

Items 1 through 6 are provided in response to your request for additional information regarding Application for Renewal of License, Control No. 137481.

1. Radioactive Material:

Element and Mass Number	Chemical and/or Physical Form	Maximum amount possessed at any time
H-3	Static Meters	250 mCi
Ra-226	Calibrator	1 mCi
Ni-63	Electron Capture Detectors	50 mCi
Cd-109	Lead detectors	20 mCi

2. Source Model and Serial Numbers:

Manufacturer	Model #	Serial #
HP	G2397	U0267
Varian	02-001972-00	A5693
MSA	N/A	007
Pylon	RNC	175
Niton	XL 309	U574NR1771
Niton	XL 309	U283NR0251
Niton	XL 703S	U1609NR0628
3M Static Meter	703	Body stamped #1882

3. The Hewlett-Packard Electron Capture Detector is generally licensed.
The 3M Static Meter Model #703 is generally licensed.
4. The units of measure have been correct on Figure 1 and Attachment 1 (enclosed).
5. We wish to remove the Institute Plant from our license. We have never used radioactive material in that facility.
6. The enclosed Radiological Characterization of Building 747 addresses the use of Building 747 and explains the wipe analysis with instrument efficiency.

**Radiological Characterization of Building 747
South Charleston Technology Park, WV
Union Carbide Corporation, A Subsidiary of The Dow Chemical Company**

Facility History

Building 747 has served as the focal point for authorized activities involving radiation sources for Union Carbide Corporation. Prior to the merger with The Dow Chemical Company in 2001, the facility was used for handling and storing sealed sources (Cd-109, Ni-63, Cs-137, and Am-241), and instrument repairs. There are no records that would indicate that any sealed sources stored within this building have leaked their radioactive content. While it is possible that loose isotopes might have been stored in this building at some point in the past, there are no records to provide conclusive proof either way. However, no work involving loose isotopes would have been conducted in this building.

Since the merger, radiation activity involving loose isotopes and instrument repair has been eliminated. A layout of Building 747 can be found in Attachment 1 & 2.

Current Radiological Status

All loose isotopes and most instruments not needed to support the current and future planned radiation program activities have been transferred to authorized facilities. The building currently holds sealed sources containing Ni-63, and several sealed check sources.

Final Radiation Survey

1.1 Contamination Surveys and Wipe Tests

Contamination surveys were performed in all areas that radioactive materials were used within the 747 Building. These surveys consisted of direct measurements with a survey meter to measure total contamination levels and wipe tests to measure removable contamination levels. Direct contamination surveys in areas were performed using a FAG Kugelfischer GM Survey Meter. Wipe tests using dry wipes analyzed by a Beckman LS6000 scintillation counter were used to measure removable contamination levels.

Survey meters used in the decontamination surveys were calibrated within the past twelve months, as described in the site written Radiation Safety Program.

1.2 Detection of Contamination

1.2.1 Beckman LS6000 Liquid Scintillation Counter

All wipe tests were analyzed with a Beckman LS6000 Liquid Scintillation Counter in the 1803 Building of the Midland, Michigan site of The Dow Chemical Company (NRC license 21-00265-06). This location is specifically licensed by the NRC to analyze wipe tests using liquid scintillation analysis. Liquid scintillation counters provide very good counting efficiency for the detection of beta particles. An internal study of the efficiency of the Beckman LS6000 liquid scintillation counter used at The Dow Chemical Company's Midland site showed that the detection efficiency ranged from 80% for Ni-63, which emits a beta particle with a maximum energy of 66 keV, to 99% for P-32, which emits a beta particle with a maximum energy of 1.71 MeV.

Operational history with the liquid scintillation unit has shown that results above 50 dpm above background are consistently distinguishable from background. Background for each energy window in the liquid scintillation unit is determined by counting 10 replicate blank swab samples for 60 minutes each, and using the mean counts per minute for each window. Functionality of the unit is confirmed by analyzing a C-14 standard with each set of wipe tests that are analyzed in the liquid scintillation unit. The unit must match the expected results within +/- 0.5% or the results are considered invalid.

Any wipe that contains greater than 50 disintegrations per minute above background will be considered to be elevated in radioactivity. Each wipe is used to test at least 100 cm² of surface area, and frequently significantly larger. Therefore, the minimum level of detection is 50 dpm/100 cm².

1.2.2 Ludlum Model 3 Survey Meter

The Ludlum Model 3 Survey Meter with a Model 44-9 pancake probe is calibrated annually against a Cs-137 standard. Additionally, with each use of the survey meter, an operability check is performed with a thorium standard to confirm that the meter is functioning properly. The meter must respond with +/- 20% of the expected response, or it is taken out of operation until it is repaired or recalibrated.

Any measurements of radiation above background that are detected by the meter will be considered to be elevated in radioactivity.

2.0 Results of Survey

Building 747 has been thoroughly wipe tested to check for removable radioactive contamination (and surveyed to check for fixed contamination).

Table 1 contains a list of the locations that were wipe tested in the 747 Building. All wipe tests were analyzed with a Beckman LS6000 Liquid Scintillation Counter in the 1803 Building of the Midland, Michigan site of The Dow Chemical Company. Attachment 1 shows a map of the areas that were surveyed. The lab report for the analysis of those wipes can be found in Attachment 2.

3.0 NRC Published Release Criteria

The NRC published screening values that are representative of unrestricted land use and which were developed for building surfaces in the *Federal Register* on November 18, 1998. The NRC also included these screening values in the decommissioning guidance document, NUREG-1757 (NRC, 2003). The screening values represent levels of radionuclide contamination that would be in compliance with the unrestricted use dose limit in 10 CFR 20.1402; i.e., 25 mrem/year. For the radionuclides of concern at the 747 Building, these screening values are:

- Ni-63: 1.8×10^6 dpm/100 cm²
- Cs-137: 2.8×10^4 dpm/100 cm²
- Cd-109: not listed, but has similar emissions as S-35 (1.3×10^7 dpm/100 cm²)
- Am-241: not listed, but the soil release criteria for Am-241 is a factor of 5.5 times lower than Cs-137. Therefore, an estimated release criteria for buildings would be 5.5 times less than the release criteria for Cs-137, or 5090 dpm/100 cm²)

All of the wipe sample results indicate that the residual contamination levels within 747 Building are orders of magnitude below these screening level release criteria. Use of these screening level release criteria is considered appropriate for the 747 Building because the site does not exhibit any criteria, as stated in the NRC decommissioning guidance (NRC, 2003), that would preclude the use of the screening values for unrestricted use.

4.0 Results and Conclusions

Results of the characterization survey show that surficial residual radioactivity at the 747 Building is not distinguishable from background levels. Wipe sample results also show that removable radioactivity from incinerator operations is non-detectable with a minimum detectable activity of 50 dpm/100 cm². Therefore, it can be concluded that historical operations within the 747 Building have not left residual contamination that would preclude the release of this building for unrestricted release.

5.0 References

U.S. Nuclear Regulatory Commission. Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material. Washington, D.C.: U.S. Nuclear Regulatory Commission. 1982.

U.S. Nuclear Regulatory Commission. Consolidated NMSS Decommissioning Guidance - Characterization, Survey, and Determination of Radiological Criteria. Washington, D.C.: U.S. Nuclear Regulatory Commission. 2003.

Attachment 1

747 Survey
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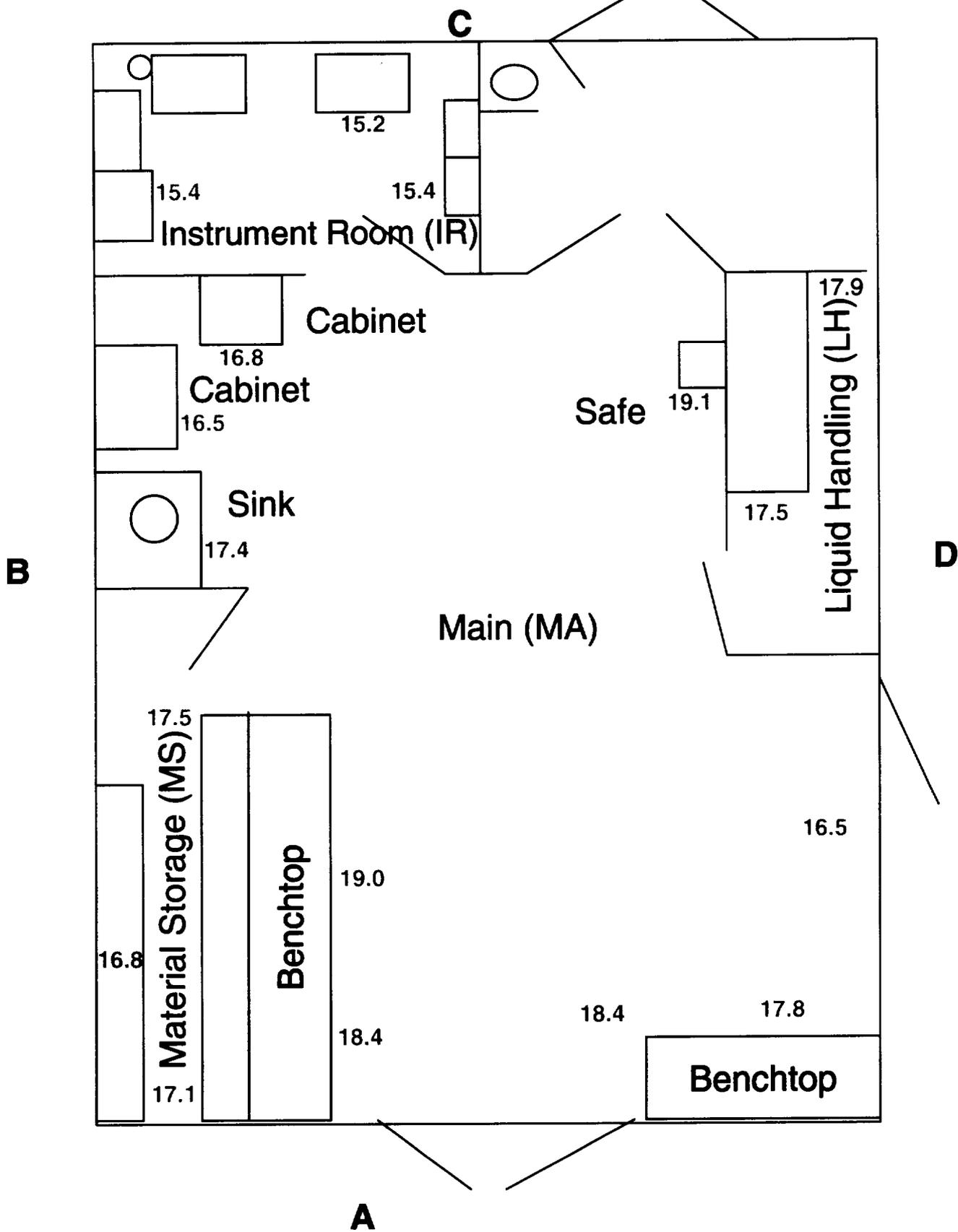
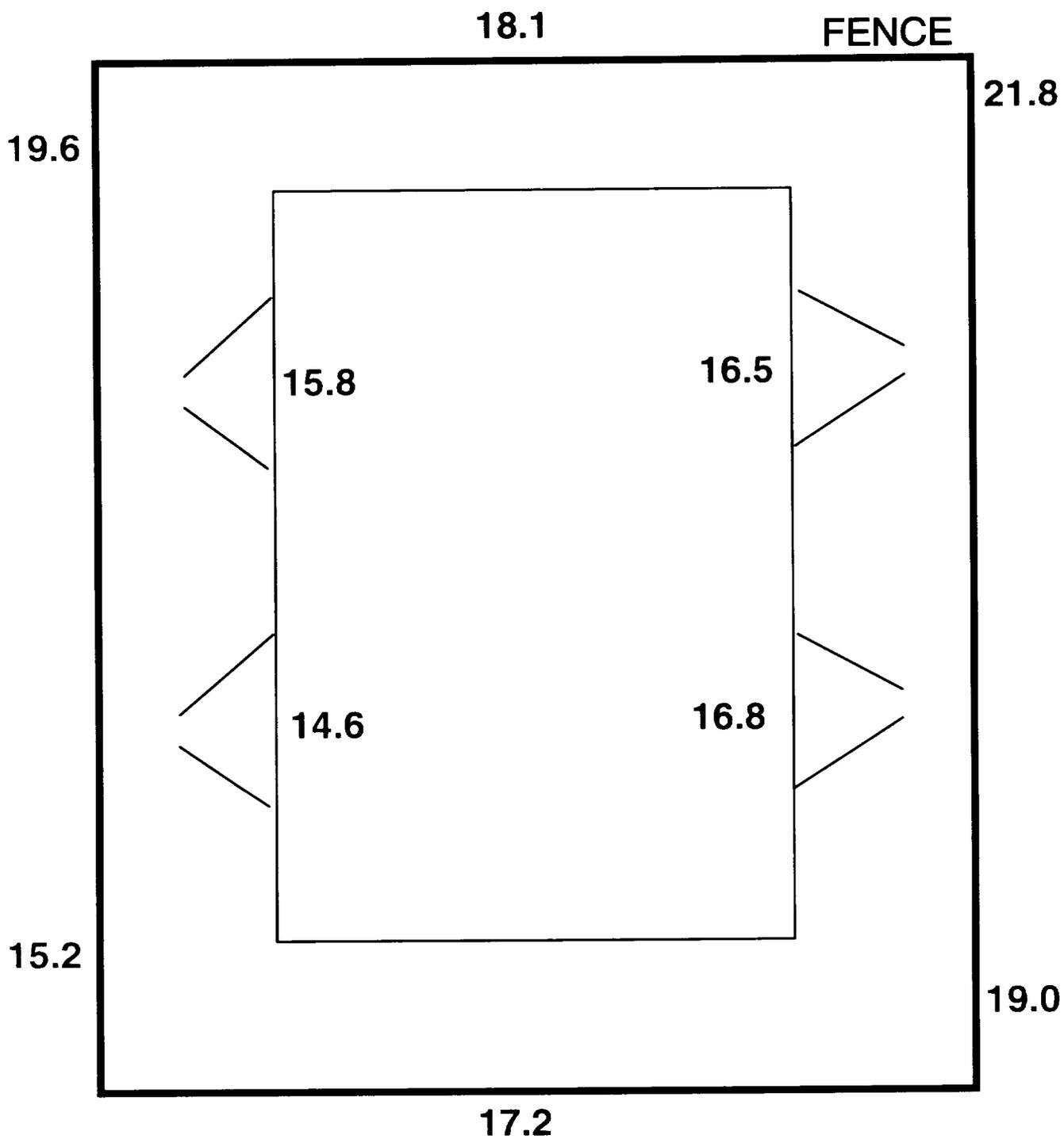


Figure 1

747 Shed Survey

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1/27/2006