

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 040-08830/90001(DRSS)

Docket No. 040-08830

License No. SUB-1430

Category (E)

Priority (III)

Mail Control No. 86841

Licensee: Honeywell, Inc.
Defense Systems Division
5640 Smetana Drive
MN04-1345
Minnetonka, MN 55343

Facility Location: Joliet Army Ammunition
Plant
Joliet, Illinois

Inspection Conducted: June 5, 1990

Inspectors:

K. J. Lambert
K. J. Lambert
Radiation Specialist

10/31/90
Date

J. F. Schneider
J. F. Schneider
Mechanical Engineer

11/1/90
Date

Reviewed By:

D. J. Sreniawski
D. J. Sreniawski, Project Director
Fuel Facilities and Contaminated Sites

11/1/90
Date

Approved By:

John A. Grobe
John A. Grobe, Chief
Nuclear Materials Safety Branch

11-5-90
Date

Inspection Summary

Inspection on June 5, 1990 (Report No. 040-08830/90001)

Areas Inspected: Special, announced inspection to review records of decommissioning, perform confirmatory surveys and wipes for removable contamination, and take appropriate environmental samples as necessary. Twenty-seven wipes were taken and assayed for removable activity. Additionally, two roof-top gravel samples and one soil sample were obtained and analyzed for depleted uranium. The inspection also included a review of

the licensee's organization; facilities and equipment; decommissioning plan; radiation surveys; receipt and transfer of materials; waste disposal; and personnel exposures.

Results: From a review of records it has been determined the decommissioning work was accomplished in compliance with NRC regulations. Surveys and wipe results indicate the facility was decontaminated in accordance with the Guideline for Decontamination of Facility and Equipment Prior to Release for Unrestricted Use or Termination of License for Byproduct, Source, or Special Nuclear Material (Attachment E). Additionally, a review of the licensee's organization; facilities and equipment; decommissioning plan; radiation surveys; receipt and transfer of material; waste disposal; and personnel monitoring revealed the licensee is in compliance with NRC Regulations. Therefore, termination of the license is recommended.

DETAILS

1. Persons Contacted

Honeywell

*J. A. Fitzsimmons, Environmental Engineer (Radiation Safety Officer)
S. Smith, Safety Engineer

Diversified Scientific Services

*B. Rogers, Project Manager

*Indicates those present at exit meeting.

2. Purpose of Inspection

This was a special inspection, conducted in response to a request for a closeout survey by the Region III Materials Licensing Section, prior to terminating License No. SUB-1430.

3. Facility History and Summary of Programs

The licensee performed ballistic tests on 30 millimeter depleted uranium penetrator projectiles from November 1983 through the first quarter of 1989 in Test Range Number Three located at the Honeywell, Inc., LAP (load and pack) Facility in Joliet, Illinois. Test Range Number Three is an indoor range, measuring 89.6 meters long. The test range (Attachment A) has three main sections: gun room, 4.6 meters long; penetrator flight tunnel, 75 meters long; penetrator impact area, 10 meters long.

Each projectile had 275 grams of depleted uranium and 70 rounds were tested per lot of 100,000 rounds. Approximately 32,297 rounds containing 8882 kilograms of depleted uranium were tested in Test Range Three between 1983 and 1989.

4. Summary of Decommissioning

Decontamination of Test Range 3 was performed between October 30, 1989 and January 26, 1990. A preliminary direct survey was conducted to determine the amount of contamination present. The test range was divided into two sections as the result of the preliminary survey, the relatively clean gun room and penetrator flight area was one section while the more contaminated impact area was the other section. The gun room and penetrator flight tunnel were decontaminated by vacuuming with HEPA filtered vacuums and then damp wiped prior to surveying. The impact area, which was more contaminated due to high velocity fragmentation of the projectiles on impact, was decontaminated by wire brushing the carbon steel plates, which covered the walls and ceiling. The steel plates, which were penetrated and could not be decontaminated, were removed and cut-up into sections for disposal. Areas of concrete behind the steel plates which contained projectile fragments were removed for disposal. Sections of the hollow core concrete ceiling also contained penetrator

fragments and were removed for disposal. Additional areas which were decontaminated included the roof of the test range, where exhaust and ventilation fans and filters were located, and a gravel area outside the test range equipment access doors.

5. Personnel Monitoring

External exposures to beta/gamma radiation were determined through the use of film badges. A review of the film badge records revealed that all personnel involved with the decontamination activities received minimal exposures. Internal exposures were determined through bioassays (urinalysis) performed prior to decommissioning and compared to bioassays performed upon completion of the decommissioning. The results of final bioassays, for both individuals involved in the decontamination, were less than five micrograms per liter of total uranium.

6. Disposition of Materials

A review of receipt and transfer records revealed that all depleted uranium present at the facility has been transferred. A NRC Form 314, Certificate of Disposition of Materials, dated March 19, 1990, indicates the material was shipped to U.S. Ecology, Inc., Hanford Reservation burial site in Richland, Washington. The depleted uranium fragments, projectiles and contaminated concrete, metal, sand, paper and filters from the decontamination cleanup of the facility filled 48 drums. The drums were disposed of in two shipments, the first shipment consisted of 47 drums and was shipped on December 20, 1989. The remaining drum was shipped on February 21, 1990.

7. NRC Confirmatory Measurements

Measurements for alpha radiation levels were made using an Eberline "Rascal" scaler with a model AC-3 alpha probe, last calibrated on February 26, 1990. Measurements for beta/gamma radiation levels were made using a Ludlum model 14-C rate meter with an Eberline HP-260 pancake probe, last calibrated on April 26, 1990, with a beta efficiency of 16.5 percent. The wipes were analyzed using a Canberra model 2201 gas proportional alpha beta counter, NRC No. 013179, with an alpha efficiency of 30.277 percent and a beta efficiency of 27.369 percent.

Surveys of the test range, roof area and gravel area were conducted for alpha radiation with all measurements consistent with normal variations of background (see Attachment B for locations). Surveys of the above areas for beta/gamma radiation resulted in seven areas with measurements between 910 and 36,364 disintegrations beta gamma per minute per 100cm². All other areas surveyed resulted in readings within normal variations of background which averaged 240 disintegrations per minute. The seven areas with elevated readings were decontaminated again by the decommissioning contractor to a level less than 6060 disintegrations beta gamma per minute per 100cm² as reported in their letter dated June 7, 1990 (Attachment C).

Twenty-seven wipes were taken to determine the amount of removable activity present after decommissioning (see Attachment B for location

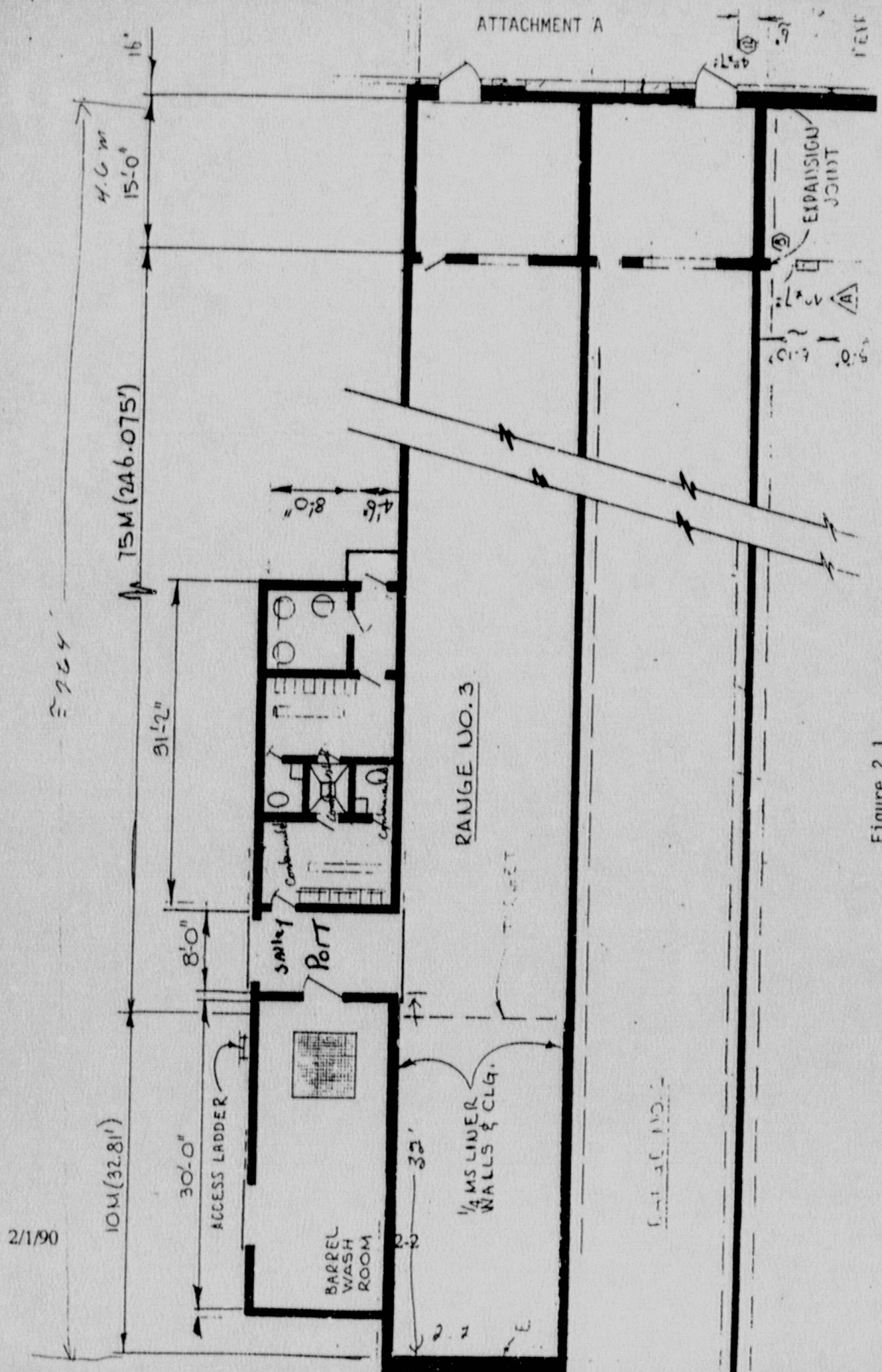
and Attachment D for results). The greatest removable activity was 45 disintegrations per minute per sample for beta activity and 11 disintegrations per minute per sample for removable alpha activity.

Three samples were collected, two samples on the test range roof in the vicinity of the exhaust fans and filters with the remaining sample collected in the gravel outside the test range equipment access door. The results of the samples indicates the average activity level is no higher than those associated with natural background or with normal agricultural uses. However, the result of the gravel sample was 13 picocuries per gram. This level of activity is well below the limit of 35 picocuries per gram specified in the Policy and Guidance Directive, FC 83-23: Termination of Byproduct, Source and Special Nuclear Material Licenses.

8. NRC Findings

The direct measurements for alpha radiation are indistinguishable from background, therefore meeting the acceptable surface contamination levels found in the Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material (Guidelines for Decontamination). The direct measurements for beta/gamma radiation show the highest reading to be 6060 disintegrations per minute for an area less than 100 cm², well below the maximum surface contamination level found in the Guidelines for Decontamination. The removable contamination levels of 11 disintegrations per minute per 100 cm² for alpha and 45 disintegrations per minute per 100 cm² for beta are well below the removable contamination level of 1000 disintegrations per minute per 100 cm² found in the Guidelines for Decontamination. The results of the samples collected, indicate the maximum activity is 13 picocuries per gram, well below the 35 picocuries per gram limit specified in the Policy and Guidance Directive, FC 83-23.

Therefore, termination of the license is recommended.



ATTACHMENT A

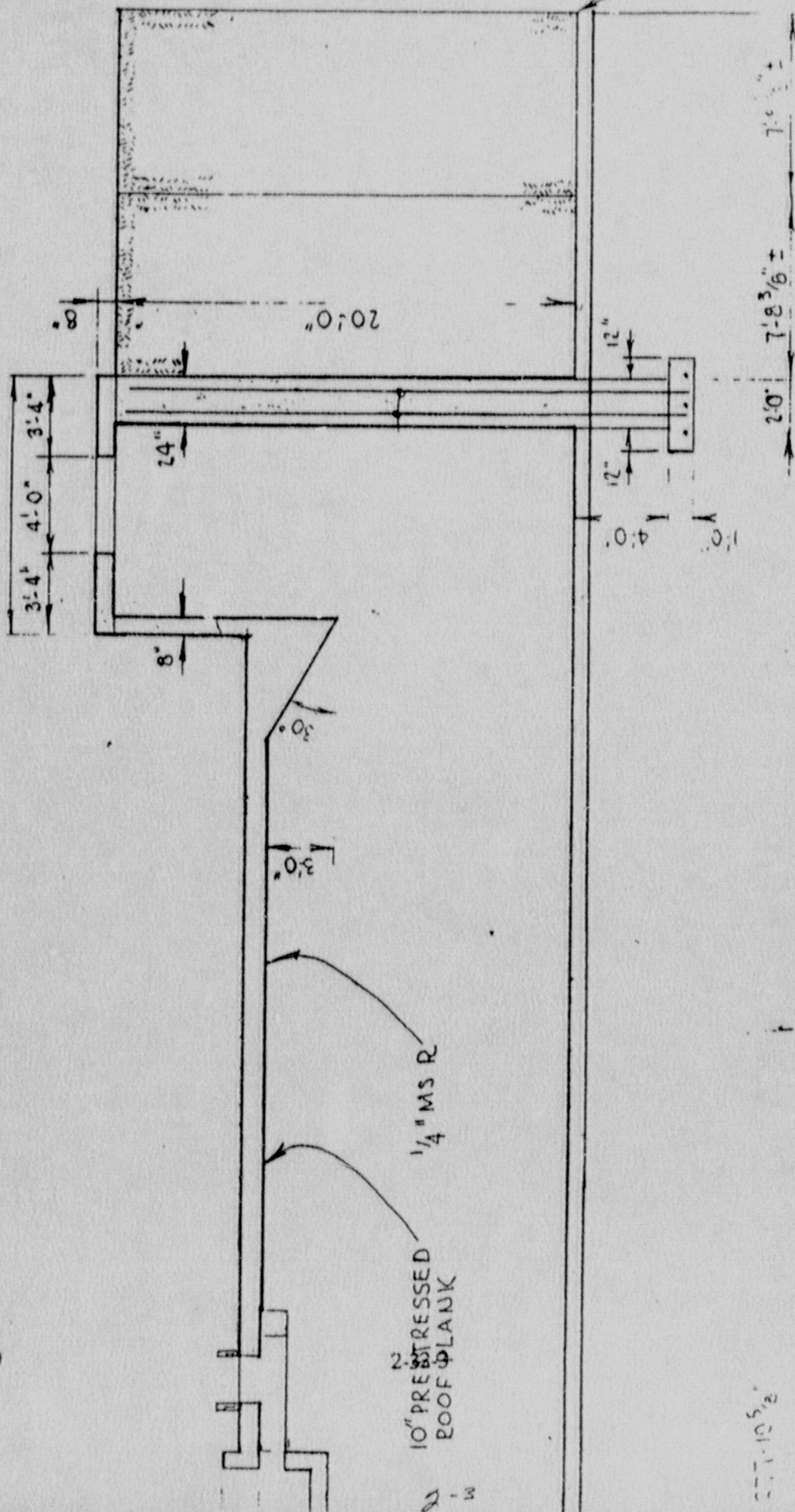
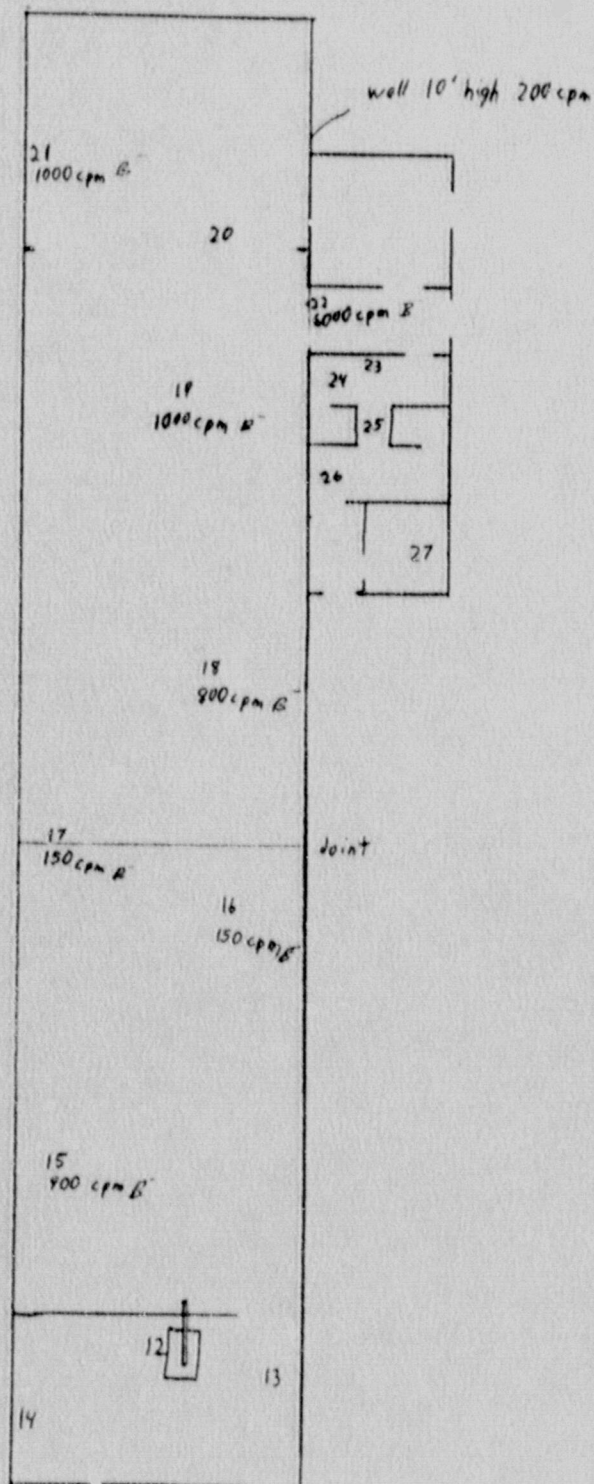


Figure 1

2/1/90

5.10.2

ATTACHMENT B



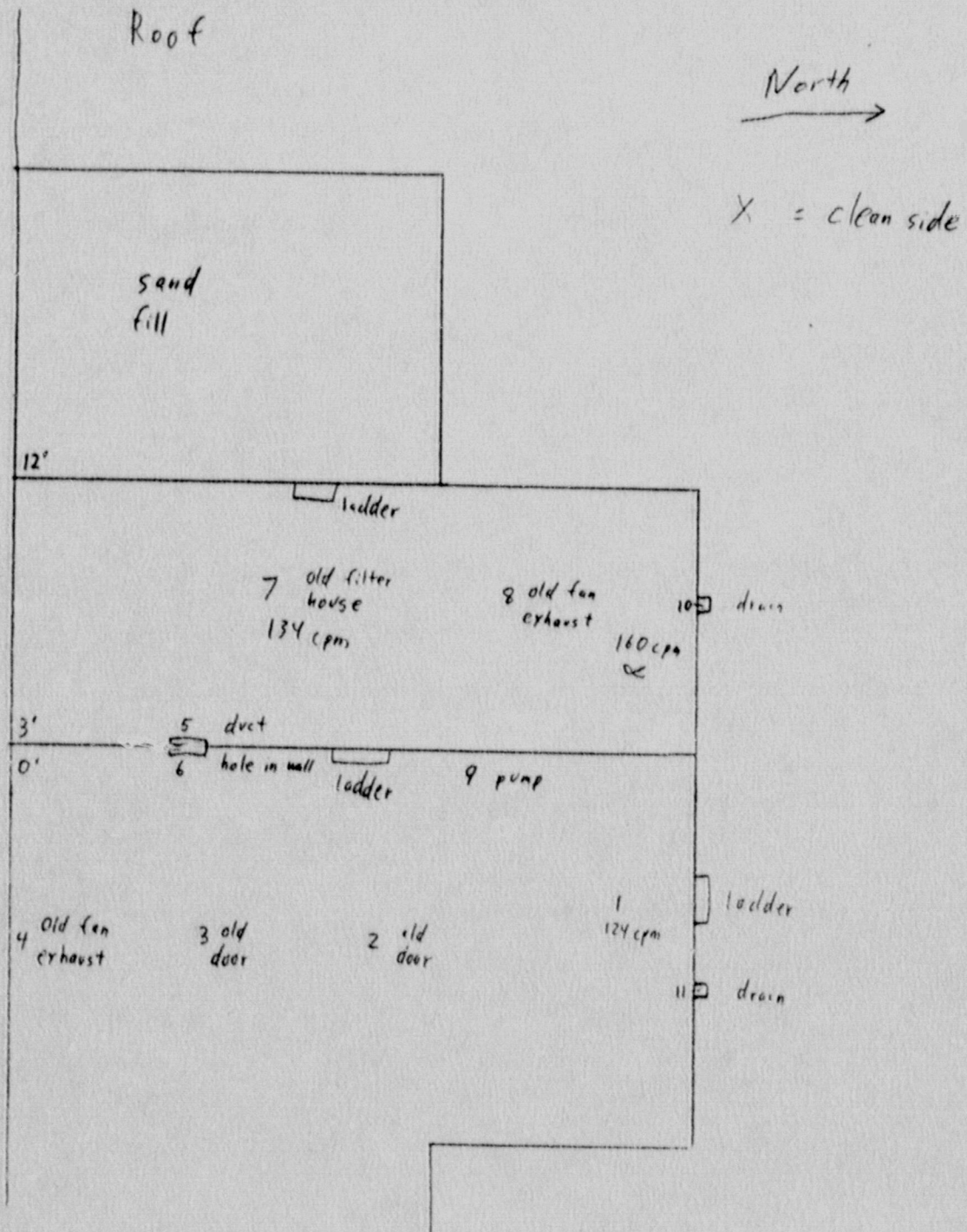
Ludlum 14C

NRC 013163

Beta Gamma

40 cpm Background

ATTACHMENT B



Honeywell

7 June 1990

Mr. Don Sreniawski
US Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Subject: Supplemental Information re: License No. SUB-1430
Termination Inspection, 5 June 1990.

Dear Mr. Sreniawski:

This letter is intended as follow up documentation for items discussed during your 5 June 1990 license termination inspection of Honeywell's Joliet LAP Facility. As discussed, myself and Mr. Bill Rogers of Diversified Scientific Services (Honeywell's decontamination/cleanup contractor) completed additional decontamination of areas identified during your survey. These seven areas were located on the range floor and are specifically identified by grid locations and page numbers from the FINAL REPORT FOR DECOMMISSIONING AND LICENSE TERMINATION FOR PVC TEST RANGE 3 FOR HONEYWELL INC, JOLIET, ILLINOIS, February, 1990. All locations were cleaned via mechanical means and HEPA vacuuming to a level at or below 0.5 millirem per hour (which corresponds to less than 1000 counts per minute on your instrumentation). The specific grid locations for this additional decontamination are:

K5 (page A4-27)

J4 (page A4-66)

J63 (page A4-49)

J5 (page A4-66)

K67 (page A4-50)

N6 (page A4-66)

Floor joint under range/sally port door (page A4-65)

I have also included for your information, copies of urinalysis results for [REDACTED] which indicate their post project uranium/urine levels to be less than 5 micrograms per liter.

EXEMPT FROM DISCLOSURE

This information should provide you with documentation requested during our 5 June 1990 meeting. Please contact me at 612/638-5205 if you have any questions or need any additional information.

JUN 14 1990

NRCLTR

DEFENSE SYSTEMS GROUP

HONEYWELL INC., NEW BRIGHTON, MINNESOTA 55112, TELEPHONE 612/870-5200

10-81 REV 11/89

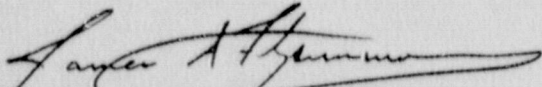
ATTACHMENT C

page 2

Honeywell's action regarding further use of the range area is contingent upon the NRC's position regarding termination of the subject license. Continued use of this range for test firing of munitions (containing no licensed material) is of high priority. Delays in our obtaining continued use of this range will have significant cost impact on certain of our production contracts. Your assistance in our obtaining prompt termination of this license is greatly appreciated.

Sincerely,

HONEYWELL INC.



James A. Fitzsimmons
Principal Environmental Engineer
(Radiation Safety Officer)

ATTACHMENT C

bcc: J. Persoon
R. Spotts
J. Straddeck
Bill Rogers

MN29-3553
IL16-1000
IL16-1300
DSS Inc.,

P.O. Box 863, Kingston, TN 37763

ATTACHMENT C

05-1990 08:58 FROM HONEYWELL MATL MANAGEMENT TO

PUC

P.04

1.102

gdm
6/5/90

Page 1
Received: 01/10/90

REPORT DIVERSIFIED SCIENTIFIC SER.
TO P. O. BOX 843
KINGSTON, TN 37763

ATTEN JIM MOVEY

CLIENT DESI SAMPLES 2
COMPANY DIVERSIFIED SCIENTIFIC
FACILITY

WORK ID URINE SAMPLES

TAKEN

TRANS

TYPE

P.O. # 1122

INVOICE UNDER SEPARATE COVER

SAMPLE IDENTIFICATION

01 3016

02 8124

ITRS. Oak Ridge

REPORT
02/06/90 10:15:40

PREPARED BY RADIOLOGICAL SCIENCES LAB.
BY 1850 BEAR CREEK ROAD
OAK RIDGE, TN 37831

ATTEN ERS

PHONE 615-482-7707

Work Order # 50-01-041
Work Not Complete

Shonda
CERTIFIED BY

CONTACT JIM DILLARD

TEST CODES and NAMES used on this report

U-TOTAL TOTAL URANIUM
VOLUME SAMPLE VOLUME

FRACTION 02A TEST CODE U-TOTAL NAME TOTAL URANIUM
Date & Time Collected 01/09/90 Category 18765

SAMPLE ID 8124

PARAMETER	RESULT	2-SIGMA ERROR	Units
U-TOTAL	CS.0		ug/ml
TOTAL SAMPLE VOLUME: 1150 ul			

ATTACHMENT C

06-1990 08:57 FROM HONEYWELL MATL MANAGEMENT TO
BY: A 6-5-90 4:33PM

PUC P.03

359394 013 376 0087: # 3

4/5/90 GDM

Page 1
Received: 01/10/90

ITRSL Oak Ridge REPORT
02/06/90 10:16:32

Work Order # SO-01-041

REPORT DIVERSIFIED SCIENTIFIC SER.
TO P. O. BOX 863
KINGSTON, TN 37763

PREPARED BY RADIOLOGICAL SCIENCES LAB
BY 1890 BEAR CREEK ROAD
OAK RIDGE, TN 37831

James T. Harvey
CERTIFIED BY

ATTEN JIM MEVEY

ATTEN ERE
PHONE 615-482-8707

CONTACT JIM DILLARD

CLIENT DSS1 SAMPLES 2
COMPANY DIVERSIFIED SCIENTIFIC
FACILITY

WORK ID URINE SAMPLES
TAKEN
TRANS
TYPE
P.D. # 1122
INVOICE Under separate cover

A

SAMPLE IDENTIFICATION

01 3016
02 B124

TEST CODES and NAMES used on this report

UTOTAL TOTAL URANIUM
VOLUME SAMPLE VOLUME

SENT BY: A

6-5-90 4:32PM

359394

615 376 0087: # 3

Page 2
Received: 01/10/90

ITRSL Oak Ridge REPORT
Results by Sample

Work Order # SO-01-041

SAMPLE ID 3016

FRACTION 01A TEST CODE UTOTAL NAME TOTAL URANIUM
Date & Time Collected 01/07/90 Category 189/95

PARAMETER	RESULT	2-SIGMA ERROR	Units
U-TOTAL	18.1	3.3	u1/ml
TOTAL SAMPLE VOLUME: 1730 ml			

*Follow-up/Recin
analysis in progress*

Honeywell

8 July 1990

Mr. Ken Lambert
US Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Subject: Follow-up Information re: License No. SUB-1430 Termination
Inspection, 5 June 1990.

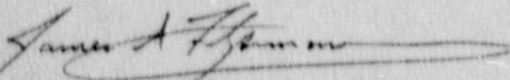
Dear Mr. Lambert:

This letter is intended to provide you with information relative to a follow-up urinalysis report for one of the contractor cleanup personnel involved with the subject range decontamination. As noted in the attached report, the referenced follow-up urinalysis result was determined to be less than 5 micrograms uranium per liter. Please note that the units for the reported results are in micrograms per liter rather than ~~milligrams~~ per liter as was indicated on some of the previous reports. The project cleanup contractor has confirmed that any reference to milligrams per liter in previously submitted urinalysis results was due to an error in lab reporting; correct units should be micrograms per liter.

Your assistance in expediting a review and decision relative to the subject license termination would be greatly appreciated. Honeywell's action regarding further use of the range area is contingent upon the NRC's position regarding termination of the subject license. Delays in our obtaining continued use of this range will have significant cost impact on certain of our production contracts. Please contact me at 612/638-5205 if you have any questions or need any additional information.

Sincerely,

HONEYWELL INC.



James A. Fitzsimmons
Principal Environmental Engineer
(Radiation Safety Officer)

*change as discussed
with J. Fitzsimmons
during telephone
conference on 7/13/90*

NRCLTR

AUG 16 1990

ATTACHMENT C

AUG-07-1990 16:29 FROM DIVERSIFIED SCIENTIFIC. TO 16126385002 P.02
 SENT BY: A : B- 7-90 4:25PM : J593544 010 370 0007/14 3

Page 2
 Received: 07/06/90

ITEL DNA RISK REPORT
 Results by Sample

Work Order # 50-07-007

SAMPLE II

- FRACTION 01A TEST CODE 02 NAME DNA SPEC
 Date & Time Collected 07/06/90 Category U-100

UNIT# 10/1
 WITH 08/07/90

VERIFIED BY

WAVE SPEC	RESULT	3-SIGMA	OTHER	RESULT	3-SIGMA
			U-TOTAL	CS. 0	
			SAMPLE		
			VOLUME:	2000 ul	

Attachment D

Honeywell, Inc.
Joliet Army Arsenal
Summary of Wipes

<u>Wipe Location</u>	<u>Alpha dpm/100cm²</u>	<u>Beta dpm/100cm²</u>
1	2	3
2	<1	5
3	<1	<5
4	<1	<5
5	<1	<5
6	<1	6
7	2	7
8	<1	<3
9	<1	<4
10	5	18
11	3	17
12	<1	<4
13	<1	6
14	<1	<1
15	<1	<1
16	7	16
17	<1	<1
18	<1	<3
19	9	45
20	7	16
21	<1	8
22	6	10
23	11	41
24	2	12
25	<1	<4
26	2	11
27	<1	8

ATTACHMENT E

GUIDELINES FOR DECONTAMINATION OF FACILITIES AND EQUIPMENT
PRIOR TO RELEASE FOR UNRESTRICTED USE
OR TERMINATION OF LICENSES FOR BYPRODUCT, SOURCE,
OR SPECIAL NUCLEAR MATERIAL

U. S. Nuclear Regulatory Commission
Division of Fuel Cycle and Material Safety
Washington, D.C. 20555

July 1982

The instructions in this guide, in conjunction with Table 1, specify the radionuclides and radiation exposure rate limits which should be used in decontamination and survey of surfaces or premises and equipment prior to abandonment or release for unrestricted use. The limits in Table 1 do not apply to premises, equipment, or scrap containing induced radioactivity for which the radiological considerations pertinent to their use may be different. The release of such facilities or items from regulatory control is considered on a case-by-case basis.

1. The licensee shall make a reasonable effort to eliminate residual contamination.
2. Radioactivity on equipment or surfaces shall not be covered by paint, plating, or other covering material unless contamination levels, as determined by a survey and documented, are below the limits specified in Table 1 prior to the application of the covering. A reasonable effort must be made to minimize the contamination prior to use of any covering.
3. The radioactivity on the interior surfaces of pipes, drain lines, or ductwork shall be determined by making measurements at all traps, and other appropriate access points, provided that contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines, or ductwork. Surfaces of premises, equipment, or scrap which are likely to be contaminated but are of such size, construction, or location as to make the surface inaccessible for purposes of measurement shall be presumed to be contaminated in excess of the limits.
4. Upon request, the Commission may authorize a licensee to relinquish possession or control of premises, equipment, or scrap having surfaces contaminated with materials in excess of the limits specified. This may include, but would not be limited to, special circumstances such as razing of buildings, transfer of premises to another organization continuing work with radioactive materials, or conversion of facilities to a long-term storage or standby status. Such requests must:
 - a. Provide detailed, specific information describing the premises, equipment or scrap, radioactive contaminants, and the nature, extent, and degree of residual surface contamination.
 - b. Provide a detailed health and safety analysis which reflects that the residual amounts of materials on surface areas, together with other considerations such as prospective use of the premises, equipment or scrap, are unlikely to result in an unreasonable risk to the health and safety of the public.

5. Prior to release of premises for unrestricted use, the licensee shall make a comprehensive radiation survey which establishes that contamination is within the limits specified in Table 1. A copy of the survey report shall be filed with the Division of Fuel Cycle and Material Safety, USNRC, Washington, D.C. 20555, and also the Administrator of the NRC Regional Office having jurisdiction. The report should be filed at least 30 days prior to the planned date of abandonment. The survey report shall:

- a. Identify the premises.
- b. Show that reasonable effort has been made to eliminate residual contamination.
- c. Describe the scope of the survey and general procedures followed.
- d. State the findings of the survey in units specified in the instruction.

Following review of the report, the NRC will consider visiting the facilities to confirm the survey.

TABLE 1
ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDES ^a	AVERAGE ^{b c f}	MAXIMUM ^{b d f}	REMOVABLE ^{b e f}
U-nat, U-235, U-238, and associated decay products	5,000 dpm α /100 cm ²	15,000 dpm α /100 cm ²	1,000 dpm α /100 cm ²
Transuramics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm ²	300 dpm/100 cm ²	20 dpm/100 cm ²
Pu-nat, Th-232, Sr-90, Pu-223, Ra-224, U-232, I-126, I-131, I-133	1000 dpm/100 cm ²	3000 dpm/100 cm ²	200 dpm/100 cm ²
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	5000 dpm $\beta\gamma$ /100 cm ²	15,000 dpm $\beta\gamma$ /100 cm ²	1000 dpm $\beta\gamma$ /100 cm ²

^aWhere surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

^bAs used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

^cMeasurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

^dThe maximum contamination level applies to an area of not more than 100 cm².

^eThe amount of removable radioactive material per 100 cm² of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.