GUTIERREZ - PALMENBERG INC.

Issuing and Using Radiation Work Permits

GPI-6

Reviewed by: _____ 2/7/97
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Gutierrez-Palmenberg, Inc. Procedure

Issuing and Using Radiation Work Permits

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Radiation Safety Procedure

ISSUING AND USING RADIATION WORK PERMITS

Procedure No. GPI-6
Revision 1
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1.0 Purpose and Scope

1.1 This procedure describes the circumstances when a Radiation Work Permit (RWP) is required and addresses the requirements for planning, developing, issuing, using, modifying, and terminating RWP's.

1.2 Adherence to this procedure will provide reasonable assurance that personnel exposures will be below specified limits, personnel will remain free of contamination and contamination will not be spread beyond the designated contaminated area.

2.0 Applicability

This procedure will be used to initiate a RWP prior to jobs where GPI personnel will enter areas where contamination is present above the limits specified in the Radiation Safety Manual, when radiation exposure rates classify the work area as a Radiation Area, when Air concentrations could exceed 10% of the Derived Air Concentration, and at the discretion of the Health Physics Technician or Project Manager.

3.0 General

3.1 Description of RWP procedures.

3.1.1 The RWP provides a complete document addressing existing radiological conditions, work scope, radiological limitations, specific protective requirements, ALARA considerations, and instructions to radiation workers.

3.1.2 This procedure describes the radiological surveys required to assist in the preparation of a RWP and provides guidelines to specific protective measures required based upon the radiological conditions in the work area.

3.2 Definitions

3.2.1 *Airborne Radioactivity Area.* - A room, enclosure or area in which radioactive material is dispersed in the air in the form of dusts, fumes, particulates, mists, vapors, or gases and the concentration of the dispersed radioactive materials is in excess of:

a) The derived air concentrations (DAC's) specified in Table 1, column 3 of Appendix B, Title 10 Part 20 of the Code of Federal Regulations.

b) Concentrations such that an individual present in the area without respiratory protective equipment could exceed, during the hours the individual is present in a week, an intake of 0.6 percent of the annual limit on intake (ALI).

3.2.2 *Contaminated Area* - A restricted area that has radioactive materials above the limits specified in the Radiation Safety manual in the form of dusts, particulates, and sorbed contaminants that could adhere to personnel clothing and skin while working in the area.

3.2.3 *Radiation Area.* - Any area accessible to personnel in which there exists ionizing radiation at dose-rates such that an individual could receive a deep dose equivalent in excess of 5 mrems in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.

3.2.4 *Restricted Area* - An area containing radioactive materials to which access is controlled to protect individuals from exposure to ionizing radiation.

3.2.5 *Personnel Survey* - A survey with radiation detection instruments that measures the amount of radioactive materials on personnel clothing or skin surfaces.

3.2.6 *LDE* - Lens Dose Equivalent. Exposure to the lens of the eye taken as the dose equivalent at a tissue depth of 0.3cm.

3.2.7 *SDE EX* - Shallow Dose Equivalent/Extremities. The shallow dose equivalent for the skin of the extremity receiving the maximum dose.

3.2.8 *SDE WB* - Shallow Dose Equivalent/Whole Body. The shallow dose equivalent to the skin of the whole body.

3.2.9 *TEDE* - Total Effective Dose Equivalent. Total effective dose equivalent is the sum of the deep dose equivalent (external dose) and the committed effective dose equivalent (internal dose).

3.2.10 *TODE* - Total Organ Dose Equivalent. Total organ dose equivalent is the sum of the external component (deep dose equivalent) and the internal component (committed dose equivalent to an organ or tissue).

4.0 Responsibilities

4.1 Program Manager - The Program Manager is responsible for insuring that all personnel assigned the tasks of working in Contaminated Areas, Radiation Areas, and Airborne Radioactivity Areas are familiar with this procedure, adequately trained in the use of this procedure, and have access to a copy of this procedure.

4.2 Radiation Safety Officer - The Radiation Safety Officer (RSO) is responsible for training of personnel working in Contaminated Areas, Radiation Areas, and Airborne Radioactivity Areas. The RSO ensures the Health Physics Technicians are qualified by training and experience to perform the requirements of this procedure.

4.3 Project Manager - The Project Manager (PM) is responsible for initiating the RWP. The Project Manager periodically reviews RWP practices to ensure procedural compliance.

4.4 Health Physics Technicians - Health Physics Technicians are responsible for performing the necessary surveys in support of the RWP's, issuing of the RWP's, job coverage of RWP's, and when appropriate terminating the RWP's. The Health Physics Technician has the responsibility to stop work if any unsafe condition exists in the work area, non-compliance with procedural requirements occurs, or significant changes in radiological conditions occur.

4.5 Radiation Workers - Radiation workers are responsible to read, understand, sign, and comply with the provisions of the RWP.

5.0 Procedure

5.1 Planning the RWP.

5.1.1 The Project Manager initiates the RWP process by filling in the description of work section of the RWP. A detailed work plan is encouraged but not required and can be attached to the RWP with appropriate reference in the description of work section.

5.1.2 The Health Physics Technician enters the date the RWP was initiated and assigns a consecutive RWP number to the document. Enter the end date which will correspond to the estimated completion date for the project.

5.1.3 The Project Manager meets with the Health Physics Technician to describe as much as possible about the nature of the work to be performed, the specific components or equipment to be worked on, the positions the workers may take to perform the

work, the possibility of releasing radioactive contamination during the work activities, and the potential for changing radiation dose rates as work progresses.

5.1.4 The Health Physics Technician and Project Manager shall:

- Obtain and review any previous surveys performed in the work area.
- They obtain all information available on the identity, form and quantities of radionuclides present in the work area.
- They review facility drawings, if available to determine ventilation flows, component and equipment layouts, and natural building structures which can be used for contamination barriers.

5.1.5 The Radiation Safety Officer selects the necessary instrumentation, equipment and protective clothing to perform surveys in the work area. If contamination is expected in the work area, wrap equipment taken into area in plastic to prevent contamination of equipment.

5.1.6 If anticipated contamination levels are above the limits specified in the Radiation Safety manual, establish a contaminated area as described in procedure GPI-9 before entry into the area.

5.2 The RWP Pre-Job Survey

5.2.1 After entering the specified work area, The Health Physics Technician obtains radiation exposure rates in the area where the workers will be positioned during work activities. Also survey the adjacent area and path route to the work area to identify any "hot spots" where elevated readings are observed. Record readings on survey forms as specified in procedure GPI-8.

5.2.2 Obtain smear samples from the work area, adjacent areas and along the path route to the work area. The number of smear samples in the work area should be 2 to 3 per 3 meter by 3 meter grid. If there is a specific piece of equipment which will be worked on, obtain an additional 2 to 3 smear samples on the equipment. The number of smear samples in adjacent areas and along the path route to the work area should be one per 3 meter by 3 meter area. (see procedure GPI-8)

5.2.3 Determine what additional safety hazards may be encountered during the work. (Confined space entry, electric equipment or mechanical equipment requiring lock out tags, falling objects, bumping hazards, slippery surfaces, fire hazards, etc.)

5.2.4 Exit the area using procedures established in GPI-10.

5.2.5 Count smear samples and any air samples collected in the area.

5.2.6 Authorize the RWP survey section by signature.

5.3 Issuing the RWP

NOTE: When the RWP request is received from the PM, the RSO will assign an RWP number.

5.3.1 A Health Physicist, the RSO, or a Health physics Technician who surveyed the work area or obtained information from records, enters exposure rates measured during survey of work area in the radiation conditions section of the RWP. Also note any "hot spots" found during the survey in this section. Calculate working time in the specified locations and enter the time in the area provided on the RWP. Attach survey forms if necessary.

5.3.2 Enter the smearable contamination conditions found in the work area and other areas with elevated contamination in the Contamination Conditions section of the RWP.

5.3.3 Enter results of air sample(s) (if taken) in the Area Air Concentration section of the RWP.

5.3.4 Based on current and anticipated contamination conditions in the area, the Health Physics Technician determines the required protective clothing to protect workers during work activities.

5.3.5 Based on contamination conditions and anticipated resuspension, determine respiratory protection requirements on the RWP.

5.3.6 Select air sampling requirements if air concentrations are likely to exceed 10% of the Derived Air Concentration (DAC).

5.3.7 Determine and mark the dosimetry requirements on the RWP form.

5.3.8 Determine Monitoring Requirements for HP coverage and job observation by marking appropriate boxes on the RWP.

5.3.9 Select or enter training requirements for workers on the project.

5.3.10 Indicate if pre-job or ALARA briefings are required for workers.

5.3.11 Authorize the ALARA/Radiological Protection requirements section by signature.

5.4 Hold Points/Special Instructions

5.4.1 Note any safety hazards in the Hold Points/Special Instructions section of the RWP and check any permits of lock out tags required.

5.4.2 Indicate any special precautions associated with PPE, dosimetry, monitoring, respiratory protection, training or ALARA.

5.4.3 Authorize this section by signature.

5.5 Approvals

The RWP shall be approved by the project manager and the RSO as a minimum, prior to work. GPI Health Physics Management approval may be needed for high exposure work.

5.6 Using the RWP.

5.6.1 A prejob briefing is held with the individuals performing the work described in the RWP. The following topics will be discussed in the prejob briefing:

a) Complete description of the work tasks to be performed and method to minimize exposures to radiation and contamination while performing these work tasks.

b) Discussions of the radiation, contamination, and air activities in the work area and situations which could result in increased levels of these components.

c) Safety concerns which could be encountered during work activities.

d) Emergency procedures.

e) Discussions of the protective equipment requirements and the monitoring requirements of the RWP.

5.6.2 The Health Physics Technician will compile the current year dose for the individuals performing RWP work to verify the radiation exposure received during the work activities will not result in the individuals dose exceeding the limits specified in the Radiation Safety Manual. The current radiation exposures are listed on the RWP sign in sheet.

5.6.3 Each individual entering the RWP work area is required to read the RWP and sign the RWP sign in sheet indicating the individual understands the provisions of the RWP and will comply with the RWP requirements.

5.6.4 The Health Physics Technician (or individual) logs the time the individual entered the work area along with reading on the individuals Pocket Ion Chamber (PIC) or Self Reading Dosimeter (SRD) if worn. The health physics Technician (or individual) also indicates if the individual wore a respirator during the work activities.

5.6.5 When the individual exits the work area, the Health Physics Technician (or individual) will log the time the individual leaves the area and the individuals SRD reading. If the individual returns to the work area, another signature entry (and corresponding line entries) must be made on the sign in sheet.

5.7 Modifying the RWP.

5.7.1 In the event that conditions or scope of the work changes occur that do not justify the generation of a new RWP, modifications of the RWP may be made by the Health Physics Technician and the Project Manager.

5.7.2 To modify the RWP, each change will be made with a single line cross out of the text or item. The RSO representative and the Project Manager shall both initial and date adjacent to each change.

5.7.3 The RSO representative shall communicate all changes to the individuals working under the RWP.

5.8 Terminating the RWP.

5.8.1 The RWP is terminated when the end date of the RWP is reached or can be terminated by one of the following reasons:

a) The job has been completed

b) There is a significant change in the scope of work.

c) There is a significant change in the radiological conditions.

d) There have been violations of the RWP requirements.

e) The RWP is revised.

5.8.2 When the RWP is terminated before the end date, a single line is drawn through the end date and a new end date recorded in its place. The person terminating the RWP initials adjacent to the change. The RWP can be terminated by a Health Physics Technician, RSO representative, or the Project Manager.

6.0 Quality Control

Instrumentation used in the surveys will be checked with standards daily and verified to have current valid calibration.

7.0 Records

The following records will be generated and retained in the permanent project file as a result of using this procedure:

7.1 Form GPI4-4 Sample Calculation Worksheet

7.2 Form GPI7-1 Air Sample Data Sheet

7.3 Form GPI6-1 Radiation Work Permits

7.4 Form GPI6-2 RWP Access Sheet

7.5 Forms GPI8-1, GPI8-2 and GPI8-3 Radiation and Contamination Survey

8.0 References

8.1 Procedure GPI-1 Operation of the Alpha Survey Meter

8.2 Procedure GPI-2 Operation of the Beta Survey Meter

8.3 Procedure GPI-3 Operation of the Micro-R Meter.

8.4 Procedure GPI-4 Operation of the Alpha-Beta Sample Counter

8.5 Procedure GPI-5 Operation of the Ionization Chamber

8.6 Procedure GPI-7 Air Sampling and Sample Analysis

8.7 Procedure GPI-8 Radiation and contamination surveys

8.8 Procedure GPI-9 Establishing Restricted Areas

8.9 Procedure GPI-10 Use of protective clothing in contaminated areas

8.10 GPI Radiation Safety Manual

9.0 Attachments

9.1 Form GPI6-1 Radiation Work Permit

9.2 Form GPI6-2 RWP Sign In Sheet

Gutierrez-Palmenberg, Inc.

Las Vegas, NV & Phoenix, AZ

RADIOLOGICAL WORK PERMIT

RSO USE ONLY	
Permit Number	AR-1
Effective Date: 1/31/1997	Expiration Date: 4/19/1997

GENERAL INFORMATION (to be completed by the requester)

Requested by	Request Number	ID Number	Group	Phone No.	Mail Stop
Thomas J. O'Dou	3	AR-1	PM	7-5699	580

Work Location	Technical Area	Building	Substructure	Room No.
ARDEC - Picatinny Arsenal	SEC	611B	In And Out	All

SOP Number	Small Job Ticket No.	Work Order No.	Requested Start Date	Expected End Date
WORK PLAN	H&S PLAN		1/31/1997	4/16/1997

Work to be performed *(add attachment if necessary)* ☒ RSO review is needed ☐ RSO review is attached

Characterize building 611B and grounds for DU contamination resulting from firing DU rounds inside the building 611B firing range into the target room. Areas of primary concern for contamination control are:

1) The target room
2) The firing room
3) The HEPA ventilation system

Contamination controls shall be used for sampling of the UST outside building 611B. The sink and piping in the instrumentation room shall be considered potentially contaminated prior to removal.

PRE-JOB RADIOLOGICAL CONDITIONS (to be completed by the RCT/HPT

☒ Anticipated radiological conditions *(Enter anticipated conditions if a survey cannot be performed before work begins).* or

☐ Measured radiological conditions *(Record all readings as highest / general area.)* ☐ See attached map

Surface Contamination (dpm/100 sq cm)

	Direct	Smear	LAS (large area swipe)
Alpha	ND	ND	ND
Beta/gamma	10000	1200	ND
Tritium		ND	

External Dose Rate (mrem/hr in work area)

Beta + gamma	.1
Neutron	0
Total (b + g + n)	.1

Identify anticipated radionuclides:
U-238 TH-234 U-234
PA-234 PA-234M

Airborne Radioactivity

Isotope	DAC
None	

☒ Anticipated or ☐ Measured

Identify any contamination under paint or on inaccessible surfaces:
Not anticipated - possibly in target room

Completed by RCT / HPT	Name	Signature	ID Number	Date
☒ Completed	Thomas J O'Dou	Thomas J O'Dou	PM-1	1/09/1997

Radiological Work Permit AR-1

ALARA/RADIOLOGICAL PROTECTION REQUIREMENTS (to be completed by RCT)

Protective Clothing Requirements ☐ None ☒ Level I (Coveralls, 2 pair surgeon's gloves, and booties)
☐ Lab coat ☐ Skull cap ☐ Hood ☐ Level II (2 Coveralls, 2 pair surgeon's gloves, and 2 pair booties)
☒ Gloves ☒ Booties ☐ Tapes openings
☒ Other: Only in contaminated areas

Respiratory Requirements ☒ None ☐ Respirator fit test card ☐ SCBA*
☐ Full-face respirator ☐ Ventilation ☐ Combination cartridge* ☐ Supplied air mask*
☐ Particulate cartridge ☐ Chemical cartridge* ☐ Supplied air suit*
☐ Job-specific air monitoring *Requires RSO or CHP approval
☒ Other: Unless indicated otherwise at job site.

Dosimetry Requirements ☐ None ☒ WB dosimeter ☐ Supplemental dosimeter
☐ TLD finger rings ☐ Special neutron dosimetry ☐ Pu access list ☐ Alarming dosimeter
☒ Special uninalysis ☐ Whole-body count ☐ Accident Dosimeter ☐ Nasal swipes
☐ Other:

Monitoring Requirements ☐ None ☐ Notify RCT before job starts @
☒ Intermittent coverage ☒ Personnel before leaving job ☐ Notify RCT at job end
☐ Continuous coverage ☐ RCT monitor doffing of anti-Cs ☒ Equipment and tools before removal
☒ Self-frisking ☒ Other: Only from contaminated areas

Training Requirements ☐ RW I ☐ RW II ☒ Other: As required by GPI License

Additional ALARA Requirements ☒ None ☐ ALARA pre-job briefing
☐ ALARA review (see attachment)

Completed by RCT	Name	Signature	ID Number	Date
☒ Completed	Thomas J. O'Dou	Thomas J. O'Dou	PM-1	1/09/1997

HOLD POINTS / SPECIAL INSTRUCTIONS (to be completed by the RCT)

Hold Points or Special Instructions:

Protective clothing required in firing rooms (booties and gloves), in target room (tyveks, booties, gloves, taped), and when accessing HEPA filter bank internals (tyvek, booties, gloves, taped openings).

HEPA system to be bagged prior to opening. Floor outside HEPA banks to be covered with plastic prior to removal of HEPA filters. HEPA bank to be emptied for characterization. New HEPA filters may be installed at descretion of ARDEC (Fabiano), or HEPA system to be disabled with plastic seal and electrically disabled.

Areas of loose surface contamination above limits or near limits will be posted during the characterization.

Completed by RCT	Name	Signature	ID Number	Date
☒ Completed	Thomas J. O'Dou	Thomas J. O'Dou	PM-1	1/09/1997

Radiological Work Permit

AR-1

APPROVALS

	Name	Signature	ID Number	Group	Date
1. Line Manager ☒ Approved	Thomas J. O'Dou	*Thomas J. O'Dou*	PM-1	VEGAS	1/09/1997
2. RCT Supervisor ☒ Approved	Dixie J. Wells	*Dixie J. Wells*	RSO-1	RSO	1/14/1997
3. Facility Manager ☒ Approved	Thomas J. O'Dou	*Thomas J. O'Dou*	PM-1	VEGAS	1/14/1997
4. Other ☐ Approved	Name	Signature	ID Number	Group	Date

POST-JOB RADIOLOGICAL CONDITIONS (to be completed by the RCT/HPT)

Measured Radiological Conditions *(Record all readings as highest / general area.)* ☐ See attached map

Surface Contamination (dpm/100 sq cm)

	Direct	Smear	LAS (large area swipe)
Alpha			
Beta/gamma			
Tritium			

External Dose Rate (mrem/hr in work area)

Beta + gamma	
Neutron	
Total (b + g + n)	

Airborne Radioactivity
DAC _____ ☐ Estimated or
Isotope _____ ☐ Measured

Survey of Personnel Leaving Job Site
☐ Personnel contaminated above applicable limits
(If yes, attach the Radiological Incident Report.)

Completed by RCT / HPT)	Name	Signature	Z Number	Date
☐ Completed				

REVIEW

Associated reports for this job *(indicate the ones that apply)*:

☐ CAM results	☐ Nasal swipe data	☐ RWP acknowledgment log
☐ Job-specific air monitoring	☐ Urinalysis report	☐ Dose tracking report
☐ Pre-job survey data	☐ Whole-body count	☐ Radiological occurrence/incident report
☐ Post-job survey data	☐ Wound count	☐ Changes in ALARA/rad protection reqs
☐ Finger-ring data	☐ Skin contamination	☐ ALARA pre-job briefing
☐ Special dosimetry results	☐ Personal clothing survey	☐ Formal ALARA review

☐ Other: _____

☐ Lessons learned (If Yes, then briefly explain. Add attachment if necessary.)

Reviewed by RCT	Name	Signature	ID Number	Date
☐ Reviewed				

Reviewed by RCT Supervisor	Name	Signature	ID Number	Date
☐ Reviewed				

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RWP Access Log

RWP No: _____ Revision No: _____ Date: _____

Work Location: _____ Start Date: _____ End Date: _____

Date	Name	SSN/IDN	Badge/TLD	PIC/SRD	Time In	Dose In	Time Out	Dose Out	T/Dose	Resp (/)