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GPU Nuclear Corporation Radiation Protection Plan

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This document is important to safety Yes No

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5.0	0						
6.0	0						
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Table of Contents

<u>Article</u>		<u>Page No.</u>
Article 1	Foundation for the GPU Nuclear Radiological Controls Program	3.0
Article 2	Responsibilities of Workers	5.0
Article 3	Audits, Reviews and Reports on the GPUN Radiological Controls Program	7.0
Article 4	Radiological Controls Training	9.0
Article 5	Control of External Exposure	10.0
Article 6	Control of Internal Exposure	12.0
Article 7	Control of Radioactive Contamination	13.0
Article 8	Control of Radioactive Materials	14.0
Article 9	Organization for Radiological Controls	15.0

Article 1 - Foundation for GPU Nuclear Radiological Controls Program

The GPU Nuclear (GPUN) Radiation Protection Plan sets forth the philosophies, basic policies and objectives of the Radiological Controls Programs at TMI-1, TMI-2 and Oyster Creek Nuclear Generating Stations. The objective of the radiological controls program is to control radiation hazards to avoid accidental radiation exposures, to maintain exposures within the regulatory requirements, and to maintain exposures to workers and the general population as low as is reasonably achievable. These philosophies, policies, and objectives are based on and implement the regulations of the Nuclear Regulatory Commission (NRC) as contained in Title 10 of the Code of Federal Regulations, Parts 19, 20, 50, and 71, and appropriate Regulatory Guides, specifically 8.8 Rev 3 (1978), 8.10 Rev 1-R (1975), 8.13 Rev 1 (1975), and 8.15 (1976). The GPUN Radiation Protection Plan is based on these references; therefore, they are not repeated throughout the remainder of this document.

Specific details as to how the GPUN Radiation Protection Plan is implemented shall be promulgated in the plant specific Radiological Controls Procedures Manual (RCPM) and shall include those applicable procedures addressed in Reg. Guide 1.33 Rev. 2 (1978), App. A, paragraph 7, and paragraph 8 (aa), (bb); further references to the RCPM are not repeated throughout this document. The RCPM will consist of revisions to existing procedures, applicable Administrative procedures, and additional procedures deemed necessary. This GPUN Radiation Protection Plan is the first part of the RCPM. Requirements governing release of radioactive liquids and gases to the environment and the disposal of solid radioactive waste are not addressed in this GPUN Radiation Protection Plan, but are addressed in the Technical Specifications.

Verbatim compliance with the GPUN RCPM is mandatory. In the event a procedure cannot be followed exactly, work under that procedure shall be stopped and shall not commence again until the procedure has been corrected.

This GPUN Radiation Protection Plan and the RCPM are written to increase the effectiveness of the Radiological Controls Programs. Procedures shall provide adequate guidance and specify appropriate methods or techniques to insure that the performance of each activity is in accordance with sound radiological controls principles, and is in compliance with applicable regulatory provisions. The RCPM shall be prepared, reviewed, approved, and controlled as described in the GPUN Administrative procedures.

The GPUN Radiological Controls Program is to be fully integrated into each and every phase of operations at TMI-1, TMI-2 and Oyster Creek. The Radiological Controls Program when carried out as specified will assure that the operation of the GPU Nuclear Generating Stations will be performed with personnel who work at the site incurring radiation exposure as low as can reasonably be achieved.

In order to meet this objective, the program must be carried out by each person involved in radiological controls activities. There is no group or person involved in nuclear operations who does not have some degree of responsibility for the Radiological Controls Program. Failure of any person to recognize this responsibility or

to comply with issued procedures will not be tolerated. A radiologically safe operation will be achieved if each individual carries out his or her responsibility.

The performance of each manager and supervisor must demonstrate support for the commitment by top corporate management to a strong, effective radiological controls program.

Article 2 - Responsibilities of Workers

Although personnel specially trained in radiological controls normally oversee Radiological work, each individual involved in this work must constantly remain aware of the potential radiological problems. Each individual is responsible for maintaining his or her exposure as low as reasonably achievable. Each individual's actions directly affect his exposure, contamination, and overall radiological problems associated with the work. The following rules shall be followed by individuals to minimize radiological problems:

1. Obey promptly "stop-work" and "evacuate" orders of radiological controls personnel.
2. Obey posted, oral, and written radiological controls instructions and procedures, including instructions on Radiation Work Permits.
3. Wear TLD and self reading dosimeter where required by signs or by radiological controls personnel. Immediately report loss or unexpected exposure and offscale dosimeter to Radiological Controls Department.
4. Keep track of personal radiation exposure status and avoid exceeding exposure limits.
5. Remain in as low a radiation area as practicable to accomplish work.
6. Do not loiter in radiation areas.
7. Do not smoke, eat, drink, or chew in a Radiologically Controlled Area unless specifically authorized by the Radiological Controls Manager.
8. Wear anti-contamination clothing and respiratory protection properly and wherever required by signs or by Radiological Controls personnel.
9. Remove anti-contamination clothing and respiratory protection properly to minimize spread of contamination.
10. Frisk or be frisked for contamination when leaving a contaminated area or a radiological control point. Notify Radiological Controls personnel if contamination is found.
11. For a known or possible radioactive spill, minimize its spread and notify radiological controls personnel promptly.
12. Do not unnecessarily touch a contaminated surface or allow clothing, tools, or other equipment to do so.
13. Place contaminated tools, equipment and solid waste on disposable surfaces (for example, sheet plastic) when not in use and inside plastic bags when work is finished.

14. Limit the amount of material that has to be decontaminated or disposed of as radioactive waste.
15. Notify Radiological Controls personnel of faulty or alarming radiation protection equipment.
16. Report the presence of open wounds to radiological controls and medical personnel prior to work in areas where radioactive contamination exists and exit immediately if a wound occurs while in such an area.
17. Notify Radiological Controls personnel upon returning to the site after medical administration of radiopharmaceuticals.
18. Assure a mentally alert and physically sound condition for performing assigned work.
19. Ensure that your activities do not create radiological problems for others and be alert for the possibilities that the activities of others may change the radiological conditions to which you are exposed.

Article 3 - Audits, Reviews and Reports on the GPUN Radiological Controls Program

As indicated in Article 2, each individual is responsible for maintaining his or her radiation exposure as low as reasonably achievable while completing the scope of work they are required to perform. Each will be required to comply with the applicable procedures of the plant specific RCPM and the specific radiological controls prescribed for work in which they are engaged.

In order to ensure that these requirements are being met and to assist all site personnel in understanding and complying with these requirements, a system of audit and review procedures shall be established including criteria for timely and appropriate corrective action. The following audit and review procedures shall be used:

1. Radiological Controls technicians shall monitor and aid the performance of each individual insofar as radiological work practices are concerned.
2. The Radiological Engineering section shall review on a regular basis the performance of the radiological controls technicians. This review includes shift coverage on those jobs which are considered likely to have a high potential for radiological difficulties.
3. Radiological assessments shall be conducted throughout the Radiological Controls Program on a continuous basis. This assessment function shall report directly to the Vice President - Radiological and Environmental Controls. A written report of the findings of this assessment shall be prepared and issued at least monthly.
4. Radiological Controls is subject to the provisions of the Corporate Quality Assurance Plan.
5. The GPUN Radiation Protection Plan and any changes thereto shall be reviewed in accordance with applicable Technical Specifications. All RCPM's shall also be reviewed in accordance with the applicable Technical Specifications.
6. Periodically, the services of an outside consultant will be utilized to provide evaluation and guidance on ways to improve the Radiological Controls Program.
7. In addition to these reviews and audits, a system shall be employed to identify radiological controls deficiencies. A radiological controls deficiency is defined as either a violation of an established procedure or a practice which could and should be improved. Such deficiencies are recorded in a Radiological Deficiency Report. This system shall be specified in the RCPM embodying the following concepts. A Radiological Deficiency Report may be initiated by any individual who observes a

deviation from good radiological practices. These reports shall be evaluated by Radiological Engineering for desirable or necessary corrective action. The purpose of this system is to identify all deficiencies, regardless of how small or inconsequential, the correction of which will result in an improved Radiological Controls Program. The Radiological Engineering group shall prepare a monthly report summarizing the Radiological Deficiency Report findings and corrective action taken.

8. The Nuclear Regulatory Commission (NRC) also inspects and reviews the Radiological Controls Program. The Radiation Protection Plan and any changes thereto shall be submitted to the NRC for information. (The Radiation Protection Plan and any changes thereto shall be submitted to the NRC for approval for TMI Unit 2 only.)
9. In the event all the preceding measures fail to prevent a radiological incident, an investigation shall be conducted to determine the causes of the incident and to determine the corrective actions and improvements needed.

Article 4 - Radiological Controls Training

1. Periodic radiological controls training shall be given to ensure each person understands the radiological conditions to which he is exposed, understands his responsibility to minimize his own exposure to radiation, and understands his own responsibilities for complying with radiological controls procedures. Personnel occupationally exposed to radiation shall receive instruction on the effects of radiation and the risks associated with radiation exposure.
2. General radiological indoctrination shall be given to those not directly involved with radiation so that they understand not to enter areas requiring TLDs and not to cross radiation barriers. The indoctrination shall include explanation of the radiological environment in which they work.
3. Radiological controls training shall be given to personnel requiring access to radiologically controlled areas. These personnel shall be required to pass a written examination, and they shall requalify by written examination at least annually.
4. In addition to the training and written examinations of paragraph 3, those who require access to areas controlled by Radiation Work Permits shall receive more extensive training and shall be required to pass a radiological examination on their practical abilities, including use of dosimetry, frisking, anti-contamination clothing, respirators, and response to unusual situations. Retraining, and both written and practical examinations shall be conducted at least annually. In addition, spot checks shall be made to ensure that personnel retain the required knowledge during the period between examinations. Special briefings and extra training including use of mockups where applicable, shall be conducted for work involving higher than usual exposures to radiation and radioactivity.
5. Radiological controls technicians and their Supervisor/Foreman shall receive theoretical and practical training and training for unusual situations. Training shall also be given for changes to procedures, equipment and programs. They shall pass both written and oral examinations, in which the passing grade for Supervisor/Foreman shall be higher than the passing grade for technicians. Periodic practical drills and oral drills shall be required for each technician and Supervisor/Foreman. Biennial requalification shall be required including both written and oral examinations. Radiological controls technician assistants shall perform specific functions under the direction of a qualified technician or Supervisor/Foreman after being qualified for the specific function.

Article 5 - Control of External Exposure

Control of radiation exposure is based on the assumption that any exposure, no matter how small, involves some risk; however, exposure within the accepted limits represents a risk that is small compared with normal hazards of life. Therefore, the policy of GPU Nuclear is to maintain exposures to individuals and total man-rem as low as is reasonably achievable (ALARA). Line management from all departments as well as each individual worker shall take an active role in radiation exposure reduction.

To aid in exposure reduction, administrative radiation exposure control levels shall be established. Radiation man-rem exposure goals shall be established for each major job and for each year. Work involving radiation exposure shall be preplanned. Major exposure jobs shall require that radiological controls be incorporated in the design, that written procedures be prepared, and that pre-job briefing and rehearsals be conducted prior to commencing work. A Radiation Work Permit will be required for any work or entry to restricted areas that would involve or create any of the following: (a) high radiation area, (b) airborne radioactivity area, and (c) contaminated area, or (d) those radiation areas specified in applicable procedures.

Restricted areas used to control personnel access to radiation and radioactive materials shall be defined, access controlled, and posted in accordance with 10 CFR 20.203 with the following modifications:

1. Each High Radiation Area shall be barricaded and conspicuously posted as a High Radiation Area, and personnel desiring entrance shall obtain a Radiation Work Permit (RWP). Any individual entering a High Radiation Area shall (a) use a continuously indicating dose rate monitoring device, or (b) use a radiation dose rate integrating device which alarms at a preset dose level, or (c) assure that a radiological controls technician provides periodic radiation surveillance with a dose rate monitoring instrument.
2. Any area accessible to personnel where a major portion of the body could receive in any one hour a dose in excess of one thousand mrem, shall be locked to prevent unauthorized entry. The keys to these locked barricades shall be maintained under the administrative control of the Radiological Controls Supervisor/Foreman on Duty in accordance with the RCPM.

Radiological Controls personnel shall be exempt from the RWP issuance requirement during the performance of their assigned radiation protection duties providing they are following radiological controls procedures for entry into High Radiation Areas.

To evaluate radiological conditions, radiation surveys shall be conducted for air activity, removable surface contamination and external radiation at regular intervals. Surveys are performed in order to (a) monitor the suitability of control measures, (b) evaluate the needs for additional controls, (c) evaluate trends for

ALARA purposes, and (d) evaluate radiological conditions in areas routinely entered without radiation work permit coverage. Surveys in unrestricted areas are provided to insure the effective control of radioactive material. Unusual conditions detected in the performance of either a routine or special survey shall immediately be brought to the attention of Radiological Controls Management. Portable radiation survey instruments will be calibrated semi-annually, except for dose rate measuring instruments, which will be calibrated quarterly, to assure a consistent, reliable and predictable response to radiation levels. Records of surveys shall be maintained on file. An Administrative program will be used to verify the calibration of personnel and field monitoring instruments.

Article 6 - Control of Internal Exposure

The GPUN policy is not to have any significant internal exposure to personnel from radioactivity associated with GPUN Operations or activities. For personnel exposed to radioactivity during their work, this means that no one should receive from internal radioactivity more than one tenth of the radiation exposure that 10 CFR 20 would allow one to accumulate in a year.

Controls in other parts of this Radiation Protection Plan to minimize internal radioactivity, such as control of surface contamination and control of wounds, are not repeated in this article. The following controls are utilized to minimize internal exposure from airborne radioactivity:

1. Engineering controls and controls on personnel access shall be applied to the maximum extent practicable so that radioactive work does not increase the amounts of airborne radioactivity inhaled. When no other controls are practicable, respirators shall be used. Those who may need to use respirators shall be medically qualified and trained at least annually. Also, such persons shall be successfully fit tested to the appropriate respirator(s) prior to being authorized to wear the respirator(s) and at least annually thereafter. (For TMI the annual Fit Test Requirement shall be implemented by March 31, 1983).
2. Airborne radioactivity shall be measured regularly in areas where personnel may be exposed. Continuous sampling representative of air the person is breathing shall be performed to supplement periodic measurements during work which has the potential for the generation of significant airborne radioactivity.

Internal radioactivity shall be measured prior to assignment and at least annually in each person who works in an area requiring a radiation work permit; this includes each person who wears respiratory protection. Internal radioactivity shall be measured promptly in each person who receives significant radioactive contamination on his skin, and in each person who is suspected of inhaling sufficient radioactivity to cause measurable internal radioactivity. Each measurement of internal radioactivity shall be reviewed in accordance with investigative levels specified in the RCPM to determine the cause and to assist in minimizing internal exposures.

Article 7 - Control of Radioactive Contamination

Radioactive surface contamination shall be controlled in order to minimize possible inhalation or ingestion of radioactivity and to minimize buildup of radioactivity in the environment. Measures to contain radioactivity and to minimize the number and extent of areas contaminated shall be taken in order to minimize personnel radiation exposure, to simplify subsequent personnel and area or facility decontamination, and to minimize the need to rely on anti-contamination clothing.

The limit used to verify the absence of contamination shall be 100 cpm as measured with a pancake GM detector.

The surface contamination limits for unrestricted release of materials and equipment are as follows:

<u>Beta-Gamma</u>	<u>Smearable</u> (1)	<u>Total</u> (Fixed and Smearable)
TMI-1, Oyster Creek	1000 dpm/100cm ²	0.1 mR/hr
TMI-2	500 dpm/100 cm ²	0.1 mR/hr
<u>Alpha</u>		
All Sites	100 dpm/100cm ²	20 cpm (2)

Emphasis in planning, training and working shall be placed on minimizing the numbers of occurrences and amounts of radioactivity involved in occurrences of radioactive surface contamination of a person's skin or on areas not controlled for radioactive surface contamination. Each such occurrence shall be reviewed in detail to determine how to correct deficiencies and improve control of radioactivity.

- (1) Direct frisking may be used in place of smears for release of materials and/or equipment.
- (2) As measured with an alpha survey meter

Article 8 - Control of Radioactive Materials

In addition to the definition of 10 CFR 20, any material having a dose rate measured with a beta gamma survey meter at 1 inch exceeding 0.1 mR/hr or with surface contamination in excess of the limits specified in Article 7 shall be handled as radioactive. A radioactive material control system shall be established to ensure radioactive material is not lost or misplaced in a location where personnel could unknowingly be exposed to radiation and to prevent the uncontrolled spread of radioactivity to areas where the public might be affected. This system shall include the following requirements:

1. The number of areas in which radioactive materials are stored shall be minimized.
2. Any new radioactive material storage area shall be approved before use by the Manager-Radiological Controls.
3. The numbers of radioactive items and the amount of radioactivity in storage shall be minimized to the extent practicable.
4. All items shall be surveyed before removing them from a restricted area.
5. Radioactive materials removed from the Protected Security Area or removed from a restricted area outside the Protected Security Area shall be controlled in accordance with an accountability procedure which ensures the materials are not lost or improperly handled during transfer or subject to unauthorized removal. This accountability procedure shall require inventory of radioactive materials which remain outside such areas.
6. Each incoming or outgoing shipment of radioactive material shall be handled in strict compliance with detailed written procedures.

Each case in which radioactive material is lost or unaccounted for shall be reviewed in detail to determine the potential radiation exposure personnel might unknowingly receive, to correct deficiencies, and to improve control of radioactive materials.

Article 9 - Radiological Controls Organization

A radiological controls program cannot be strong and effective if left solely to the Radiological Controls Department. Each worker and supervisor has responsibility for radiological controls; consequently, the organization for each of the GPUN sites represents the organization for radiological controls.

However, each Manager-Radiological Controls is responsible for ensuring that a high quality radiological controls program is established and maintained. It is the responsibility of the Radiological Controls Department to evaluate radiological conditions and recommend precautionary measures.

At times when demands upon the Radiological Controls Department are sufficiently heavy to require a temporary increase in staff, qualified contractor personnel will be used. These personnel will be fully integrated into the department under the direction of the Manager-Radiological Controls. Support services (instrument calibration, respiratory protection, bioassay, TLD/dosimetry, and training) may be provided by other GPUN organizations. These support services will be administered by procedures which define the organizational interface required to insure the quality of services provided meet the commitments of the Radiation Protection Plan.

Qualifications for the key radiological managers in NRC Regulatory Guide 1.8, Rev. 1-R, (1975) will be met as far as practicable. Where the combination of strong manager and experience in radiological controls cannot practicably be obtained in the same person, either the manager or a deputy manager will meet the requirements of Regulatory Guide 1.8.

One portion of the GPUN radiological controls program which warrants particular note is the ALARA program which requires personnel radiation exposures to be as low as reasonably achievable. To accomplish this each engineer involved with the operation of TMI-1, TMI-2 or Oyster Creek has to have radiological engineering as part of his assignment. Thus, most radiological engineering functions are performed in engineering groups rather than in the Radiological Controls Department. The overall coordination of the ALARA program, however, is assigned to Radiological Engineering in the Radiological Controls Department.

The respective TMI-1, TMI-2, and Oyster Creek Radiological Controls organizations are depicted in the GPU Nuclear Organizational Plan.