DL-112296_01

RAY-SAFE ASSOCIATES

Consultants in Radiation Protection Training and Management Programs

November 22, 1996

United States Nuclear Regulatory Commission
Region II
101 Marietta Street, N.W., Suite 2900
Atlanta, Georgia 30323-0199

Attn: Jay L. Henson
License Reviewer
Materials Licensing/Inspection Branch 2

Mail Control No. 257206
Docket No. 030-10034
License No. 45-15923-01

Dear Mr. Henson:

This correspondence is a follow-up to our telephone conversation on November 8, 1996 and your letter dated October 21, 1996 (Enclosure A). As per our discussion, the additional information you requested concerning the Radiological Safety Assessment dated September 16, 1996 is submitted. The information requested is as follows:

- **Identification of the specific radionuclides that were used by the Licensee in Rooms 3D231 and 3D239.**

  **The inclusion of the levels of fixed contamination on surfaces surveyed in these laboratories and the results expressed in dpm/100 cm$^2$.**

- **The comparison of the instrument and swipe surveys conducted in these laboratories with the specific radionuclides used in these laboratories, and an assessment to compare the survey results to the USNRC guidance document, entitled "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source on Special Nuclear Material," April, 1993.**

Enclosed is a Supplement to the initial report with the necessary information as requested (Enclosure B).

Since time is of the essence, I am submitting this information on behalf of the Licensee who has retained me as their Technical Health Physics Consultant.

Thank you in advance for your utmost attention and cooperation in this matter.

Sincerely,

Michael S. Terpilak

Michael S. Terpilak
Certified Health Physicist

1918 Grayslake Drive • Silver Spring, Maryland 20906 • (301) 598-5633

ENCLOSURE A

UNITED STATES NUCLEAR REGULATORY COMMISSION
CORRESPONDENCE

ACKNOWLEDGMENT OF REQUEST
FOR A
LICENSING ACTION

OCTOBER 21, 1996

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

OCT 21 1996

Department of the Interior
ATTN: Gregory A. Wandless
Radiation Safety Officer
12201 Sunrise Valley Drive
Reston, Virginia 22092

Mail Control No. 257206
Docket No. 030-10034
License No. 45-15923-01

SUBJECT: ACKNOWLEDGEMENT OF REQUEST FOR A LICENSING ACTION
(Your: ✓Letter ☐Application ✓Dated ☐Received September 18, 1996)

Dear Sir or Madam:

1. In response to your request, we have performed an administrative review of your application for a:
☐new ☒amendment ☐renewal ☐termination licensing action.

It should be noted that a technical review may identify additional omissions in the submitted information, technical issues that require additional information, or policy/technical issues that require coordination with headquarters or other NRC regional offices.

2. It appears that your request is ☒incomplete ☐complete and: ☐routine (see 3-5 below);
☒non-routine, and if necessary, can be completed within 20 - 30 days, following fee approval and response to any telephone or telefax deficiency requests from our license reviewer.

3. New and amendment actions are normally processed in 20 - 30 days, unless we find major deficiencies, or policy issues requiring central program office assistance.

4. Renewal actions are normally processed in 60 - 90 days, however under timely filing (before expiration) you may continue to operate under your existing license.

5. Termination actions are normally processed in 20 - 30 days, unless confirmatory surveys following decontamination are involved.

6. A copy of your correspondence has been forwarded to our Licensing Fee and Debt Collection Branch (301/415-6067) for approval of the fee category and amount.

7. If you have a compelling safety or business-related reason for requesting expedited review, please contact me or our Licensing Assistant, Diane Heim, at 404/331-4673 (voice/ans) or 404/331-7437 (fax) or Internet: ddh@nrc.gov. We will try to complete your request, as stated in 2. above.

8. Please call or write with any questions. I can be reached directly at 404/331-0344 (voice/ans) or via Internet: jlh@nrc.gov.

Sincerely,

Jay L. Henson, License Reviewer
Materials Licensing/Inspection Branch 2

ENCLOSURE B

# SUPPLEMENT

# TO

# RADIOLOGICAL SAFETY ASSESSMENT

# FOR

# UNITED STATES DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

RESTON, VIRGINIA 22092

TASK ORDER NO. D3A96IN3,179-06A

NOVEMBER 15, 1996

PREPARED BY:

DEPARTMENT OF HEALTH AND HUMAN SERVICES

U.S. PUBLIC HEALTH SERVICE

DIVISION OF FEDERAL OCCUPATIONAL HEALTH

WASHINGTON, D.C. FIELD OFFICE

PREPARED FOR:

U.S. DEPARTMENT OF INTERIOR

U.S. GEOLOGICAL SURVEY

# SUPPLEMENT TO

# RADIOLOGICAL SAFETY ASSESSMENT

UNITED STATES DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

RESTON, VIRGINIA 22092

NOVEMBER 15, 1996

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# I. INTRODUCTION

The John Wesley Powell Building on the United States Geological Survey (USGS) National Center Campus located in Reston, Virginia is a multistory administrative and laboratory complex which houses approximately a few thousand employees. The complex consists of about 75% administrative offices and about 25% laboratory space. The two laboratories surveyed will be released for unrestricted use and will be converted into office space (Figure 1).

# II. RADIONCULIDE USAGE IN LABORATORIES 3D231AND 3D239

The only radionuclides used in this laboratory space were as follows:

- Scandium - 46
- Iron - 59
- Cobalt - 60

Attached for your information is Table 1.0 that identifies the specific characteristics of these radionuclides (Attachment A).

**Radiation History Room 3D231 John Wesley Powell Building, USGS, Reston, VA**

This laboratory was approved to use radioactive material for the first time on February 15, 1995. Prior to that time the laboratory was used for routine chemical analyst. Radioactive material processed in its laboratory consisted of mineral and glass material irradiated at the USGS TRIGA Reactor Facility in Denver, Colorado. The mineral grains 0.01g per sample were embedded in epoxy or Teflon and covered with mica detectors during irradiation. All irradiated material was in the solid state, no radioactive liquids or gases were involved. The functions of this laboratory were moved to 3C232 in May of 1996. Levels of activity were <3 mr/hr when irradiations were received from reactor. In addition, the physical half-lives of the irradiated material was primarily in days with eventual decay of the samples in a short period of time.

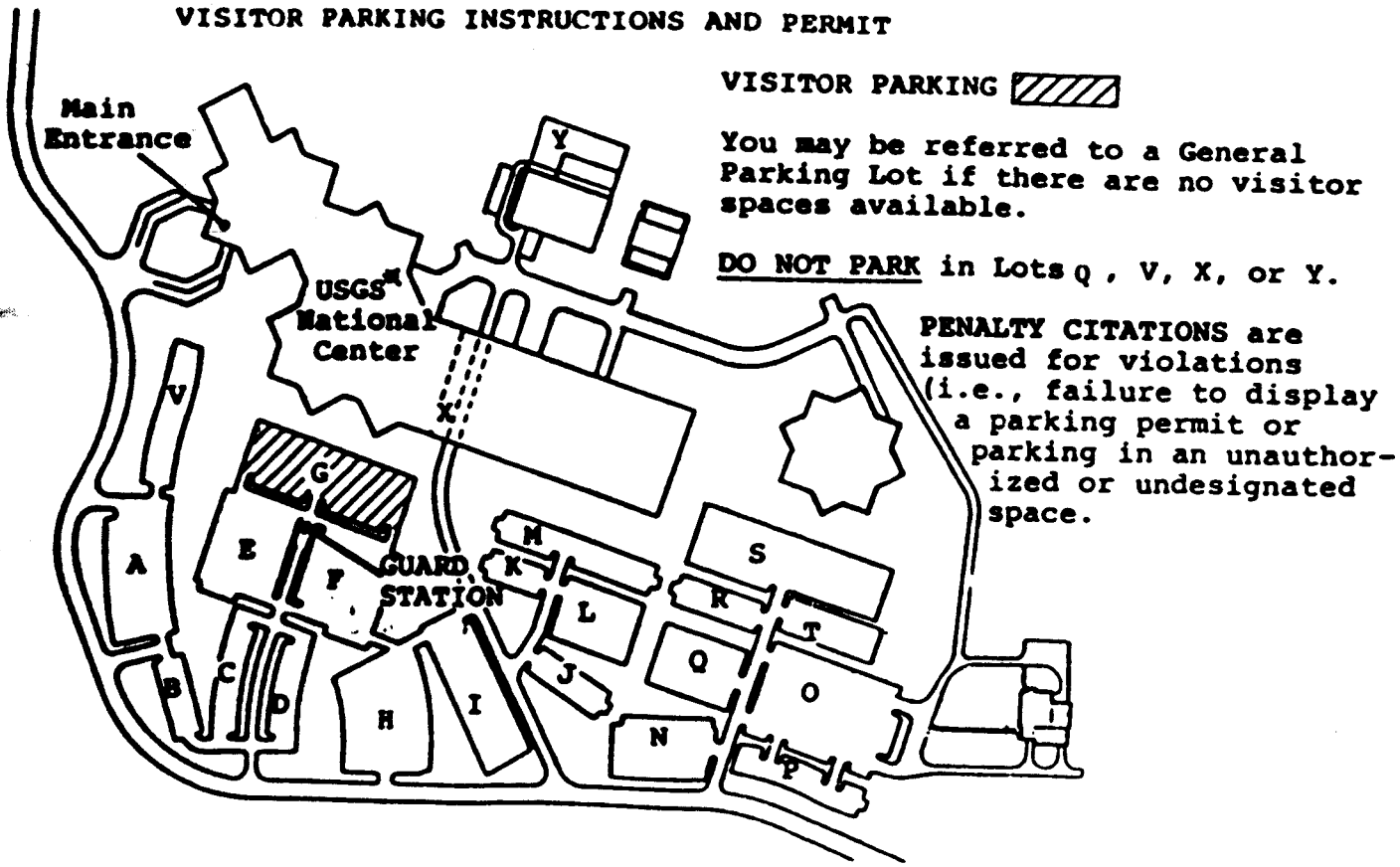
**Based on the above use of this laboratory it was designed as an unaffected area as defined in NUREG/R-5849 and as such section 4.2.3 Selecting Measurement Sampling Locations for Structure Surveys states that scans of unaffected areas should cover a minimum of 10% of the floor and lower wall surface area.**

**Radiation History Room 3D239, John Wesley Powell Building, USGS, Reston, VA**

The John Wesley Powell building was completed in 1972. Room 3D239 was occupied on or about that date by the Radiochemistry Project of the Branch of Analytical Labs. This room was used solely for the purpose of performing chemical separation of neutron activated

FIGURE 1

JOHN WESLEY POWELL BUILDING *



ATTACHMENT A

TABLE 1.0

CHARACTERISTICS OF RADIONUCLIDES
USED IN LABORATORIES 3D231 AND 3D239

| Radionuclide | Radiation | Energy | Half-Life |
|---|---|---|---|
| • Scandium-46 | Beta | 0.357 MeV (Max.) | 84 days |
| | Gamma | 1.120 MeV (100%)<br>0.889 MeV (100%)<br>Ti - x-ray | |
| • Iron-59 | Beta<br>B-1 | 130.8 keV Max. (1.27%)<br>35.8 keV Avg. | 45 days |
| | B-2 | 273.4 keV Max.<br>80.8 keV Avg. (45.6%) | |
| | B-3 | 465.8 keV Max.<br>149.3 keV Avg. (52.8%) | |
| | B-4 | 1.565 MeV Max.<br>635.8 keV Avg. (0.18%) | |
| | Gamma<br>γ-1<br>γ-2<br>γ-3<br>γ-4 | <br>190 keV (3%)<br>1.10 MeV (56%)<br>1.29 MeV (44%)<br>143 keV (1%) | |
| • Cobalt-60 | Beta<br>Beta | 318.0 keV Max. (99%)<br>95.80 keV Aug. (99%) | 5.27 years |
| | Gamma | 1.173 MeV (100%)<br>1.332 MeV (100%) | |

In addition, all irradiated samples were in a solid state, no radioactive liquids or gases were involved, and all irradiated samples were sealed, no unsealed radioactive material or sources were used in these laboratories. The estimated activity of the radioactive materials never exceeded microcurie quantities.

geological samples. This work was performed until approximately 1985 when the Radiochemistry Project was moved to the Solid State Physics Building. This room was no longer used by the radiochemistry: project for performing radiochemical expiations. Activated samples were processed chemically, using various acid digestion techniques, ion-exchange chromatography and precipitation. Active liquids were present during these periods of laboratory use.

Radioactive material processed in this laboratory consisted of minerals indicated at the USGS Triga Reactor Facility in Denver, Colorado. Since 1985 until the present, the laboratory only utilized sealed sources in Argon-Argon analysis and samples were never unsealed. Repeated instrument and swipe surveys over the last 20 years indicated no spills and no record of contamination.

Based on the above use of this laboratory it was designated as an affected area as defined in NUREG/CR-5849 and as such section 4.23 Selecting Measurement Sampling Locations for Structure Surveys states that scans of unaffected areas should cover a minimum of 100% of the floor and lower wall surface area. Since there was no reason to suspect residual activity exceeding 25% of the guideline value on these surfaces, a minimum of 30 measurement locations each, on vertical and horizontal surfaces where radioactive materials would likely accumulate (air exhaust rents and horizontal surfaces where dust would settle)was selected. To assure a reasonable coverage of these surfaces, an average of at least 1 measurement location per $20m^2$ of surface area was selected.

# III. RADIATION SURVFYS

The radiation surveys conducted by portable radiation detection instruments in each of the laboratories 3D231 and 3D239 did not indicate any fixed contamination on all the surfaces surveyed. A total of 115 and 156 surfaces, areas and locations were surveyed in laboratories 3D231 and 3D239 respectively and all instrument surveys indicated no radiation levels above natural background, therefore an indication of no fixed contamination was identified

**As a result of these instrument surveys since there was no fixed contamination identified, there was no need to express results in fixed contamination in dpm/100 $cm^2$. The specific radionuclides in question have energies similar to the calibration energies of the radiation instruments used for the surveys. In addition, the scanning and survey technique was demonstrated to have a detection sensitivity for the radionuclide or radiations of interest at $\leq$ 25% of the guideline level.**

**In addition, all swipe surveys in these laboratories were determined to be Minimum Detectable Activity (MDA), i.e., zero Disintegrations per Minute (DPM) which indicates that there was no removable and/or loose surface contamination identified.**

# IV. ANALYSIS AND COMPARISON OF RADIATION SURVEY RECRUITS Ɔ U.S. NUCLEAR REGULATORY COMMISSION (NRC) GUIDELINES

The USNRC guidance document entitled "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source or Special Nuclear Material," April 1993 states that depending on the specific radionuclides identified acceptable surface contamination levels shall be followed.

Therefore, based on three radionuclides identified in these two laboratories the category Beta-Gamma emitters was selected as the criteria for analysis and comparison with the radiation survey results (instrument and swipes).

The Beta-Gamma emitter nuclide category for acceptable surface contamination levels are as follows:

- Average - 5,000 dpm Bγ/100 $cm^2$
- Maximum - 15,000 dpm Bγ/100 $cm^2$
- Removable - 1,000 dpm Bγ/100 $cm^2$

In addition, 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.

Swipe surveys at each laboratory indicted that samples were nondetectable, i.e., Minimum Detectable Activity (MDA), the results were significantly below the average, maximum and removable acceptable surface contamination levels.

Subsequently the radiation instrument surveys of each laboratory indicated levels in the range of 0.020 mR/hr and 15-20 μR/hr which indicate natural background radiation and were significantly below the average and maximum radiation levels associated with surface contamination resulting from then beta-gamma emitters.

# V. RESULTS AND CONCLUSION

Based on the results of the radiogical safety assessment, i.e., radiation instrument and swipe survey and comparison with the USNRC guidelines, Laboratory Rooms 3D231 and 3D239 can be released for unrestricted use.

# FINAL REPORT

# RADIOLOGICAL SAFETY ASSESSMENT

# FOR

# UNITED STATES DEPARTMENT OF THE INTERIOR

# U.S. GEOLOGICAL SURVEY

# RESTON, VIRGINIA 22092

TASK ORDER NO. D3A96IN31179-06A

SEPTEMBER 16, 1996

PREPARED BY:

DEPARTMENT OF HEALTH AND HUMAN SERVICES

U.S. PUBLIC HEALTH SERVICE

DIVISION OF FEDERAL OCCUPATIONAL HEALTH

WASHINGTON, D.C. FIELD OFFICE

PREPARED FOR:

U.S. DEPARTMENT OF INTERIOR

U.S. GEOLOGICAL SURVEY

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# I. EXECUTIVE SUMMARY AND ACTION ITEMS

A radiological safety assessment of the United States Department of Interior, U.S. Geological Survey (USGS) John Wesley Building was conducted on August 15 and 16, 1996 by Michael S. Terpilak, Certified Health Physicist.

The radiological safety assessment included a radiation survey utilizing portable radiation detection survey instruments. In addition, a total 271 swipe samples were conducted at two laboratories located in the John Wesley Building on the campus of the USGS National Center located at Reston, Virginia.

The findings and results of all samples (i[illegible]ment and swipe surveys) indicated that the 2 laboratories were free of fixed and removabl[illegible]amination and qualify for release for UNRESTRICTED USE in accordance with [illegible]ent U.S. Nuclear Regulatory Commission (NRC) guidelines, April 1993.

# II. INTRODUCTION

This radiological assessment was requested by May Beth Givan, Contract Officers Technical Representation (COTR), Public Health Service, Division of Federal Occupational Health (PHS/FDOH), Washington Field Office. This radiological assessment was also conducted at the request of Mr. Gary Kramer, Bureau Safety Manager of the USGS National Center. The date of request was August 16, 1996 and the Task Order number is USGS - D3A96IN31179-06A. The Radiological Safety Assessment was performed by Michael S. Terpilak, Certified Health Physicist, on August 15 and 16, 1996.

The objective of this report is to present the findings and results of the radiation survey and to indicate whether the laboratories surveyed qualify for release for UNRESTRICTED USE in accordance with current U.S. NRC guidelines April, 1993 and NUREG/CR-5839, "Manual for Conducting Radiological Surveys in Support of License Termination," June 1992.

# III. BACKGROUND

The U.S. Department of the Interior, U.S. Geological Survey (USGS) currently holds an NRC License (License Number - 45-15923-01 as amended through amendment 28) to operate the following facilities: (Appendix A)

- U.S. Geological Survey National Center
  12201 Sunrise Valley Drive
  Physics Building Laboratories
  Reston, Virginia 22092

- U.S. Geological Survey
  Stephenson Center
  Suite 129
  729 Gracern Road
  Columbia, South Carolina 29210

The current license expired on November 30, 1995. In accordance with 10 CFR 30.37, to ensure that the operating license did not expire, the USGS submitted the renewal application on November 27, 1995 and renewed July 29, 1996 with an expiration date of November 30, 2000.

The Nuclear Regulatory Commission (NRC) has established Technical and Financial Regulations for decommissioning Licensed Nuclear Facilities (53 CFR 24018, June 27, 1988). The regulations address decommissioning planning, needs, timing, funding methods, and environmental review requirements for Public and Private Facilities having licenses under 10 CFR parts 30, 40, 50, 70 and 72. The intent of the regulations is to ensure that the decommissioning of all Licensed facilities will be accomplished in a safe and timely manner and that licensees will provide adequate funds to cover all costs associated with decommissioning. The rule defines "Decommissioning" as the following: To safely remove nuclear facilities from service and reduce residual radioactivity to a level that permits release of the property for unrestricted use and termination of the license.

As noted in Part 30.35 f.4, government licensees may elect to submit a statement of intent containing an amount based on the possession limit of the license and indicating that funds will be obtained when decommissioning actually occurs. Part 30.35 c.2 states that if the licensee chooses to submit a certificate of financial assurance (statement of intent) at this time, a decommissioning funding plan and cost estimate shall be included in the licensee's next application for license renewal.

The regulations specify that a facility licensee either must set aside money for decommissioning activities or must provide a guarantee through a third party that funds will be

available. The funds set aside or guaranteed are determined by a decommissioning funding plan (DFP) which the licensee provides.

Specific requirements are stated in 10 CFR 30.35, "Financial Assurance and Recordkeeping for Decommissioning." 10 CFR 30.35.f.4 state that in the case of Federal, State, or local government of licensees, a statement of intent containing a cost estimate--or a value fixed by the regulation and determined by the type of facility--is acceptable. The **regulations do not explicitly address the need for a DFP for all Federal, State, or Local government licensees. However, other NRC documents indicate the need for a DFP before the issuance of a new license or the renewal of an existing license.**

Specific details of what the NRC considers an acceptable DFP are documented in NUREG-1336, "Interim Guidance on the Standard Format and Content of Financial Mechanisms Required for Decommissioning Under 10 CFR Parts 30, 40, and 70," and subsequent Regulatory Guide (Reg Guide) 3.66 published in June 1990. Also, NUREG-1337, "Interim Guidance on the Standard Review Plan for the Review of Financial Assurance Mechanisms for Decommissioning Under 10 CFR Parts 30, 40, and 70," serves as an outline and checklist for NRC staff reviewers. Reg Guide 3.65, "Standard Format and Content of Decommissioning Plan for Licensees under 10 CFR Parts 30, 40, and 70," outlines the overall decommissioning plan requirements showing the relationship of the DFP to the decommissioning process.

In addition, the following radiological surveys were conducted by the contractor for the Licensee prior to the release of Laboratories 3D231 and 3D239 for unrestricted use.

- Establishing Background Levels
- Scanning Survey Using Portable Radiation Instruments
- Removable Surface Contamination Measurements
- Laboratory Analysis and Measurement of Smear (Filter Paper) Samples

**In accordance with section 4.2.2 Establishing Reference Grid Systems, since unaffected areas do not require gridding for the purpose of establishing measurement or sampling locations, the specific laboratory survey locations (instrument and smear) were marked, identified by white adhesive tabs and the laboratories were locked and secured to deny and prohibit areas pending the NRC review of this Radiological Safety Assessment report.**

# IV. EVALUATION METHODS

The radiological assessment was conducted by Michael S. Terpilak, Certified Health Physicist, in a manner similar to typical radiation surveys of licensees by the Nuclear Regulatory Commission (NRC).

These surveys were accomplished and performed in accordance with and as specified in the Nuclear Regulatory Commission (NRC), NUREG/CR-5849, "Manual for Conducting Radiological Surveys in Support of License Termination," Draft Report for Comment, June, 1992 as described and specified in section 4.2 and in addition to 10 CFRs Part 30 (Appendix B).

## ESTABLISHING BACKGROUND LEVELS

Background was determined by conducting survey measurements and/or sampling at locations on the site, which are unaffected by-site operations, i.e., preferable locations for interior background determinations all within on-site buildings of similar constructions, or even John Wesley Powell Building location that has had no previous history of licensed operations, i.e., use of radioactive materials. Surveys conducted with portable radiation instruments as well as smear surveys were duplicated in laboratories and/or office space similar in dimensions and construction as the laboratories that are presently using licensed materials (i.e., laboratories using radioactive materials). Background surveys radiation instrument surveys were in the range of 0.020 mR/hr and 15-20 $\mu$R/hr and random smear samples were nondetectable, i.e., Minimum Detectable Activity (MDA).

Based on previous historical records, interviews with personnel, present licence inventory and possession license limits and conditions as well as current and present documented monthly Laboratory Contamination Surveys it was determined in accordance with Section 4.2 Designing the Survey, NUREG/CR-5849 that the two laboratories to be surveyed 3D231 was classified as an unaffected area and 3D239 was classified as an affected area, i.e., these laboratories are not expected to contain residual radioactivity, based on a knowledge of site history and previous survey information.

**Since it can be readily shown from previous records, inventories, possession limits and many surveys that alpha radioactive material has never been used at this facility, it is recommended that only Beta-Gamma ($\beta$-$\gamma$) assessment be performed at this time.**

## SCANNING SURVEYS USING PORTABLE RADIATION INSTRUMENTS

These measurements typically consist of surface scanning (moving the detector at a consistent speed and distance near the surface) and measuring levels of direct radiation (surface activity and exposure rate) at representative points.

Before conducting any fixed measurements, surfaces are scanned to identify the presence of elevated direct radiation which might indicate residual gross activity or hot-spots. Scans are conducted for all radiations potentially present, based on the operational history. The scanning detector is kept as close as possible to the surface and moved cross the surface at a slow speed. Nominally, the distance between the detector and the surface is maintained at less than two centimeters. For particulate radiations (beta) which may have very limited ranges, the scan speed should not exceed 1 detector width per second; this speed should be reduced to as low as 1/3 detector width per second for those situations when relatively low count rates may be indicative of residual activity exceeding guideline values. For gamma radiation the scanning speed may be greater; the probe is typically moved in a serpentine pattern while advancing at a speed of about 0.5 m per second.

For optimum detection sensitivity, changes in the instrument response are monitored via the audible output (use of headphones is recommended), rather than by observing fluctuations in the analog meter reading. This use of an audible signal negates concern for the time constant related to the meter response. Locations of direct radiation, discernable above the ambient level (typically 2 to 3 times the ambient count rate), are marked on facility maps and identified for further measurements and/or sampling.

A complete radiological assessment included a radiation survey utilizing a Radiological Instrumentation as identified and specified in section 5 Radiological Instrumentation of NUREG/CR5489 (Appendix C).

- Beta-Gamma ($\beta$-$\gamma$) Field Survey Instrumentation

The following instruments were utilized in the survey.

- Ludlum Model #2 survey meter serial #88228 with a pancake type halogen quenched Geiger Muller (G-M) Probe Model #44-9 Serial #010560 with a 1.7 ± 0.3 mg/cm$^2$ mica end window and active area of 15 cm$^2$.

- Ludlum Model #3 survey meter serial #22331 with an end window halogen quenched Geiger Muller (G-M) Probe Model #44-7 Serial #PX05338 with a 1.7 ± 0.3 mg/cm$^2$ mica end window and active area of 6 cm$^2$.

- Gamma Field Survey Instrumentation

The following instrument was utilized in the survey.

- Victoreen Model 450P Pressurized Ion Chamber Survey Meter with a high sensitivity Micro-R measurements of exposures and exposure rates. Serial #1618.

The appropriate calibration certificates for the above instruments are enclosed (Appendix G).

The Beta-Gamma ($\beta$-$\gamma$) field survey instrumentation, i.e., the surface scanning (moving the detectors at a consistent speed and distance near the surface of each area approximately 1 cm) was conducted at 115 surface locations in Laboratory 3D231 and 156 locations in Laboratory 3DL39 and reported in mR/hr (Appendix C).

The gamma ($\gamma$) field survey instruments were conducted at approximately 1 meter from the 115 surface locations in Laboratory 3D231 and 156 locations in Laboratory 3D239 and reported in $\mu$R/hr at 1 meter (Appendix C). The radiological surveys were conducted consistent and in compliance with 10 CFR 30 and NUREG/CR 5849. In addition a total of 271 wipe samples were conducted in the two laboratories, 115 wipes in Laboratory 3D231 and 156 wipes in Laboratory 3D239 located in the John Wesley Powell Building, Main Campus, Reston, Virginia. **Laboratory 3D231 was classified as an UNAFFECTED AREAS, i.e., these areas were not expected to contain residual radioactivity, based on a knowledge of site history and previous survey information.**

**Radiation History Room 3D231 John Wesley Powell Building, USGS, Reston, VA**

This laboratory was approved to use radioactive material, for the first time on February 15, 1995. Prior to that time the laboratory was used for routine chemical analysis. Radioactive material processed in its laboratory consisted of mineral and glass material irradiated at the USGS TRIGA Reactor Facility in Denver, Colorado. The mineral grains 0.01g per sample were embedded in epoxy or Teflon and covered with mica detectors during irradiation. All irradiated material was in the solid state, no radioactive liquids or gases were involved. The functions of this laboratory were moved to 3C232 in May of 1996. Levels of activity were <3 mr/hr when irradiations were received from reactor. In addition, the physical half-lives of the irradiated material was primarily in minutes and/or days with eventual decay of the samples in a short period of time.

Based on the above use of this laboratory it was designated as an **unaffected area** as defined in NUREG F 5849 and as such section 4.2.3 Selecting Measurement Sampling Locations for Structure Surveys states **that scans of unaffected areas should cover a minimum of 10% of the floor and lower wall surface area.**

**Radiation History Room 3D239, John Wesley Powell Building, USGS, Reston, VA.**

The John Wesley Powell building was completed in 1972. Room 3D239 was occupied on or about that date by the Radiochemistry Project of the Branch of Analytical Labs. This room was used solely for the purpose of performing chemical separation of neutron activated geological samples. This work was performed until approximately 1985 when the Radiochemistry Project was moved to the Solid State Physics Building. This room was no

longer used by the radiochemistry project for performing radiochemical separations. Activated samples were processed chemically, using various acid digestion techniques, ion-exchange chromatography and precipitation. Active liquids were present during these periods of laboratory use.

Radioactive material processed in this laboratory consisted of minerals indicated at the USGS Triga Reactor Facility in Denver, Colorado. **Since 1985 until the present, the laboratory only utilized sealed sources in Argon-Argon analysis and samples were never unsealed. Repeated instrument and swipe surveys over the last 20 years indicated no spills and no record of contamination.**

**Based on the above use of this laboratory it was designated as an affected area as defined in NUREG/CR-5849 and as such section 4.23 Selecting Measurement Sampling Locations for Structure Surveys states that scans of unaffected areas should cover a minimum of 100% of the floor and lower wall surface area. Since there was no reason to suspect residual activity exceeding 25% of the guideline value on these surfaces, a minimum of 30 measurement locations each, on vertical and horizontal surfaces where radioactive materials would likely accumulate (air exhaust rents and horizontal surfaces where dust would settle was selected). To assure a reasonable coverage of these surfaces, an average of at least 1 measurement location per 20m² of surface area was selected.**

## REMOVABLE SURFACE CONTAMINATION MEASUREMENTS

A total of 115 wipe areas and 115 Beta-Gamma and 115 Gamma instrument measurements were conducted in laboratory 3d231, which is approximately 24' x 24' or 576 square feet or 54 square meters, which is a great deal more than recommended (Appendix E).

A total of 156 wipe areas and 156 Beta-Gamma and 156 Gamma instrument measurements were conducted in laboratory 3d239 which is approximately 28' x 25' or 700 square feet or 65 square meters, which is a great deal more than recommended (Appendix E).

Swipe samples were conducted over a surface are of 100 cm² within a 1 m² area of each laboratory

The 271 wipe samples were analyzed for the following:

- Gross BETA - Gas Flow Proportional Counter
- GAMMA Spectroscopy - Sodium Iodide (NAI) Detector

## LABORATORY ANALYSIS AND MEASUREMENT OF SMEAR (FILTER PAPER) SAMPLES

If any samples were identified with radioactive contamination, then these samples were analyzed for specific radioactivity (i.e., isotopic analysis). The results of the swipe sample analysis are enclosed (Appendix E)

# V. BRIEF SUMMARY OF STANDARDS/CRITERIA

The U.S. Nuclear Regulatory Commission (NRC), Division of Fuel Cycle, Medical, Academic and Commercial Use Safety, Washington, D.C., has published a technical document entitled "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source of Special Nuclear Material," dated April 1993. The document delineates specific instructions concerning instrument and swipe surveys and Table 1, specifically states "Acceptable Surface Contamination Levels" that shall be used for decontamination of facilities and equipment prior to release for unrestricted use (Appendix F).

# VI. RESULTS AND CONCLUSIONS

Based on the results of the radiological safety assessment, i.e., the radiation instrument and swipe survey, the following laboratories located in the John Wesley Powell Building United States Geological Survey (USGS) National Center can be released for unrestricted use:

- Laboratory Room 3D231
- Laboratory Room 3D239

# VII. REFERENCES


Title 10 Code of Federal Regulations. Part 20. Standards for Protection Against Radiation. January 1993. Federal Register Vol. 56. No. 98. Tuesday. May 2. 1991. pp. 23360-23474 (Includes revisions to Parts 2. 19. 20. 30. 31. 32. 34. 35. 39. 40. 50. 61. and 70).

Title 10 Code of Federal Regulations. Part 30. Rules of General Applicability to Domestic Licensing of Byproduct Material. January 1. 1993.

Title 10 Code of Federal Regulations. Part 33. Specific Domestic Licenses of Broad Scope for Byproduct Materials January 1. 1993.

Title 10 Code of Federal Regulations. Part 71. Packaging and Transportation of Radioactive Materials. January 1993.

Title 49 Code of Federal Regulation. Parts 100 to 177. Transportation. October 1. 1992

Regulatory Guide 3.66. Standard Format and Content of Financial Assurance Mechanisms Required for Decommissioning under 10 CFR Parts 30. 40. 70. and 72. June 1990.

Regulatory Guide 7.10. Establishing Quality Assurance Programs for Packaging Used in the Transport of Radioactive Material. Rev. 1. June 1986

Regulatory Guide 8.7. Instructions for Recording and Reporting Occupational Radiation Exposure Data. Rev. 1. June 1992.

Regulatory Guide 8.9. Acceptable Concepts. Models. Equations and Assumptions for a Bioassay Program. Rev. 1. July 1993

Regulatory Guide. 8.10. Operating Philosophy for Maintaining Occupational Radiation Exposure as Low as Reasonably Achievable. Rev. 1. May 1977

Regulatory Guide 8.18. Information Relevant to Ensuring that Occupational Radiation Exposures at Medical Institutions Will Be As Low As Reasonably Achievable. Rev. 1. October 1982

Regulatory Guide 8.23. Radiation Safety Surveys at Medical Institutions. Rev. 1. January 1981

Regulatory Guide 8.25. Air Sampling in the Workplace. 1992

Regulatory Guide 8.33. Quality Management Program. October 1991

Regulatory Guide 8.34. Monitoring Criteria and Methods to Calculate Occupational Radiation Doses. July 1992.

Regulatory Guide 8.36. Radiation Dose to the Embryo Fetus. July 1992.

Regulatory Guide 8.37. ALARA Levels for Effluents from Materials Facilities. July 1993.

# APPENDIX A

# UNITED STATES GEOLOGICAL SURVEY

# RADIOACTIVE MATERIALS LICENSE

# NUMBER--45-15923-01

# JULY 29, 1996