National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas
77058

NASA

Reply to Attn of: SD5-83N-113

'83 NOV -7 A11:10

NOV 3 1983

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

Dear Sir:

We are requesting reissue of Byproduct Material License 42-09388-02 in accordance with previous submittals that are listed below by date. We also submit an up-date of Management and Radiological Control Personnel. The license will continue to be managed and operated in accordance with these documents and all applicable NRC Regulations and conditions of referenced license.

June 26, 1978 - Supplement No. 1, Attachments 1 and 2
Sealed source descriptions

June 26, 1978 - Supplement No. 3, JSCM 1860B Radiological
Health Manual

June 26, 1978 - Supplement No. 5, Description of Facilities
and Equipment

June 26, 1978 - Supplement No. 6, With attached drawings
Fail Safe Modification to Irradiator

October, 1983 - Supplement 2A, Reflects current personnel
and titles of those who will directly perform
Radiological Control Program

October, 1983 - Supplement 4A, Reflects current Management
Control Program

If there are any questions concerning this renewal request, please contact Dr. D. S. Nachtwey at (713) 483-5281 or FTS 525-5281.

Sincerely,

for W. E. Rice, Acting Director
Space and Life Sciences

FEE EXEMPT

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4 Enclosures

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Supplement No. 2A
October 1983 Renewal of License No. 42-09388-02
Lyndon B. Johnson Space Center

Resumes of:

Stuart Nachtwey, Ph.D./Radiological Health Officer

A. W. Orsak/Radiological Safety Officer

D. J. Waggett/Alternate Radiological Safety Officer

RADIOLOGICAL SAFETY OFFICER - Arnold W. Orsak

The position of Radiological Safety Officer has been established to perform the functions and responsibilities prescribed in 10 CRF 33. Mr. A. W. Orsak is presently appointed to this position. The Radiological Safety Officer also administers the day-to-day operation of the radiation protection program supported by one health physicist. The experience and training of Mr. Orsak is stated below:

A. Pertinent Training

1. Graduate, Sam Houston State College, 1963.
   Bachelor of Science in Biology; minor in chemistry.

2. Radiation Protection Training

   a. Basic Radiological Health, USPHS, 2 weeks, 1964.
   b. Occupational Radiation Protection, USPHS, 2 weeks, 1965.
   c. Management of Radiation Accidents, USPHS, 2 weeks, 1965.
   d. Radium Hazards and Control, USPHS, 1 week, 1965.
   e. Medical X-ray Protection, USPHS, 2 weeks, 1964.
   f. Orientation in Occupational Health, USPHS, 1 week, 1964.
   g. Radiflo Supervisors Course, C. E. Corporation, 2 weeks, 1966.
   h. Radef Monitors Instructor's Course, OCDM, 1 week, 1964.

B. Experience with Radiation

1. Supervisor of Radiological Health Services, Kelsey-Seybold Clinic, contractor to Johnson Space Center (JSC), January 1969 to present. Appointed Radiological Safety Officer for JSC, Houston, Texas, March 1969.

2. Supervisor at Texas Instruments, Dallas, Texas.
   500 curies of Krypton 85 in hermetic seal checks and two 150 KV X-ray machines were used for internal defect check of transistors and integrated circuits. Responsibilities included Radiological Health Training, Radiation Instrument repair and calibration and periodic radiological health surveys. (1966-1968).

3. Radiation Health Specialist - Texas State Department of Health, Austin, Texas. (1963-1966).

   Duties:

   a. Calibration of survey instruments with sealed gamma (Max. 300 mCi) and neutron sources (Max. 5 Ci).

b. Radiation hazards evaluation surveys of radioisotopes (kilocurie quantities), and machine produced radiation (up to 14 MeV).

c. Inspection of radioactive material licensees which included colleges, hospitals, research laboratories, radiographers, well loggers and clinics, for compliance with Texas State Regulation.

d. Investigation of incidents such as lost sources, over-exposures and contamination monitoring and clean-up.

e. Evaluation of applications and procedures for Texas license.

f. Prepare for appropriate signatures new and amended Radioactive Material License, containing special conditions which might apply.

g. Radiation Safety Officer for State Health Department (1965-1966) which involved accountability, leak tests and surveys for approximately six civil defense source sets and 10 calibration sources. All sources ranged from 2 to 300 mc (cobalt and cesium).

ALTERNATE RADIOLOGICAL SAFETY OFFICER - Dennis J. Waggett

The program at JSC is fast moving, requiring daily action at the Radiological Safety Officer level, and an alternate to the Radiological Safety Officer has been designated to assure immediate action and continuance of the program. Mr. D. J. Waggett, Health Physicist is designated as Alternate Radiological Safety Officer and his experience and training is stated below:

A. Education and Training

1. San Jacinto Jr. College - AA Degree

2. University of Houston

3. Radiological Health Short Courses:

   a. Nuclear Warfare School, U. S. Navy

   b. Environmental Surveillance and Analysis; Tracerlab

   c. Laser Beam Analysis and Biological Effects; Tracerlab

   d. Basic Radiological Health Course; USPHS

   e. Occupational Radiation Protection Course; National Center for Radiological Health

   f. Radionuclide Analysis by Gamma Spectroscopy Course; USPHS

B. Experience with Radiation

Health Physicist - Johnson Space Center/Kelsey-Seybold Clinic, September 1966 to present.

Duties:

a. Radioactive materials, including sealed and unsealed sources, multicurie sources, neutron sources and special nuclear material, a 120 curie Co-60 High Range System and a 100 curie Co-60 irradiator.

b. Radiation Producing Equipment, routine radiological considerations of such devices as radiography units, medical, dental and radiography X-ray units and a Van de Graaff Accelerator.

c. Radiological Surveys - Routine radiological surveys of NASA buildings and laboratories, such as isotope storage areas, neutron generators and miscellaneous diffraction equipment.

d. Environmental surveillance consisting of air, water, soil and vegetation collection with subsequent laboratory preparation and analysis for radioactive material control.

e. Leak testing of sealed sources held under NRC License granted to NASA-JSC.

f. Decontamination - Routine decontamination of laboratory equipment and laboratory work areas.

Supplement No. 4A
October 1983 Renewal of License No. 42-09388-02
Lyndon B. Johnson Space Center

The radiation protection program is described in a series of Attachments to this sheet:

ATTACHMENT 1: Organization and Functions

ATTACHMENT 2: Operating Procedures

ATTACHMENTS 3: Leak Test and Disposal

Supplement No. 4A
Attachment 1

ORGANIZATION AND FUNCTIONS

The Johnson Space Center is headed by Gerald D. Griffin, Director, and he is supported by staff offices performing certain special functions. Program offices reporting to the Director are responsible for the direction of specific manned spaceflight programs. An Administrative Directorate, reporting through the Associate Director is responsible for business affairs and administrative support of the Center, and five other directorates, reporting to the Director, are responsible for certain operational functions and technical support of JSC programs. Responsibility for assuring proper and safe use of Byproduct Material has been delegated to the Director of Space and Life Sciences (JSC Management Instruction 1860.4F, Appendix A, Supplement 3).

Dr. Stuart Nachtwey is responsible for the functional management of the radiological health program, along with other manned spaceflight aspects of radiation technology. The radiological health activity is supported by a health physics group provided under a medical support services contract. The contract health physics group provides professional services for the performance of radiation safety evaluation of usages of Byproduct Material, advice on radiation protection including special training to users, performance of initial and periodic radiation surveys, surveillance of all radiation use and applied health physics procedures such as leak tests, storage and issue of Byproduct Material, personnel dosimetry, instrument calibration, and all related recordkeeping. A

contractor Health Physicist has been designated as JSC Radiological Safety Officer to administer the detailed health physics program. He relates to NASA through the Radiological Health Officer in the Biomedical Applications Branch, Medical Services Division, Space and Life Science Directorate.

(See Figure 1, page 2-5, Supplement 3).

Supplement No. 4
Attachment No. 2

OPERATING PROCEDURES
HEALTH PHYSICS LABORATORY

Irradiator and Calibration System Operation

General

Operation of the Irradiator and Calibration System is authorized by the Byproduct Material License 42-09388-02 issued to the Lyndon B. Johnson Space Center, and all operation shall conform to applicable parts of the U. S. Nuclear Regulatory Commission, Rules and Regulations, Title 10, Code of Federal Regulations and conditions of referenced license. All operating personnel shall be familiar with the operating procedures and the provisions of the license. Copies of each shall be posted conspicuously in the laboratory.

Control Procedures

a. Authorization for Use. Only those individuals approved as users on Byproduct Material License 42-09388-02 will use or directly supervise use of the Irradiator and Calibration System.

b. Scheduling of Use. All approved uses of the Irradiation and Calibration System shall be subject to schedules submitted to and approved by the Radiological Safety Officer or his alternate.

c. Records of Use. All use of the Irradiation and Calibration System shall be recorded. Such records shall incorporate date of use, total time each source is out of the storage cask, names and identification of users, signature of person performing pre-operational safety inspection, description of operation, and dosimetry records.

Supplement No. 4
Attachment No. 2

Subject: Operating Procedures, Health Physics Laboratory, (Irradiator and Calibration System Operation - continued).

d. Access to Laboratory. Access to the laboratory during operation of the Irradiation and Calibration System shall be limited to those persons authorized by the supervising health physicist and having proper dosimetry as specified in these procedures.

Operating Rules for Irradiation and Calibration System

a. The person acting as supervising health physicist will supervise and be responsible for overall safe operation of the irradiation and calibration system during operation.

b. Only authorized personnel will be allowed to operate the Irradiation and Calibration System in accordance to limitations of the authorization.

? only 2 users according to S. Nadberg via telephone on 6/22/84 [illegible]

c. The facility shall not be left unattended while sources are in the exposure position.

d. Two persons shall be present during all operations of the system with the 100 curie and 10 curie sources.

e. The 100 curie Cobalt-60 source shall not be used in excess of one (1) hour in any 24-hour period.

f. The traverse mechanism shall not be energized for relocation on the receiver tube until all sources have been returned to the storage container.

Supplement No. 4
Attachment No. 2

Subject: Operating Procedures, Health Physics Laboratory, (Irradiator and Calibration System Operation - continued).

g. The control console key shall be maintained in a locked metal cabinet, access to which is limited to individuals approved as users on Byproduct Material License 42-09388-02.

Operating Procedures for Irradiation and Calibration System

A pre-operational safety inspection shall be made of the Health Physics Laboratory Facility Prior to each operation. The inspection shall consist of:

(1) A walk-through inspection of the High Radiation Area enclosed within the facility to assure that the area is clear of all unauthorized personnel.

(2) A direct Inspection of all gates and doors and securing of locks.

(3) Informing personnel within the facility of intended operations.

(4) Verification of the proper operation of interlocks, area monitors, alarms, limit switches and stops.

(5) Verification that authorized personnel only are in the control room or restricted area, with proper dosimetry for each person.

*If items mentioned are not satisfactory, discrepancies must be corrected before proceeding.

Supplement No. 4
Attachment No. 2

Subject: Operating Procedures, Health Physics Laboratory, (Irradiator and Calibration System Operation - continued).

*b. An operational safety inspection shall be made of the Health Physics Laboratory Facility immediately after activation of the Irradiation and Calibration System and periodically during operation. The inspection shall assure that:

(1) All remote area monitor readings are of nominal value.

(2) The dose rate at the operator's position is of nominal value.

(3) A visual inspection of the High Radiation Area is conducted.

(4) An Inspection of the restricted area for unauthorized presence of personnel is conducted.

(5) The dose rates at the predetermined inspection points are of nominal value.

c. A post-operational safety inspection shall be made of the Health Physics Laboratory Facility after each operation of the system. The inspection shall assure that:

(1) The remote area monitor reading is of nominal value for the sources in the storage position.

(2) The dose rate at the storage cask is of nominal value.

(3) The cask is in storage position.

(4) Records of use are properly prepared.

*If items mentioned are not satisfactory, discrepancies must be corrected before proceeding.

Supplement No. 4
Attachment No. 2

Subject: Operating Procedures, Health Ph-sics Laboratory, (Irradiator and Calibration System Operation - continued).

Personnel Monitoring Procedures

a. Each person will wear a gamma sensitive film badge and a pocket chamber or self-reading dosimeter, and will log results daily.

b. Weekly exposure will not exceed 100 mRem unless specifically authorized by the Radiological Safety Officer.

c. Dosimetry devices will be used to measure extremity exposure when it will vary significantly from whole body exposure.

d. A record will be maintained in the laboratory of exposure data from all dosimetry devices except film badges.

EMERGENCY PROCEDURES

IRRADIATION/CALIBRATION SYSTEM OPERATION

JOHNSON SPACE CENTER

LICENSE # 42-09388-02

EMERGENCY PROCEDURES

a. Source fails to leave storage cask - Notify Radiological Safety Officer or Health Physicist and suspend operation until trouble is investigated and corrected by Health Physics.

b. Source fails to leave exposure position - Notify Radiological Safety Officer and suspend operation immediately. Clear laboratory compound of all personnel not required for remedial procedures. Do not attempt remedial procedures until directed to do so by Radiological Safety Officer.

c. Source fails to complete traverse - Notify Radiological Safety Officer and Security immediately. Determine radiation field pattern and clear the laboratory compound of all personnel. If source position creates the potential for significant exposure outside the laboratory compound, coordinate with Security to have a suitable area closed. Remedial operations will be directed by the Radiological Safety Officer.

d. Suspected or known overexposure to radiation

The JSC Clinic, with a staff of fifty (50) professional health care personnel, will be utilized, in the following manner:

(1) Request ambulance transfer of the exposed person(s), Est. 3333, to the JSC Clinic.

(2) Contact the JSC Radiological Safety Officer, or alternate, at Ext. 5936.

(3) After assuring that the facility is secured, accompany the exposed person(s) to the JSC Clinic, Building 8, and provide the details to the attending physician.

(4) The physician will proceed with prescribed medical treatment with consultation of the Kelsey-Seybold Clinic Nuclear Medicine physician, if needed.

(5) Should further treatment or confinement be requested, the patient(s) will be transferred by JSC ambulance to a Houston Medical Center hospital, accompanied by a JSC physician.

(6) The JSC Radiological Safety Officer, or alternate, will supervise any necessary clean-up operation and maintain a constant surveillance on the status of the exposed person(s).

(7) An immediate investigation will be conducted by the Radiation Safety Committee, assisted by the Radiological Health staff, to determine the cause of overexposure or accident involving nuclear materials. The facility will not be operated until this review is complete and approval of the Radiation Safety Committee is received.

Supplement No. 4
Attachment No. 3

LEAK TEST AND WASTE DISPOSAL

Leak tests of sealed sources are performed by health physicists provided under a Medical Support Services contract and the results certified to the Radiological Safety Officer and the Radiological Health Officer. Records of leak test results shall be maintained for inspection by the Commission.

Assay of leak tests will be in laboratory-type nuclear counting instruments capable of detecting radioactivity of less than .005 microcuries of removable contamination.

Wipe and assay procedures will be approved by the Radiological Safety Officer and will be conducted on schedules to meet conditions of Licenses issued to JSC.

Radioactive waste shall be picked up and maintained by contractor health physics personnel. No local disposal of radioactive material will be performed. All disposal will be by off-site contract services, wherein the material is transferred to persons licensed by the Nuclear Regulatory Commission and/or Agreement State to receive and/or dispose of radioactive materials.