-5632.

Loren J. Hueter, License Reviewer
Materials Licensing Section

Enclosure: Letter dated
October 17, 1990

HARRIS
SEMICONDUCTOR

October 17, 1990

United States Nuclear Regulatory Commission
Region III
799 Roosevelt Rd.
Glen Ellyn, Il. 60137
Attention: Loren Hueter

Subject: **Status of NRC Approval for Release of Krypton Gas to Atmosphere**

Dear Mr. Hueter:

I am inquiring into the status of a formal Request by Harris Semiconductor to remove two leak test systems from service by release of small quantities of Krypton gas to atmosphere.

On April 30, 1990, the first request was submitted to your headquarters. On June 15,1990, Harris submitted an amendment to license 34-16429-01 to permit the release.

In early October, you indicated by telephone that the Harris amendment was sent to Washington Headquarters for further study and approval.

The two referenced leak test systems are now shut down and awaiting NRC approval to proceed with decommission plans. The Mark V system will be transferred to a Harris Melbourne Florida facility and the Minirad system will be dismantled.

Both systems are in rooms serving as restricted confines to unauthorized individuals. The rooms have now become obstacles to expansion of the manufacturing facility. The facility expansion will now be inhibited until NRC provides approval for further decommission actions.

I request that NRC take quick action to move the approval process along which will allow our facility expansion to continue in timely fashion.

Please contact the Washington office advising them of our concern and indicate that if they have questions, I can be contacted at telephone 419-423-0321. Thank you,

Ray Lau, RSO
Harris Semiconductor
Findlay Operations

RECEIVED
OCT 24 1990
REGION III

OCT 24 1990

HARRIS
SEMICONDUCTOR

October 17, 1990

United States Nuclear Regulatory Commission
Region III
799 Roosevelt Rd.
Glen Ellyn, Il. 60137
Attention: Loren Hueter

Subject: **Status of NRC Approval for Release of Krypton Gas to Atmosphere**

Dear Mr. Hueter:

I am inquiring into the status of a formal Request by Harris Semiconductor to remove two leak test systems from service by release of small quantities of Krypton gas to atmosphere.

On April 30, 1990, the first request was submitted to your headquarters. On June 15,1990, Harris submitted an amendment to license 34-16429-01 to permit the release.

In early October, you indicated by telephone that the Harris amendment was sent to Washington Headquarters for further study and approval.

The two referenced leak test systems are now shut down and awaiting NRC approval to proceed with decommission plans. The Mark V system will be transferred to a Harris Melbourne Florida facility and the Minirad system will be dismantled.

Both systems are in rooms serving as restricted confines to unauthorized individuals. The rooms have now become obstacles to expansion of the manufacturing facility. The facility expansion will now be inhibited until NRC provides approval for further decommission actions.

I request that NRC take quick action to move the approval process along which will allow our facility expansion to continue in timely fashion.

Please contact the Washington office advising them of our concern and indicate that if they have questions, I can be contacted at telephone 419-423-0321. Thank you,

Ray Lau, RSO
Harris Semiconductor
Findlay Operations

RECEIVED
OCT 24 1990
REGION III

OCT 24 1990

HARRIS CORPORATION SEMICONDUCTOR SECTOR 1700 FOSTORIA ROAD FINDLAY OHIO 45840-6287 TELEPHONE 419-423-0321 FAX 419-424-4434

CONVERSATION RECORD

TIME

DATE 9-28-90

TYPE

☐ VISIT ☐ CONFERENCE ☑ TELEPHONE ☐ INCOMING ☐ OUTGOING

Location of Visit/Conference:

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (Office, dept., bureau, etc.)	TELEPHONE NO.
Ray Law	Harris Semiconductor	419-423-0321

SUBJECT
SN 89649

ROUTING	
NAME/SYMBOL	INT

SUMMARY

This call was in response to Ray's attempt to call me yesterday. He wanted status on request to release Kr-85 gas to atmosphere for disposal. He said today was last day and unit would be shut down. He said Harris people would be there for shut down, only release to atmosphere and preparation of unit for shipment to Florida as well as salvage & shipment back to California of some of key components of the unit to be left at Harris Semiconductor's Findlay facility. I told him of our TDR to HQ on 9-5-90 and that we agreed to expedite. He expressed desire for resolution as soon as possible.

ACTION REQUIRED

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
	L. Hunter	9-28-90

ACTION TAKEN

SIGNATURE	TITLE	DATE

90-15

SEP 5 1990

License File
34-16429-01

MEMORANDUM FOR: John E. Glenn, Ph.D., Chief, Medical, Academic, and Commercial Use Safety Branch, NMSS

THRU: Bruce S. Mallett, Ph.D., Chief, Nuclear Materials Safety Branch, Region III

FROM: Cynthia G. Jones, Acting Chief, Materials Licensing Section

SUBJECT: REQUEST FROM HARRIS SEMICONDUCTOR FOR RELEASE TO THE ENVIRONMENT AS THE DISPOSAL MECHANISM FOR 20 CURIES RESIDUAL KR-85 IN TWO ISOVAC RADIFLO UNITS (MAIL CONTROL NO. 389649)

Harris Semiconductor is an industrial licensee located in Findlay, Ohio. Currently, this license (Enclosure 1) authorizes use of up to 21 curies of krypton-85 in each of two Isovac Engineering Radiflo units (a Minirad and a Mark V) for leak testing parts and components and authorizes gas in shipping containers for storage and use in loading the Radiflo units and one small sealed standard source of krypton-85.

In their letters dated October 31, 1989, April 30, 1990, and June 15, 1990 (Enclosure 2), the licensee requests in part a license amendment to authorize release to the environment as a disposal mechanism about 10 curies of krypton-85 gas from each of the Isovac units via the normal stack release pathway.

We have prepared a proposed deficiency letter (Enclosure 3) to request additional and current information which, if the licensee addresses properly, we anticipate no objection to the planned releases. This evaluation is based on previous licensee submittals at the time each unit was initially installed. The licensee's May 28, 1975 evaluation (Enclosure 4) for the older unit showed the distance downwind at which the ground level concentration will be maximum is 139.47 meters and at this distance with a release rate of 0.791 microcuries per sec (25 curies per year) the concentration will be 9.3×10^{-10} µCi/cc. The licensee's October 5, 1985 evaluation (Enclosure 4) for the newer unit showed the distance at which the ground level concentration will be a maximum is 222.3 meters downwind. At this distance (with a release rate of 0.951 microcuries per sec [30 curies per year]) the concentration will be 6.3×10^{-10} µCi/cc. The licensee's March 22, 1985 letter (Enclosure 5) shows (at that time) the nearest offsite building was a two story brick and frame apartment dwelling about 450 feet (137.2 meters) from point of discharge which is significantly closer than the maximum ground level release point. If one uses the Sutton isotropic diffusion equation to calculate the airborne

concentration, and changes the downwind distance to that of the nearest offsite building (137.2 meters), the concentration at this building is calculated to be 1.6×10^{-9} µCi/cc. This is a factor of 187 below the unrestricted area MPC of 3×10^{-7}µCi/cc for krypton-85. Therefore, we conclude that this proposed environmental release presents no significant radiological consequences.

We would appreciate your evaluation of the suitability of this request and, if you conclude that such an amendment could be granted, we ask that you advise whether the amendment should be considered as an exemption to the regulation pursuant to 10 CFR 20.302(a).

The licensee would appreciate expeditious processing of this evaluation.

If you need additional information in regard to this request, please contact Loren Hueter of my staff at FTS 388-5632.

Cynthia G. Jones, Acting Chief
Materials Licensing Section

Enclosures:
1. NRC Byproduct Material License No. 34-16429-01
2. Ltrs dtd 10/31/89, 4/30/90, and 6/15/90
3. Deficiency Letter
4. Evaluations dtd 5/28/75 and 10/5/84
5. Ltr dtd 3/22/85

RIII
Hueter/mj
08/31/90

RIII
Jones
08/31/90

RIII
Mallett
08/31/90

NRC Form 374
(9-84)

U.S. NUCLEAR REGULATORY COMMISSION

CORRECTED COPY

MATERIALS LICENSE

Amendment No. 07

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. G. E. Solid State, Incorporated	In accordance with application dated January 13, 1986 3. License number 34-16429-01 is amended in its entirety to read as follows:
2. 1700 Fostoria Road Findlay, OH 45840	4. Expiration date March 31, 1993
	5. Docket or Reference No. 030-11015

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Krypton-85	A. Gas	A. 21 curies
B. Krypton-85	B. Gas	B. 21 curies
C. Krypton-85	C. Gas	C. 21 curies
D. Krypton-85	D. Sealed Sources (Gas sealed in pyrex vials)	D. 1 millicurie per per vial

9. Authorized Use

A. For use in an IsoVac Engineering Radiflo Model Minirad for leak testing parts and components.

B. For use in an IsoVac Engineering Radiflo Model Mark V for leak testing parts and components.

C. For storage in shipping containers and for use as necessary for loading into Radiflo units.

D. Standards for use with the Radiflo units.

CONDITIONS

10. Licensed material shall be used only at the licensee's facilities located at 1700 Fostoria Road, Findlay, Ohio.

11. Licensed material shall be used by, or under the supervision of, Ray Lau, Wayne Mertz, Jim Woollett, or Ken Stachowski.

COPY 2ML30 LK

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number: 34-16429-01

Docket or Reference number: 030-11015

CORRECTED COPY

Amendment No. 07

12. Radiation Safety Officer: Ray Lau

13. Installation, repair, relocation and initial radiation survey of the Radiflo unit shall be performed by IsoVac, Inc. or by other persons specifically licensed by the Commission or an Agreement State to perform such services.

14. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Application received December 31, 1974;

B. Applications dated May 20, 1980, September 28, 1980, December 14, 1984 and January 13, 1986; and

C. Letters dated May 28, 1975 and March 22, 1985.

For the U.S. Nuclear Regulatory Commission

Date: April 6, 1988

Original Signed
By Kathy J. Graden
Materials Licensing Section, Region III

COPY

NRC Form 374A (9-84)

U.S. NUCLEAR REGULATORY COMMISSION

PAGE 1 OF 1 PAGES

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number: 34-16429-01

Docket or Reference number: 030-11015

Amendment No. 08

Harris Semiconductor
Findlay Operations
1700 Fostoria Road
Findlay, OH 45840-6287

In accordance with application dated March 20, 1989, License Number 34-16429-01 is amended as follows:

Item 1 (Name) is changed from: G.E. Solid State, Incorporated

to: Harris Semiconductor
Findlay Operations

Conditions 11. and 14. are amended as follows:

11. Licensed material shall be used by, or under the supervision of, Ray Lau, Wayne Mertz, Fred Eickman, Larry Snock or Randy Logan.

14. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Application received December 31, 1974.

B. Applications dated May 20, 1980, September 28, 1980, December 14, 1984 and January 31, 1986, and

C. Letters dated May 28, 1975, March 22, 1985 and November 28, 1988.

For the U.S. Nuclear Regulatory Commission

Original Signed
By Patricia J. Pelke
Materials Licensing Section, Region III

Date: April 13, 1989

COPY

11/29/90

HARRIS SEMICONDUCTOR

HARRIS · RCA · GE · INTERSIL

2277K

October 31, 1989

United States Nuclear Regulatory Commission
Region III
799 Roosevelt Rd.
Glen Ellyn, IL 60137

SUBJECT: RELOCATION OF LICENSED EQUIPMENT

Gentlemen:

Harris Semiconductor International Incorporated has made a business decision to consolidate the device assembly portion of its semiconductor manufacturing operation located in Findlay, OH, with the device assembly operation located in Melbourne, FL.

Current plans call for relocation of an ISOVAC Mark V leak detection system to Melbourne, FL, on or after 2/1/89 as well as the decommissioning of an IOSVAC minirad leak test system after the mentioned date. Both systems are licensed under 34-16429-01 for krypton 85 gas.

Harris Corporation requests written consent for the mentioned actions as required by 10 CFR 30.34.

Available information relating to the transfer is as follows:

A. The names of the transferrer and transferee do not change (Harris Semiconductor International, Inc.). This is a control change as opposed to a change of ownership.

B. The transferrer will remain in business after license cancellation. (Harris Semiconductor, 1700 Fostoria Rd., Findlay, OH 45840.)

C. Equipment transfer and decommissioning will be performed under supervision of ISOVAC engineering (contact: Henry Michel (213) 245-1014) which manufactured and installed the equipment.

D. Supervisory personnel named in license condition #11 will not be responsible for licensed material after equipment transfer/decommission.

E. Radiation safety officer for the Melbourne, FL, facility is Troy McCuskey (telephone: (407) 724-7039).

F. Harris is currently submitting necessary documents to Florida Department of Health and Rehabilitative Service, Office of Radiation Control (telephone: 904-487-2437) to ammend the facility tracer-flo license no. 662-3 to cover the Mark V system after relocation.

G. The new location for the Mark V system is:

Harris Semiconductor International, Inc.
P.O. Box 883
Palm Bay Road, Bldg. #61
Melbourne, FL 32902-0883

H. The following Melbourne individuals are connected with the safety and operation of the Mark V system and must answer questions relating to system location on premises, surveillance, calibrations, surveys and facility status:

Troy McCuskey (RSO) (407) 724-7039

Ron Sirman (407) 729-5053

Hong Toh (407) 724-7863

I. Transferee's memo agreeing to change in control status is attached. Transferee will provide a description of its program to assure compliance with the license and regulations.

If you have additional questions, please contact the writer at (419) 423-0321 or Troy McCuskey at (407) 724-7039. Thank you for your assistance in this matter.

Ray Lau

Ray Lau (RSO)
Harris Semiconductor
Findlay Operations

RL/bc

Attachment

cc: T. McCuskey (Melb)
J. Mainzer (Findlay)
W. Kasselman (Findlay)
R. Fowler (Melb)
H. Toh (Melb)
H. Michel (ISOVAC)
W. Mertz (Findlay)
P. Baumann (Findlay)
R. Emmons (Findlay)
R. Sirman (Melb)
A. Critzer

HARRIS SEMICONDUCTOR
HARRIS · RCA · GE · INTERSIL

SEMICONDUCTOR SECTOR

0078-90

TO:	FROM:	DATE:
RAY LAW	TROY McCUSKEY	11/1/89

SUBJECT: TRANSFER OF ISOVAC

This letter is to request the transfer of the IsoVac Engineering Radiflo, Model Mark V for leak testing parts and components. This equipment will be added to our existing radiation license #662-3 which is issued from the State of Florida, Department of Health and Rehabilitative Services, Office of Radiation Control. Harris, Palm Bay Facility, will except the responsibility of this equipment on/or about February 1, 1990, when the scheduled move from Findlay, Ohio to Palm Bay, Florida takes place.

Sincerely,

T McC

Troy McCuskey, Engineer
Assistant RSO
Health & Safety

TM/nlh

CC: Rowland Thaver
Bob Fowler
Ron Sirman

M124 REV. 2-88

HARRIS
SEMICONDUCTOR

April 30, 1990

United States Nuclear Regulatory Commission
Region III
799 Roosevelt Rd.
Glen Ellyn, Il. 60137

Subject: Request For NRC Approval To Release A Small Quantity of Krypton Gas To Atmosphere.

Gentleman:

This letter requests NRC approval for release to atmosphere of 10 curies of krypton 85 gas from each of two leak detector systems. The commission was advised on November 2, 1989 that Harris will relocate an Isovac Mark V leak detection system to the Melbourne Florida facility and remove from service a Minirad leak detection system in 1990. The license number relating to the mentioned actions is 34-16429-01.

The Mark V system cannot be transferred to our Florida facility with Krypton gas in the storage chamber. It would not be practical to transfer the gas into a DOT approved storage vessel since this would require a shielded cylinder having a rather large volume.

10 CFR 20.106 $\Rightarrow Kr^{85} = 3E-7$

10CFR20, Appendix B, Table II states that the maximum exposure permitted for an unrestricted area is 3×10^{-7} microcuries per cubic centimeter (air). The original license application has an appendix indicating that for a usage of 30 curies, the maximum ground level concentration (unrestricted area) would be about 6.3×10^{-10} microcuries per cc air averaged over one year. Using the same calculations, the proposed 10 curie release over two days would result in 4×10^{-8} microcuries per cc air ground level concentration. This is less than the mentioned table II limit. (Note: the stack point of discharge is considered a restricted area as the roof is restricted to normal access)

Prompt response to this request by NRC is needed in order to meet a July 1990 transfer date.

Contact me if you have questions at 419-423-0321. Thank you for your assistance in this matter.

MAY 10 1990

HARRIS CORPORATION SEMICONDUCTOR SECTOR 1700 FOSTORIA ROAD FINDLAY OHIO 45840-6287 TELEPHONE 419-423-0321 FAX 419-424-4434

HARRIS SEMICONDUCTOR

HARRIS RCA GE INTERSIL

Ray Lau

Ray Lau, RSO
Harris Semiconductor
Findlay Operations

cc: J. Marshall
W. Mertz
R. Emmons
J. Mainzer
G. Neff - Isovac Engineering

rl/nrc

HARRIS SEMICONDUCTOR

June 15, 1990

A
030-11015
3-31-93
3P
fee pd

United States Nuclear Regulatory Commission
Region III
799 Roosevelt Rd.
Glen Ellyn, Il. 60137

Subject: Amendment to License Number 34 16429-f..

Gentleman:

This letter requests amendment of the materials license issued to Harris Semiconductor as follows:

1. Add William D. Shade to the license (condition 11). Mr. Shade has been trained by Isovac Engineering in Radiological Safety, Radiflo equipment operation, and handling of radioisotopes pursuant to the requirements of USNRC and Isovac Engineering report R-3848-B. Mr. Shade was trained by Isovac 26 February 1987. His technical support for the Radiflo leak test equipment may be required during third quarter for relocation of the equipment to the Melbourne, Florida facility. Mr Shade's training certificate is attached.

2. Amend the license to allow for release to atmosphere of 10 curies Krypton gas from each of two leak test systems. Harris will shut down both systems during third quarter 1990. (Extended from July 1990) Removing the gas from the equipment by Cryo trapping is not a safe alternative. NRC's Kevin Null has a letter dated 4/30/90 concerning the release request. A copy of the letter is attached.

A check for the amendment fee is enclosed. Prompt response to this request by the commission is needed in order to meet the third quarter transfer date.

Contact me if you have questions at 419-423-0321. Thank you for your assistance in this matter.

RECEIVED
JUN 20 1990
REGION III

JUN 2 6 1990

HARRIS CORPORATION SEMICONDUCTOR SECTOR 1700 FOSTORIA ROAD FINDLAY OHIO 45840-2801 TELEPHONE 419-423-0321 FAX 419-424-4434

CONTROL NO. 89649

HARRIS SEMICONDUCTOR

Ray Lau, RSO
Harris Semiconductor
Findlay Operations

cc: J. Marshall
W. Mertz
R. Emmons
J. Mainzer
G. Neff - Isovac Engineering

rl/nrcamen

IS CORPORATION, SEMICONDUCTOR SECTOR 1700 FOSTORIA ROAD FINDLAY OHIO 45840-6287 TELEPHONE 419-423-0321 FAX 419-424-4434

CONTROL NO. 89649

Harris Semiconductor
Findlay Operations
ATTN: Ray Lau, R.S.O.
1700 Fostoria Road
Findlay, OH 45740-6287

Gentlemen:

We have reviewed your letters dated October 31, 1989, April 30, 1990 and June 15, 1990 requesting an amendment to License No. 34-16429-01 to add an authorized user and to request approval to release to the environment as a disposal mechanism about 10 curies of krypton-85 gas from each of two Isovac Engineering Radiflo leak test units. We find that we will need additional information as follows:

1. Please provide a copy of Mr. Shade's training certificate for the training he received by Isovac on February 26, 1987. Your June 15th letter stated that the training certificate was attached but the letter was received without the certificate.

2. In order to evaluate the release, please provide for each system the following information:

   a. Diagram of the system including storage tank, piping, isolation and flow control valves, monitoring devices including stack monitoring, etc. (If any modification of system is required please identify it in the diagram and provide a separate detailed description.)

   b. Procedures for release (including how release is controlled to assure it exhausts via the stack).

   c. Identify for each stack the distance to the current nearest air intake and the nearest offsite building and its use, and provide an evaluation of air concentrations at these locations based on planned releases.

   d. If air concentrations at point of release from the stack will exceed the unrestricted area MPC listed in 10 CFR Part 20, Appendix B, Table II, Column I for Kr-85, describe your provisions for restricting access to the roof area where stack is located.

   e. Describe any meteorological restrictions that will be required during the releases.

f. Describe provisions for terminating release in the event of loss of stack flow.

g. Confirm that releases from both units will not be made simultaneously.

3. Please describe your means of evaluating the quantity of residual Kr-85 (in oil and metal surfaces) contained in each unit after the proposed release to atmosphere in order to demonstrate whether the license will be subject to certification of financial assurance (greater than 100 millicuries of Kr-85). Also, please note that the unit you plan to transfer will need to be considered a contaminated item.

If you have any questions or require clarification on any of the information stated above, you may contact us at (708) 790-5625.

We will continue our review of your application upon receipt of this information. Please reply in duplicate, within 30 days, and refer to Control Number 89649.

Upon failure to file an answer within the specified time, we will consider that you have abandoned your request and will void this action. This is without prejudice to resubmission of the application.

Sincerely,

Original Signed By
Loren J. Hueter
Materials Licensing Section

RIII
Hueter/dj
08/31/90

2306

May 28, 1975

An Evaluation of Krypton-85 Concentrations in Occupiable Unrestricted Areas From the Operation of the Radiflo System

RCA

Findlay, Ohio

R-3787

By:

George R. Neff

Technical Director, IsoVac Engineering

PURPOSE

The purpose of this report is to analyze the known and calculated parameters of the subject Radiflo installation to demonstrate that it will be unlikely that the operation of the Unit will result in concentrations of radioactive material in unrestricted areas in excess of the limits established in Appendix B, Table II of 10CFR20.

It is further intended that the evaluation will serve in conjuction with a record of Krypton-85 discharges to completely fulfill the requirement of section 20.201 title 10, CFR Part 20, for surveys with respect to concentration in effluents to unrestricted areas, and exposures of individuals to concentrations of radioactive material in unrestricted areas.

SUMMARY

Assuming a mean wind velocity of 10.0 miles per hour, a moderate inversion, and based of the calculated values for the effective stack height, the calculated annual discharge rate, and the distance in meters from the point of release to the point of maximum concentration, and obtaining the diffusion coefficient from the prepared table, an evaluation of maximum concentrations in occupiable unrestricted areas is performed by utilizing formula (4.50) found on page 47 of the publication entitled "Meteorology and Atomic Energy," AECU 3066, prepared by the U. S. Department of Commerce Weather Bureau for the United States Atomic Energy Commission. This formula is known as Sutton's Isotropic, Continuous Point Source Formula. Concentration at air inlets and other points of interest above ground level are determined by the use of equation (8.35) found on page 239 of "MICROMETEOROLOGY" by O. G. Sutton, published by McGraw-Hill Book Co., 1958. The results of these computations indicate that maximum concentration at ground level as a result of the anticipated emission rates at the subject installation would be 9×10^{-10} μc/cc averaged over a period of one year. Maximum concentration on the roof and at other points of interest above ground level are less than 1×10^{-9} μc/cc averaged over a period of one year. Concentration at the point of discharge from the stack is calculated to be slightly higher than the allowable 3×10^{-7} μc/cc averaged over a period of one year. Since the calculated concentrations in occupiable unrestricted areas do not exceed the limits specified in Appendix B, Table II of 10CFR, Part 20, it seems appropriate to request an exception to 20.106 (b) of title 10CFR, Part 20, to permit concentrations of Krypton-85 to unoccupiable unrestricted areas of slightly more than 3×10^{-7} μc/cc.

ATMOSPHERIC CONDITIONS

The average wind velocity over a period of years reported by the U.S. Weather Bureau at the Findlay, Ohio Airport of 10 miles per hour will be used in this report. A moderate inversion will also be considered in the report.

ATMOSPHERIC CONDITIONS (continued)

These conditions will be referred to as atmospheric condition I. The stability parameter and mean wind velocity are tabulated below.

Atmos. - Condition	n	$\bar{u}$
1	0.33	4.47

where:

n = nondimensional parameter associated with stability

$\bar{u}$ = mean wind speed (meters/sec.)

EFFECTIVE STACK HEIGHT

The effective height of the stack is the sum of the height of the building upon which the stack is constructed, the height of the stack proper and the height of the plume rise above the stack. It is calculated by using formula (5.6) on page 72, of the AECU 3066 mentioned above, known as the "Bryant-Davidson" expression which reads:

$$\Delta h = d\left(\frac{Vs}{u}\right)^{1.4}\left(1 + \frac{\Delta T}{Ts}\right)$$

where:

Δh = plume rise above stack (feet)

d = diameter of stack (feet)

V_s = stack discharge velocity (ft/sec.)

u = wind speed (ft/sec.)

ΔT = stack gas temperature, excess of ambient (°C)

T_s = stack gas temperature

Since the worst possible conditions are being considered, it will be assumed that ΔT is zero. The formula then reduces to:

$$\Delta h = d\left(\frac{V_s}{u}\right)^{1.4}$$

EFFECTIVE STACK HEIGHT (continued)

An average height of 21.5 ft. for the building plus the exhaust will be used. A nominal exhaust capacity of 628 cfm, (at point of discharge) and a 0° temperature rise will be used.

A tabulation of the effective stack height considering the above mentioned atmospheric condition is recorded below.

Atmos. Cond.	Hgt. of Stack + Bldg. (ft) (assumed)	d(ft)	V_s(ft/sec)	Plume rise(ft) h	Effective Hgt. (ft)	Effective Hgt,(mtrs.)
1	21.5 ft.	.5	53.27	.68	22.18	6.77

ANTICIPATED ANNUAL DISCHARGES

In the RADIFLO Unit, byproduct material is discharged to the environs each time the equipment is cycled through a complete activation cycle. This discharge is the result of not returning all of the Krypton-85 to the Storage tank. The anticipated annual discharges are determined by calculating the loss per cycle, multiplying the figure obtained by the number of cycles per day, and multiplying the sum by the number of working days per year. The amount of gas lost per activation cycle is determined by the following formula:

$$La = (S)(Pas)(F_{Va})$$

where:

L_a = loss of gas in Activation tank per cycle (mc/cycle)

S = concentration of gas in the Unit (μc/atmos cc)

P_{as} = pressure in Activation tank after return of gas to Storage tank (atm)

F_{Va} = volume of Activation tank with filler (cc)

The values will be:

A ≤ 200 μc/atmos cc (S = A)

P_{as} ≤ $\frac{.5}{760}$ atmospheres = 6.6×10^{-4} atmos

$L_a = (200)(6.6)(800) \times 10^{-4}$

= 105.6 μc or 0.106 mc/cycle

F_{Va} ≤ 800 cc.

ANTICIPATED ANNUAL DISCHARGES (continued)

The anticipated gas loss is thus .119 mc/cycle. The annual release from non-recovery of gas cycling the unit 66 times daily for 260 working days per year would be 2.04 Curies/year.

With the incorporation of a gross leak test which is more commonly being used in these machines, the equipment is being vented at 2 mm Hg. Thus:

A	≃	200	µc/atm cc.
P	=	2	atmospheres
		760	
F	≃	800	cc

The anticipated gas loss is thus .421 mc/cycle. The annual release from the non-recovery of gas cycling the unit as above would be 7.2 curies. It must also be noted that the devices which fail the test are consuming Krypton-85 gas which is normally vented through the same room air exhaust system. This consumed gas has been seen to increase the annual usage to 25-30 curies in high production applications.

The anticipated emission rate averaged over the year, based on proposed operating conditions would be obtained by dividing the calculated release (µc) by the number of seconds in a year. The anticipated emission rate is therefore .791 µc/sec.

CALCULATION OF CONCENTRATION AT POINT OF DISCHARGE FROM THE STACK

Concentrations at the point of discharge from the stack are calculated by dividing the anticipated discharge rate "Q" (µc/sec) by the exhaust flow rate (cc/sec). Based on a stack flow of 628 cfm /min., operating continuously, concentration at the point of discharge averaged over a period of one (1) year would be 3.2×10^{-6} µc/cc.

POINT OF MAXIMUM CONCENTRATION

To determine the distance downwind at which ground concentrations will be maximum, formula (4.65) found on page 49 of "Meteorology and Atomic Energy" is used, this is a simplification of Sutton's basic formula.

It reads:

$$d_{max} = \left(\frac{h^2}{c^2}\right)^{\frac{1}{2-n}}$$

POINT OF MAXIMUM CONCENTRATION (continued)

In order to keep designations uniform and thus avoid confusion d will be written x. The formula then reads:

$$x_{max} = \left(\frac{h^2}{c^2}\right)^{\frac{1}{2-n}}$$

where:

x = point of maximum concentration (meters)

h = effective stack height (meters)

C = diffusion coefficient (meters) $^{n/2}$

n = nondimensional parameter associated with stability

Listed below is a tabulation of the values used in the equation and the results obtained.

Atmos. Condition	h(meters)	C(meters)$^{n/2}$	n	x (meters)
1	6.76	.108	0.33	139.47

MAXIMUM GROUND LEVEL CONCENTRATION

Maximum ground level concentrations are calculated by applying the aforementioned parameters to Sutton's Isotropic, Continuous Point Source Formula, which reads:

$$\chi\ (xy) = \frac{2Q}{\pi c^2 \sigma x^{2-n}} \exp\left(-\frac{y^2 + h^2}{c^2\ x^{2-n}}\right)$$

where:

χ = concentration at "x" distance downwind and "y" distance crosswind (μc/cc)

Q = emission rate from stack (μc/sec)

x = horizontal distance downwind from the point of discharge (meters)

MAXIMUM GROUND LEVEL CONCENTRATION (continued)

y = horizontal distance crosswind from the point of discharge (meters)

h = effective plume height above point at which concentration is being calculated (meters)

C = diffusion coefficient (meters) $^{n}/_{2}$

n = nondimensional parameter associated with stability

$\bar{u}$ = mean wind speed (meters/sec)

to avoid confusion χ will be called K. The formula then reads:

$$K(xy) = \frac{2Q}{\pi C^2 \bar{u} x^{2-n}} \exp\left(-\frac{y^2 + h^2}{C^2 x^{2-n}}\right)$$

Since for the purpose of this evaluation it is assumed that the wind will be blowing continually directly toward the point of calculation, "y" equals zero. The formula then reads:

$$K(x) = \frac{2Q}{\pi C^2 \bar{u} x^{2-n}} \exp\left(-\frac{h^2}{C^2 x^{2-n}}\right)$$

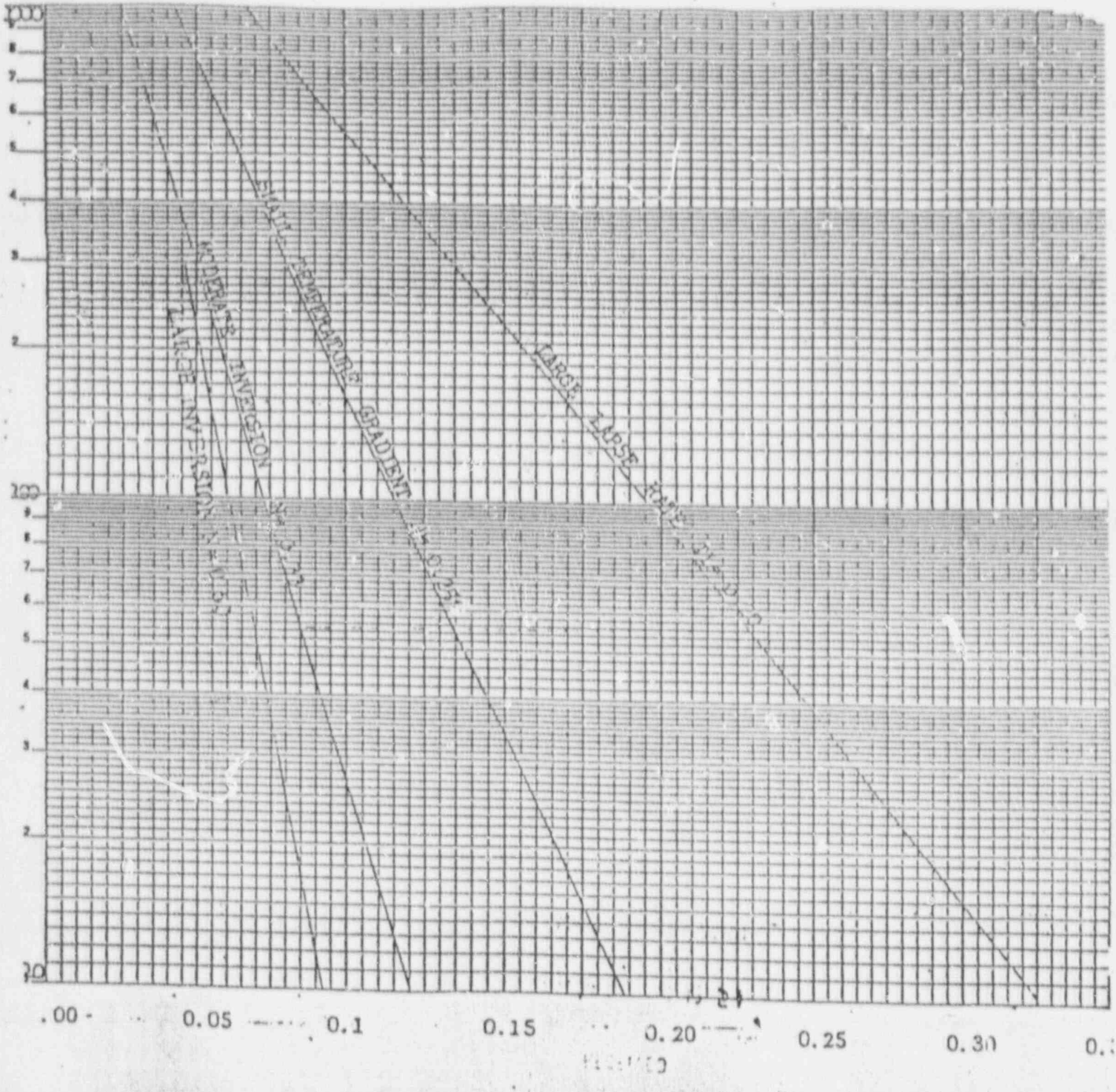
Tabulated below are the values used in the calculation, their units, and the results obtained.

Atmos Cond.	Q(μc/sec)	$\bar{u}$ (mtrs/sec)	h(mtrs)	n	C(mtrs)$^{n}/_{2}$	X(mtrs)	K_x(μc/cc)
1	.791	4.47	6.76	0.33	.108	139.47	9.3×10^{-10}

DIFFUSION COEFFICIENT.

Report Number 2306

From Table 4.3, Page 53 and Figure 4.5, Page 55 of Meteorology and Atomic Energy Sutton's values for "h" and "C" under varying atmospheric conditions and effective plume heights are excerpted in the graph below:



C (meters) $^{n}/_{2}$

IsoVac Engineering Inc.

APPENDIX E

An Evaluation of Krypton-85 Concentrations

in Occupiable Unrestricted Areas

From the Operation of the Radiflo System

Located At

COMPANY NAME _____

ADDRESS Solid-State Division
Fostoria Road
Findlay, Ohio

Report No. R-3911

Date October 5, 1984

932 grand central avenue - glendale, california 91201 --- 213/247-1431
cable address: radiflo 245-1014

PURPOSE

The purpose of this report is to analyze the known and calculated parameters of the subject Radiflo installation to demonstrate that it will be unlikely that the operation of the Unit will result in concentrations of radioactive material in unrestricted areas in excess of the limits established in Title 10 Code of Federal Regulations, Part 20.

It is further intended that the evaluation will serve in conjunction with a record of Krypton-85 discharges to completely fulfill the requirement of Title 10 Code of Federal Regulations Part 20 for surveys with respect to concentration in effluents to unrestricted areas, and exposures of individuals to concentrations of radioactive material in unrestricted areas.

SUMMARY

Assuming a mean wind velocity of 10.0 miles per hour, a moderate inversion, and based on the calculated values for the effective stack height, the calculated annual discharge rate, and the distance in meters from the point of release to the point of maximum concentration, and obtaining the diffusion coefficient from the prepared table, an evaluation of maximum concentrations in occupiable unrestricted areas is performed by utilizing formula (4.50), found on page 47 of the publication entitled, "Meteorology and Atomic Energy", AECU 3066, prepared by the U.S. Department of Commerce Weather Bureau for the United States Atomic Energy Commission. This formula is known as Sutton's Isotropic, Continuous Point Source Formula. Concentration at air inlets and other points of interest above ground level are determined by the use of equation (8.35), found on page 239 of, "MICROMETEOROLOGY", by O.G. Sutton, published by McGraw-Hill Book Co., 1958. The results of these computations indicate that maximum concentration at ground level as a result of the anticipated emission rates at the subject installation would be 6.31×10^{-10} μc/cc averaged over a period of one year. Maximum concentration on the roof and at other points of interest above ground level are less than 1×10^{-9} μc/cc averaged over a period of one year. Concentration at the point of discharge from the stack is calculated to be slightly higher than the allowable 3×10^{-7} μc/cc averaged over a period of one year. However, since the rooftop is a restricted area and only authorized personnel are permitted in this locale, the 3×10^{-7} μc/cc maximum is not applicable.

ATMOSPHERIC CONDITIONS

The averaged wind velocity over a period of years reported by the U.S. Weather Bureau at the Dayton, Ohio Airport of 10.0 miles per hour will be used in this report. A moderate inversion will also be considered in the report.

ATMOSPHERIC CONDITIONS (continued)

These conditions will be referred to as atmospheric condition 1. The stability parameter and mean wind velocity are tabulated below.

Atmos. Condition	n	$\bar{u}$
1	0.33	4.47

where:

n = nondimensional parameter associated with stability

$\bar{u}$ = mean wind speed (meters/sec.)

EFFECTIVE STACK HEIGHT

The effective height of the stack is the sum of the height of the building upon which the stack is constructed, the height of the stack proper and the height of the plume rise above the stack. It is calculated by using formula (5.6) on page 72, of the AECU 3066 mentioned above, known as the "Bryant-Davidson" expression which reads:

$$\Delta h = d\left(\frac{V_s}{u}\right)^{1.4}\left(1 + \frac{\Delta T}{T_s}\right)$$

where:

Δh = plume rise above stack (feet)

d = diameter of stack (feet)

V_s = stack discharge velocity (ft/sec.)

u = wind speed (ft/sec.)

ΔT = stack gas temperature, excess over ambient (°C)

T_s = stack gas temperature

Since the worst possible conditions are being considered, it will be assumed that ΔT is zero.

The formula then reduces to:

$$\Delta h = d\left(\frac{V_s}{u}\right)^{1.4}$$

EFFECTIVE STACK HEIGHT (continued)

An average height of 15 ft. for the building plus the exhaust will be used. A nominal exhaust capacity of 1500 cfm, (at point of discharge), and an 0° temperature rise will be used.

A tabulation of the effective stack height considering the above mentioned atmospheric condition is recorded below.

Atmos. Condition	Hgt. of stack+Bldg. (ft)	d(ft)	V_s(ft/sec)	Plume rise(ft) h	Effective Hgt. (ft)	Effective Hgt. (mtrs.
1	23	.67	71.62	6.14	29.14	8.88

ANTICIPATED ANNUAL DISCHARGES

In the RADIFLO Unit, byproduct material is discharged to the environs each time the equipment is cycled through a complete activation cycle. This discharge is the result of not returning all of the Krypton-85 to the Storage tank. The anticipated annual discharges are determined by calculating the loss per cycle, multiplying the figure obtained by the number of cycles per day, and multiplying the sum by the number of working days per year. The amount of gas lost per activation cycle is determined by the following formula:

$$La = (S)\ (Pas)\ (F_{Va})$$

where:

L_a = loss of gas in Activation tank per cycle (mc/cycle)

S = concentration of gas in the Unit (μc/atmos cc)

P_{as} = pressure in Activation tank after return of gas to Storage tank (atm)

F_{Va} = volume of Activation tank with filler (cc)

The values will be:

$S \approx 225$ μc/atmos cc.

$P_{as} \approx \frac{.5}{760}$ atmospheres

$F_{Va} \approx 800$ cc.

ANTICIPATED ANNUAL DISCHARGES (continued)

The anticipated gas loss is thus .119 mc/cycle. The annual release from non-recovery of gas cycling the unit 66 time daily for 266 working days per year would be 2.04 curies/year.

With the incorporation of a gross leak test which is more commonly being used in these machines, the equipment is being vented at 2 mm Hg. Thus:

S	=	225	μc/atm cc
P	=	$\frac{2}{760}$	atmospheres
F	=	800	cc

The anticipated gas loss is thus .473 mc/cycle. The annual release from the non-recovery of gas cycling the unit as above would be 8.1 curies. It must also be noted that the devices which fail the test are consuming Krypton-85 gas which is normally vented through the same room air exhaust system. This consumed gas has been seen to increase the annual usage to 25-30 curies in high production applications.

The emission rate averaged over the year, based on the conservative gas loss figure of 30 curies would be obtained by dividing the calculated release (μc) by the number of seconds in a year. This maximum emission rate is therefore .95 μc/sec.

CALCULATION OF CONCENTRATION AT POINT OF DISCHARGE FROM THE STACK

Concentrations at the point of discharge from the stack are calculated by dividing the anticipated discharge rate "Q" (μc/sec) by the exhaust flow rate (cc/sec). Based on a stack flow of 1500 c.f.m., operating continuously, concentration at the point of discharge averaged over a period of one (1) year would be 1.34×10^{-6} μc/cc.

POINT OF MAXIMUM CONCENTRATION

To determine the distance downwind at which ground concentrations will be maximum, formula (4.65) found on page 49, of "Meteorology and Atomic Energy" is used, this is a simplification of Sutton's basic formula.

It reads: $d_{max} = \left(\frac{h^2}{c^2}\right)^{\frac{1}{2-n}}$

Revised 2/6/70

POINT OF MAXIMUM CONCENTRATION (continued)

In order to keep designations uniform and thus avoid confusion, "d" will be written "x". The formula then reads:

$$x_{max} = \left(\frac{h^2}{c^2}\right)^{\frac{1}{2-n}}$$

where:

x = point of maximum concentration (meters)

h = effective stack height (meters)

C = diffusion coefficient (meters) $^{n}/2$

n = nondimensional parameter associated with stability

Listed below is a tabulation of the values used in the equation and the results obtained.

Atmos. Condition	h (meters)	C (meters) $^{n}/2$	n	x (meters)
1	8.88	.0978	0.33	221.3

MAXIMUM GROUND LEVEL CONCENTRATION

Maximum ground level concentrations are calculated by applying the aforementioned parameters to Sutton's Isotropic, continuous Point Source Formula, which reads:

$$\chi\,(xy) = \frac{2Q}{\pi C^2 u x^{2-n}} \exp\left(-\frac{y^2 + h^2}{C^2 x^{2-n}}\right)$$

where:

χ = concentration at "x" distance downwind and "y" distance crosswind (μc/cc)

Q = emission rate from stack (μc/sec.)

x = horizontal distance downwind from the point of discharge (meters)

MAXIMUM GROUND LEVEL CONCENTRATION (continued)

y = horizontal distance crosswind from the point of discharge (meters)

h = effective plume height above point at which concentration is being calculated (meters)

C = diffusion coefficient (meters)$^{n/2}$

n = nondimensional parameter associated with stability

$\bar{u}$ = mean wind speed (meters/sec.)

to avoid confusion χ will be called K. The formula then reads:

$$K(xy) = \frac{2Q}{\pi C^2 \bar{u} x^{2-n}} \exp\left(-\frac{y^2 + h^2}{C^2 x^{2-n}}\right)$$

Since for the purpose of this evaluation it is assumed that the wind will be blowing continually directly toward the point of calculation, "y" equals zero. The formula then reads:

$$K(x) = \frac{2Q}{\pi C^2 \bar{u} x^{2-n}} \exp\left(-\frac{h^2}{C^2 x^{2-n}}\right)$$

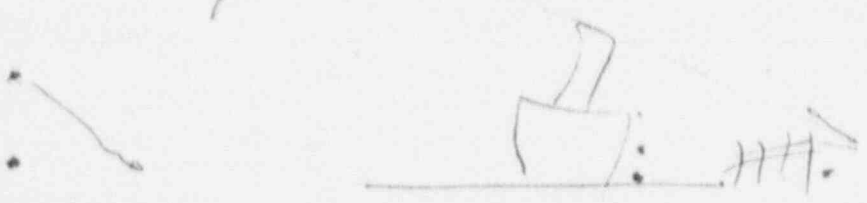
Tabulated below are the values used in the calculation, their units, and the results obtained.

Atmos. Conditions	Q (uc/sec)	u(meters/sec)	h(meters)	n	C(mtrs)$^{n/2}$	X(mtrs)	K_x (μc/cc)
1	.951	4.47	8.88	0.33	.0978	221.3	6.31×10^{-1}

↑ 392 yr

↑ 726 ft

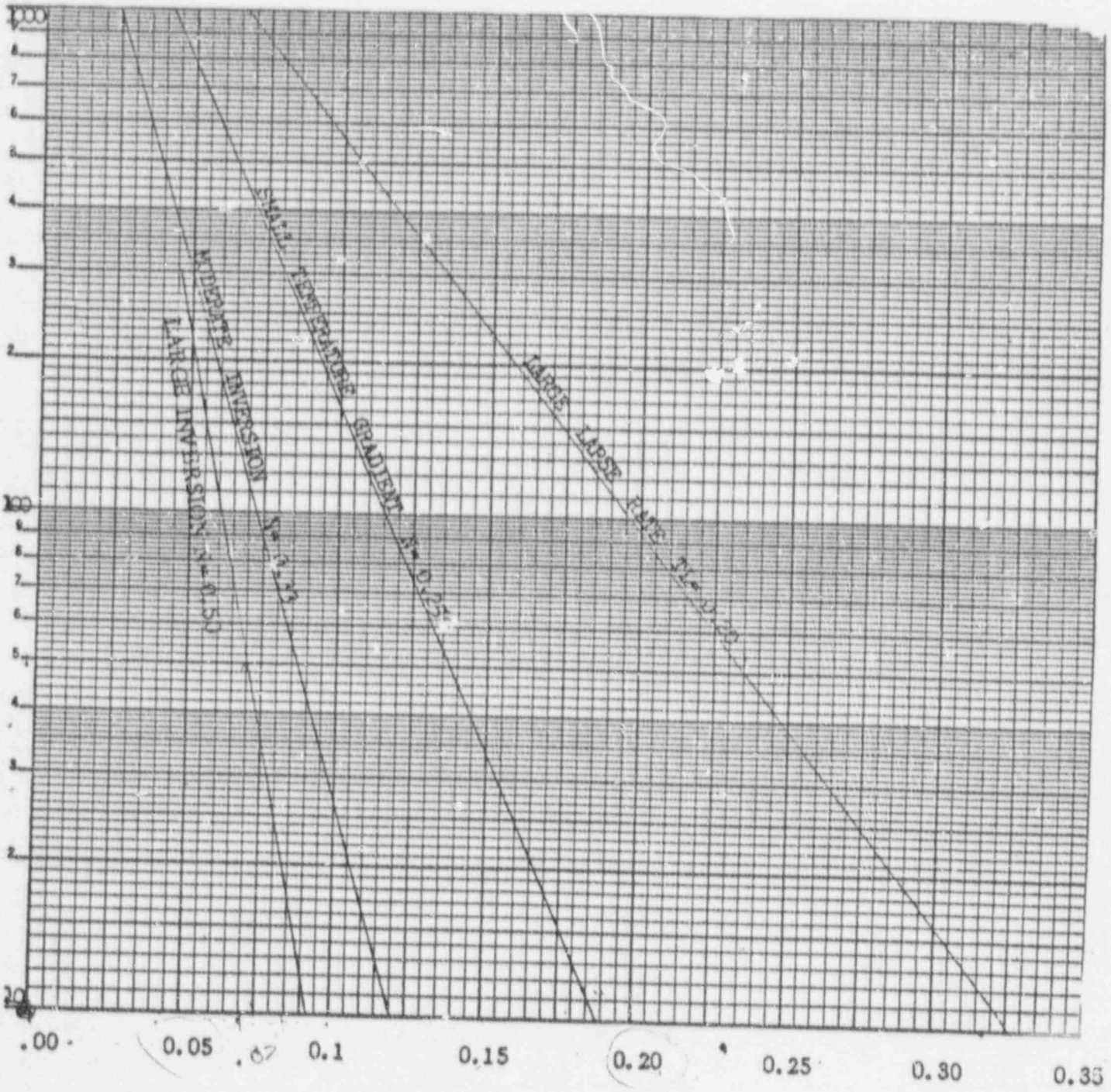
↑ This was converted from m^3 to cm



vised: 3/6/78

DIFFUSION COEFFICIENT.

From Table 4.3, Page 53 and Figure 4.5, Page 55 of Meteorlogy and Atomic Energy Sutton's values for "h" and "C" under varying atmospheric conditions and effective plume heights are excerpted in the graph below:



RCA| Solid State Division| Fostoria Road| Findlay, Ohio 45840| 419-423-0321

B. J. Holt
Materials Licensing Section
USNRC, Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

RCA

Re: Control #77972

March 22, 1985

Dear Ms. Holt:

In reference to your letter dated 14 March 85:

Item 1: Enclosed is Isovac Document #200748 which gives in some detail a description of the facilities lay out for the Mark V. Be advised the top of the exhaust stack will be at twenty (20) feet from the plant roof and the exhaust system will meet Isovac's specifications of 1500 cfm minimum at the point of stack discharge.

The Minirad and the Mark V units will be on separate exhaust systems and will be approximately 120 feet apart. The boundary edge of the room is 100 feet.

Item 2: Enclosed is a copy of a State of Ohio Geological Survey Map marked as follows: (Red numbers building locations; blue dot exhaust stack discharge point).

1. A two story frame home approximately 750 feet from point of exhaust discharge.

2. A one story brick Veterinarians Animal Clinic approximately 2,600 feet from point of exhaust discharge.

3. One story frame homes approximately 1,500 feet from point of discharge.

4. A one story brick home approximately 1,700 feet from point of discharge.

5. Two story brick and frame apartment dwellings approximately 450 feet from point of discharge.

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The closest plant air intake is approximately 70 feet to the east and 14 feet below the stack discharge point.

Item 3: We understand that the Mark V is normally operated with 20 curies of Krypton-85 and our application calculations are based upon this Appendix E. It must be noted however that this request for 60 curies of Krypton-85 is divided up between two machines (Minirad and Mark V at 20 curies per machine) and the possibility of a shipping cylinder in-house. Since we were inspected by USNRC Inspector Stan R. Lasuk on 4 December '84 and found to be in violation of our 20 curie Minrad License due to overshipment by Oak Ridge, we feel our request for 60 curies of Krypton is justified for the above stated reasons. We do not wish to be in violation again and feel we are approaching a "Catch 22" situation.

Item 4a: Krypton-85 is ordered from Oak Ridge only when needed on a 10 curie basis. At times Oak Ridge will ship more to us than the 10 curies ordered, thus placing us in violation of our license. See above item 3 requesting 60 curie maximum amount we may possess at any one time, thus attempting to resolve this problem. See also attached letter dated 11-9-76.

Item 4b: See attached letter dated 8-5-75. See paragraph 2.

Item 4c: See attached letter dated 8-5-75. See paragraph 1.

Item 4d: See attached letter dated 8-5-75. See paragraph 3.

Item 5: The Mark V will be used in our High Reliability (HiRel) Department which is constantly being monitored by in-house auditors from the Defense Electronic Supply Command (DESC). DESC dictates that all personnel working in this area be properly trained in product handling and equipment procedures. Each employe has a training card which authorizes them to operate certain pieces of equipment in the area. In addition to this procedure, each lot of product has a "Lot Traveler Card" which must be initialed by the employe when the lot of product is processed in the equipment. These auditors constantly monitor these two cards against each other to make certain only properly trained employes operate the equipment.

Item 6: Radiation surveys will be conducted on a monthly basis and will be recorded in a survey log. The survey will be conducted by the Radiation Safety Officer or his designated representative by utilizing a properly calibrated survey meter. The meter will be placed on the exterior of all of the Mark V's room walls and on all sides of the Mark V itself.

Item 7: The Mark V room will be under negative pressure therefore insuring any leaking gas will be drawn into the exhaust system which is the only means of escape from the room.

Item 8: The air flow through the Mark V is measured by the Mark V to be at least 500 cfm and if at any time the required air flow drops below 500 cfm, the Mark V will alarm and stop operation, and a panal light indicates the condition. The exhaust stack air flow rate will be measured by a static pressure gauge to show at least 1500 cfm at the exit point of the stack. The gauge will be visibly available to operator and will be marked to show alert conditions.

In addition to the above, measurements will be made by C. C. Williams, licensed Professional Engineer, utilizing a Dryer Manometer twice a year. The measurements will be certified by letter to the plant Radiation Safety Officer. It should be noted that Mr. Williams has performed these measurements in the past for our Minirad.

Item 9: If any interlock fails, the Mark V will automatically interrupt operation and shutdown. The radiation alarm and the automatic gas recovery will be checked monthly at the same time the room survey is conducted as per the manufacturers instructions.

Item 10: All reject units shall be placed in a steel container with a cover inside the Mark V room. At the end of each day these units shall be placed in the activation chambers of the Mark V and held at final evacuation below .5mm of Hg for 15 minutes or longer. Waste contaminated oil shall be drained into an open pan and stored inside the Mark V room on a hot box for approximately one week to allow the oil to outgas.

It should be noted that with our Minirad we have found only <u>one</u> time when the oil was contaminated and the above reject unit procedure has always worked.

As your letter state, please process our reque. as an amendment to License #34-16429-01 and that our request is for a Radiflo Model Mark V Unit.

If we can assist any further, please advise. As we have stated in the past we need this piece of equipment to meet go rnment requirements. We would appreciate your expediting our equest.

Sincerely,

Wayne L. Mertz

W. L. Mertz
Safety Administrator

WLM:jm
enclosures

N
24 MI.
1.8 MI.
0.4 MI. TO U.S. 224
4266 II SW
(FINDLAY)
4549
FINDLAY
Sewage Disposal
224
825
Trailer Park
NORFOLK AND
837
844
840