SCOPE

This General Instruction establishes minimum requirements for compliance with the regulations of the Government of Saudi Arabia and Saudi Aramco Environmental Protection and Loss Prevention Policies to protect workers, the public and the environment from the hazards associated with ionizing radiation.

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1. BASIC PRINCIPLES OF RADIATION PROTECTION:

The Company shall adhere to the following basic principles for protection against ionizing radiation hazards:

1.1 No practice or a radiation source within a practice should be authorized unless it produces sufficient benefit to offset the potential radiation harm.

1.2 The normal radiation exposure of individuals resulting from an authorized practice or a combination of authorized practices shall be restricted so that no applicable dose limit is exceeded (as described in Section 4). Radiation dose limits shall not apply to therapeutic or diagnostic medical and dental exposures of patients from authorized practices.

1.3 Radiation protection shall be optimized in order that the number of individuals exposed to ionizing radiation and the likelihood of incurring exposures are all kept As Low As Reasonably Achievable (ALARA).

2. DEFINITIONS:

2.1 **Absorbed Dose:** Average amount of energy imparted by radiation per unit mass of matter in units of Gray (Gy), where 1 Gy =1 Joule/kg.

2.2 **Alpha Particle:** A positively charged particle consisting of two protons plus two neutrons emitted by a radionuclide.

2.3 **Beta Particle:** An electron emitted by the nucleus of a radionuclide. The electric charge may be positive, in which case the beta particle is called a positron.

2.4 **Calibration:** A measurement of, or adjustment to, an instrument, component or system to ensure that its accuracy or response is acceptable.

2.5 **Contamination:** The deposition of unwanted radioactive material on the surfaces of structures, areas, objects, or people. It may also be airborne, external, or internal (inside components or people).

2.6 **Decommissioning:** The process of closing down a facility followed by reducing residual radioactivity to a level that permits the release of the property for unrestricted use.

2.7 **Dose:** A measure of the energy deposited by ionizing radiation in a target.

2.8 **Dose Limit:** The value of the effective dose or the equivalent dose to individuals from controlled radiation practices that shall not be exceeded.

2.9 **Effective Dose:** The summation of tissue equivalent doses, each multiplied by a tissue weighting factor (W_T) in units of Sievert (Sv).

2.10 **Equivalent Dose:** The average absorbed dose by a tissue or organ multiplied by a radiation weighting factor (W_R) and summed over different types of ionizing radiation (in mixed radiation fields). The unit of equivalent dose is the Sievert (Sv).

2.11 **Exposure:** The term “exposure” in this document refers to radiation exposure.

2.12 **Extremity:** Hand, elbow, arm below the elbow, foot, knee, or leg below the knee.

2.13 **Gamma Ray:** A discrete quantity of electromagnetic energy without mass or charge emitted by a radionuclide.

2.14 **Government Regulatory Authority:** National authority responsible for radiation protection in Kingdom of Saudi Arabia (KSA).

2.15 **Intake:** The process of taking radionuclides into the human body by inhalation, ingestion or through the skin.

2.16 **Ionizing Radiation:** Any type of radiation that produces ionization in matter by removing an electron or more from an atom. Examples are gamma rays, x-rays, alpha particles, beta particles, neutrons, high-speed electrons, and high-speed protons.

2.17 **Isotope(s):** Any two or more forms of an element having the same atomic number but different mass numbers.

2.18 **KACST:** King Abdulaziz City for Science and Technology.

2.19 **Medical Radiation Exposure**: Radiation exposure incurred by patients as part of their own medical or dental diagnosis or treatment; by persons, other than those occupationally exposed, knowingly while voluntarily helping in the support and comfort of patients; and by volunteers in a program of biomedical research involving their exposure.

2.20 **Naturally Occurring Radioactive Material (NORM):** Naturally occurring primordial radioactive nuclides and their radioactive decay products, which have been enhanced above their natural levels due to industrial operations. For the purpose of this GI, the terms NORM and TENORM (Technically Enhanced Naturally Occurring Radioactive Material) have the same meanings.

2.21 **Neutron:** An elementary particle with approximately one unit atomic mass and no electric charge.

2.22 **Nuclide:** A general term referring to all known isotopes, both stable and unstable of the chemical elements.

2.23 **Occupational Exposure:** Radiation exposure incurred by radiation workers from authorized radiation sources, radiation practices and intervention situations, excluding any therapeutic or diagnostic medical and dental radiation exposures.

2.24 **Principal Party:** Any entity holding license(s) for certain radiation practices or sources which bear all responsibilities related to radiation protection for all licensed practices and sources under normal and abnormal situations.

2.25 **Proponent of Radiation Services:** Any Saudi Aramco Organization which receives radiation services provided by a non-Saudi Aramco organization under contractual agreement (directly or through sub-contract).

2.26 **Proton:** An elementary particle with unit atomic mass approximately and unit positive electric charge.

2.27 **Public Exposure:** Radiation exposure incurred by members of the public from authorized radiation sources, radiation practices and intervention situations, excluding any occupational or medical exposure and the local natural radiation background.

2.28 **Radiation:** The term “radiation” in this document refers only to ionizing radiation.

2.29 **Radiation Dosimetry:** The theory and application of the principles and techniques involved in the measurement and recording of ionizing radiation doses.

2.30 **Radiation Exposure:** The act or condition of being externally and/or internally irradiated by ionizing radiation.

2.31 **Radiation Incident**: An occurrence which is not part of the planned operational activities associated with the use, storage, handling or transportation of a radiation source and has the potential of causing loss of control of a radiation source, compromising integrity of a radiation source, causing radioactive contamination or exposing humans to radiation.

2.32 **Radiation Practice:** Any human activity that introduces additional sources of exposure or exposure pathways or extends exposure to additional people or modifies the network of exposure pathways from existing radiation sources so as to increase the exposure or the likelihood of exposure of people or the number of people exposed.

2.33 **Radiation Practice License:** The document by which the government regulatory authority permits the licensee to select a location, design, posses, manufacture, produce, construct, own, transport, import, export, receive, place, use or commence the operation, transfer or dispose of any radioactive substance, radiation generating equipment, nuclear installation or radioactive waste facility.

2.34 **Radiation Protection Officer (RPO):** An individual technically competent in radiation protection matters relevant to a specific radiation practice. This individual is designated by the user organization, licensed by the government regulatory authority of radiation protection and approved by Radiation Protection Unit (RPU) of Environmental Protection Department (EPD).

2.35 **Radiation Service Provider:** A non-Saudi Aramco organization providing radiation services to Saudi Aramco organization. This provider is considered as a user as defined below.

2.36 **Radiation Source:** Any radioactive material or any equipment that produces ionizing radiation.

2.37 **Radiation Survey:** The use of portable radiation detection instruments to determine radiation exposure, radiation dose and/or radioactive contamination in a certain area.

2.38 **Radiation Worker:** An individual whose job involves routine use of man made radiation sources and who has the potential to receive effective radiation dose of 2 milli-sievert or higher accumulated over one year. Radiation worker shall be 18 years of age or older.

2.39 **Radioactive Material:** Any substance that emits ionizing radiation above exemption limits specified by government regulations. IAEA Safety Series 115 shall be used wherever exemption limits are not defined by government regulations.

2.40 **Radioactive Waste:** Any waste that contains, or is contaminated with, radionuclides at concentrations or activities greater than exemption levels for radioactive waste as specified by the government regulatory authority. Reference 7.3 includes details on classifications and exemptions of radioactive waste.

2.41 **Radioactivity:** The phenomenon whereby atoms undergo spontaneous random disintegration, usually accompanied by the emission of ionizing radiation.

2.42 **Radioisotope:** An unstable isotope of an element that decays or disintegrates spontaneously, emitting radiation.

2.43 **Radionuclide:** An unstable nuclide that emits ionizing radiation.

2.44 **Saudi Aramco Property:** For the purpose of this document, Saudi Aramco property shall include Saudi Aramco facilities, sites, concessionary areas, and facilities or property under exclusive lease, hire or contract.

2.45 **Sealed Radioactive Source:** Radioactive material that is permanently sealed in a capsule or closely bonded in a solid form. Specifications for sealed radioactive sources shall be as detailed in ISO 2919:199 (Reference #7.9).

2.46 **Skin Equivalent Dose:** The average equivalent dose over one square centimeter of the most highly irradiated area of the skin.

2.47 **Thermo-Luminescence-Dosimeters (TLDs):** Passive devices used for measuring the external ionizing radiation dose received by the person wearing the TLD badge/ring accumulated over a period of time.

2.48 **TLD Program:** A program administered by EPD utilizing TLD badges/rings to monitor the monthly/quarterly external radiation dose received by Saudi Aramco employees classified as radiation workers.

2.49 **Unsealed Radioactive Source:** Radioactive source that does not meet the definition of a sealed radioactive source.

2.50 **User:** A Saudi Aramco organization utilizing, handling, transporting, disposing or storing radiation sources, or a non Saudi Aramco entity utilizing, handling, transporting, disposing or storing radiation sources on Saudi Aramco property.

2.51 **X-Rays:** A discrete quantity of penetrating electromagnetic energy without mass or charge having a range of wavelengths (energies) that are similar to those of gamma photons. X rays are usually produced by excitation of the electron field around certain nuclei.

3. RESPONSIBILITIES:

3.1 ENVIRONMENTAL PROTECTION DEPARTMENT (EPD)

3.1.1 Radiation Protection Unit (RPU) is the entity under Environmental Protection Department (EPD) which is responsible for issues related to radiation protection.

3.1.2 Act as a single point contact on behalf of Saudi Aramco in correspondence, coordination and communications with the Saudi Government agencies and Regulatory Authority for matters related to radiation protection.

3.1.3 Assess radiation protection compliance of users of radiation sources and organizations having responsibilities in this GI with government regulations and Saudi Aramco GIs/Standards and report non-compliance issues to the users' management for remedial actions.

3.1.4 Coordinate the efforts to develop and review radiation protection General Instructions / standards and concur Saudi Aramco radiation protection procedures.

3.1.5 Maintain the Saudi Aramco Radiation Protection Manual, which provides general information and guidance on ionizing radiation, its applications and protection.

3.1.6 Administer a company wide dosimetry program to measure the accumulative external radiation dose received by Saudi Aramco radiation workers and maintain personal radiation dose records.

3.1.7 Approve Saudi Aramco the import, use, storage, export and disposal of radioactive materials and radiation producing equipment.

3.1.8 Maintain inventory records of company radiation sources.

3.1.9 Provide technical advice and consultation to Saudi Aramco on matters related to radiation protection.

3.1.10 Review and assess the user final radiation incident report and conduct an independent investigation if necessary as per Section 6.

3.1.11 Review reports of apparent excessive personnel radiation exposures and assess corrective actions.

3.1.12 Administer a program for assessing industrial radiographers' radiation protection competency.

3.2 PREVENTIVE MEDICINE SERVICES DIVISION (PMSD)

3.2.1 Preventive Medicine Services Division (PMSD) is the entity under Saudi Aramco Medical Services Organization (SAMSO) responsible for monitoring the compliance of medical users of radiation sources with the applicable radiation protection requirements.

3.2.2 Determine the course of medical care and remedial actions in the case of individuals' overexposure to radiation and/or medical treatment of personnel contaminated with radioactive material.

3.2.3 Provide health surveillance and medical recommendations regarding the placement of radiation workers according to government regulatory authority regulations.

3.2.4 Enforce the requirements of this General Instruction in SAMSO facilities using radiation sources.

3.2.5 Ensure quality control tests are performed on all Saudi Aramco owned or leased medical and dental equipment utilizing radiation at the start of operation (after acceptance test), after maintenance, and routinely at periods not exceeding 12 months.

3.2.6 Perform the radiation protection surveys on all Saudi Aramco owned or leased medical and dental equipment utilizing radiation at the start of operation (after acceptance test), after major repair, and routinely at periods not exceeding 12 months.

3.2.7 Perform semi-annual radiation protection surveys on medical uses of radionuclides.

3.3 LOSS PREVENTION DEPARTMENT (LPD)

3.3.1 Participate in the investigation of radiation incidents as deemed necessary.

3.3.2 Verify that personnel who work with NORM material or NORM contaminated equipment are wearing the correct personal protective equipment (PPE) including respiratory protective equipment during field compliance checks.

3.4 RESEARCH & DEVELOPMENT CENTER (R&DC)

3.4.1 Conduct radiation leak test analyses for Saudi Aramco owned sealed radioactive sources and devices that contain depleted uranium shielding.

3.4.2 Conduct radioactivity measurements on air, filters, water, soil, scale, sludge, and waste samples.

3.4.3 Maintain records of results for radiation leak test analysis and radioactive measurements and provide RPU/EPD with copies for assessment.

3.5 FIRE PROTECTION DEPARTMENT (FrPD)

3.5.1 Develop procedures for, and respond to, incidents involving radiation sources which can not be handled by users and require personal rescue and/or fire control by FrPD.

3.5.2 Specify FrPD responsibilities in case of radiation incidents as detailed in section 5.

3.5.3 Be aware of the locations of the radiation sources on Saudi Aramco property (as communicated in paragraphs 3.7.16 and 3.7.17).

3.5.4 Ensure that an adequate number of FrPD employees are trained on supporting the response to incidents involving radiation sources; these may include fire, spillage and trapped personnel near a radiation source.

3.6 INSPECTION DEPARTMENT

3.6.1 Ensure that all locations and facilities used for the temporary storages of industrial radiography radioactive sources on Saudi Aramco property are constructed, used and demolished as per the applicable Saudi Aramco standards (e.g., SAEP 1141).

3.6.2 Ensure the compliance of contractors performing industrial radiography on Saudi Aramco property with the company's radiation protection requirements (e.g., SAEP 1141).

3.6.3 Ensure that each Inspection Department RPO is available or on-call during any movement, radiographic work or emergency situation relating to the radiation sources under his responsibility.

3.7 USERS OF IONIZING RADIATION SOURCES

3.7.1 Implement the requirements of this GI.

3.7.2 Comply with Saudi Government radiation protection regulations and Saudi Aramco radiation protection standards.

3.7.3 Obtain EPD's approval prior to deviation or waiver from any requirement specified by this GI.

3.7.4 Develop written radiation protection procedures compliant with Saudi Aramco radiation protection GIs/standards and Saudi government regulations, covering all authorized radiation practices conducted by the user including procedures on the import, handling, transportation, usage, storage and disposal of radioactive materials.

3.7.5 Appoint a Radiation Protection Officer (RPO) certified by the government regulatory authority.

3.7.6 Provide RPU/EPD with their RPO names and details of the areas of responsibilities of each RPO as specified in paragraph 3.7.26.

3.7.7 Ensure that all radiation workers within the user's organization are adequately trained and competent in the safe use and handling of ionizing radiation sources related to their job responsibilities.

3.7.8 Provide the necessary personnel monitoring and protection measures prior to allowing any employee to use/handle ionizing radiation sources.

3.7.9 Ensure that radiation monitoring and survey equipment are calibrated periodically as required by Saudi Aramco radiation protection standards and government regulations.

3.7.10 Ensure that radioactive waste is disposed of according to Saudi government regulations and company standards (e.g., SAEP-358).

3.7.11 Maintain records of occupational radiation exposures, sealed and unsealed radioactive sources (radiopharmaceuticals, tracers, standard sources, etc), radiation producing equipment, survey instrument calibration, radiation surveys, radioactive waste, and radiation incidents.

3.7.12 Ensure that all radiation practices within the user's organization are licensed by the government regulatory authority.

3.7.13 Ensure that import and export of Saudi Aramco radiation sources are pre-approved by RPU/EPD.

3.7.14 Ensure that the import, use, storage, transportation and export of radioactive materials and radiation producing equipment are in compliance with Saudi government regulations and Saudi Aramco standards.

3.7.15 Maintain an up-to-date inventory (including locations) of Saudi Aramco radiation sources under the user's custody.

3.7.16 Provide RPU/EPD and FrPD with a copy of the inventory of all radiation sources under the user's custody every June and December. This inventory is required only from Saudi Aramco source users and other source users storing radioactive sources in Saudi Aramco property. The inventory shall include at least the following:

3.7.16.1 Radiation source nuclide(s) or radiation producing equipment type(s)

3.7.16.2 Activity of the radioactive sources

3.7.16.3 Type(s) of emitted radiation from the sources

3.7.16.4 Radioactive source physical and chemical form (solids shall be further described as to identify their physical form e.g. powders, pellets, beads, rods, and plates.)

3.7.16.5 Operating voltage of radiation producing equipment

3.7.16.6 Specific locations of the radiation sources

3.7.16.7 Emergency contact numbers as detailed in the contingency plan required by paragraph 5.1

3.7.17 Provide RPU/EPD and FrPD with copies of the following radiation source documentations and updates for any change in the radiation sources or locations under the user's custody:

3.7.17.1 Documentation that includes the effects of fire, explosion, chemical exposure, flooding water, and high pressure water streams on the radiation sources

3.7.17.2 Documentation that includes source shielding types, material and design

3.7.17.3 Plot plan indicating the source locations within the facility and elevation

3.7.17.4 Shutter / window design and control mechanism if applicable

3.7.18 Ensure that radioactive sources are stored inside adequately shielded storage facilities and that adequate security measures are implemented to prevent loss or theft of radiation sources.

3.7.19 Ensure that all portable radiation sources are adequately surveyed before and after use or movement of any source using proper and calibrated radiation survey equipments, and maintain records of the radiation survey.

3.7.20 Ensure that all non portable radiation sources are adequately surveyed at least annually (unless it is required to be more frequent by the applicable standards or regulations for the radiation practice) using proper and calibrated radiation survey equipments, and maintain records of the radiation survey.

3.7.21 Ensure the leak testing of sealed radioactive sources is conducted at least annually (unless it is required to be more frequent by the applicable standards or regulations for the radiation practice) using calibrated counting equipment that can reliably measure to 185 Becquerel (0.005 micro Curie), and maintain records of the leak tests.

3.7.22 Ensure that required calibration and quality assurance of each radiation producing equipment are conducted in a timely manner to verify that such equipment is operating within its design parameters.

3.7.23 Inform RPU/EPD of any anticipated change in radiation practices, sources, procedures or equipment which could change radiation exposure characteristics.

3.7.24 Develop radiation incident's response and notification plan, as specified in section 5 and provide FrPD with a copy of the response plan.

3.7.25 Ensure that decommissioned facilities are free of any radioactive source or radioactive contamination and decommissioning of Saudi Aramco radioactive material facilities are coordinated with RPU/EPD.

3.7.26 Define each RPO area of responsibility, which must include as a minimum the radiation sources, the facilities, and the personnel under his radiation protection responsibility. **Ensure that the appointed RPO performs the following duties:**

3.7.26.1 Coordinate the administration and documentation of the radiation practice license, and the import and export of radioactive sources.

3.7.26.2 Enforce the implementation of Saudi Aramco radiation protection GIs and standards.

3.7.26.3 Maintain personnel radiation dose records of radiation workers in his area of responsibilities.

3.7.26.4 Review radiation workers' dose results and identify any unexpected doses. Investigate causes, suggest corrective measures, and report findings to his management and RPU/EPD.

3.7.26.5 Review and understand his responsibilities in case of radiation incidents as detailed in sections 5 & 6.

3.7.26.6 Maintain records of radiation sources in his area of responsibility. These records shall include but not be limited to the inventory of radioactive sources, source certificates, import and export permit documentations and operational manuals related to the radiation sources.

3.7.26.7 Coordinate the periodical calibration of radiation monitoring and survey equipment as required by Saudi Aramco standards and government regulations.

3.7.26.8 Ensure at least weekly, by direct or indirect method, that all radioactive sources under his responsibility are safe and secured against damage, loss or theft.

3.7.26.9 Inspect, at regular intervals not exceeding 12 months, all permanent storages, locations and facilities of radiation sources under his responsibility, and maintain records of the inspection.

3.7.26.10 Ensure that all required radiation surveys are performed adequately and maintain records of survey results.

3.7.26.11 Ensure radioactive sources in his area of responsibility are leak tested as per Saudi Aramco standards and government regularity authority.

3.7.26.12 Notify promptly the user's management and RPU/EPD of any violations of Saudi Aramco radiation protection GIs and standards.

3.7.26.13 Participate and handle emergency situations that involve radiation sources or accidental exposures in his organization as specified in sections 5 and 6 of this GI.

3.7.26.14 Participate in investigating incidents or any hazardous situations involving radiation sources within his organization in accordance with section 6 of this GI.

3.8 PROPONENTS OF RADIATION SERVICES

3.8.1 Ensure that the radiation service provider is in possession of a valid Saudi government radiation practice license matching the radiation service rendered to the proponent.

3.8.2 Ensure that the radiation service provider has a valid Saudi government RPO certificate matching the radiation service rendered to the proponent.

3.8.3 Obtain a hazard identification plan as required by the Saudi Aramco Construction Safety Manual from each radiation source provider for using radiation source in the facility of the proponent.

3.8.4 Notify RPU/EPD prior to signing a contractual agreement to render radiation services other than industrial radiography or oil/gas well logging.

4. DOSE LIMITS

Radiation dose limits stated in paragraphs 4.1 to 4.4 shall not be exceeded except under certain emergency conditions specified by government regulations or Saudi Aramco standards and procedures. Therapeutic or diagnostic medical and dental radiation exposures of patients shall not be considered as part of any dose limits mentioned in this GI. Also, exposures from natural sources that cannot reasonably be regarded as being under the responsibility of any principal party shall not be included in any dose limits. The equivalent and effective dose shall be determined using radiation and tissue weighting factors according to the recommendations of the International Commission on Radiological Protection (ICRP 60).

4.1 OCCUPATIONAL EXPOSURE

The radiation exposure of each radiation worker shall be controlled so that the following limits are not exceeded:

4.1.1 **Whole body:** An effective dose of 20 mSv per year averaged over five consecutive years with the additional provision that the effective dose in any single year does not exceed 50 mSv.

4.1.2 **Lens of the eye:** An equivalent dose of 150 mSv per year.

4.1.3 **Skin and extremities:** An equivalent dose of 500 mSv per year.

4.2 PUBLIC EXPOSURE

4.2.1 **Whole body:** The effective dose for members of the general public shall not exceed 1 mSv in a year. This effective dose can be increased in any single year with additional provision that it should not exceed 5 mSv over five consecutive years.

4.2.2 **Lens of the eye:** An equivalent dose of 15 mSv per year.

4.2.3 **Skin and extremities:** An equivalent dose of 50 mSv per year.

4.3 PREGNANT RADIATION WORKERS

Female and male radiation workers are subject to the same dose limits. However, when a female radiation worker is declared pregnant her working conditions may be modified so that the equivalent dose to the surface of the abdomen (lower trunk) does not exceed 2 mSv and the effective dose to the embryo-fetus during the remaining period of pregnancy does not exceed 1 mSv.

4.4 EDUCATIONAL AND TRAINING EXPOSURES

4.4.1 **Whole body:** an effective dose of 6 mSv per year.

4.4.2 **Lens of the eye**: an equivalent dose of 50 mSv per year.

4.4.3 **Skin and extremities:** an equivalent dose of 150 mSv per year.

Note: Individuals between ages of 16 and 18 years may have limited involvement for educational and training purposes only. Individuals under the age of 16 years shall not be allowed to participate in any activity involving ionizing radiation sources, neither occupationally nor during training.

4.5 EMERGENCY RESPONSE EXPOSURE

In the case of emergency situations involving radiation sources on Saudi Aramco property that require intervention of individuals not categorized as radiation workers such as Safety & Industrial Security (S&IS) and Medical Services, the whole body radiation exposure of such emergency responders shall be controlled to 20 mSv per year averaged over five consecutive years. The responding organization shall develop an emergency response plan, approved by RPU/EPD, including monitoring of radiation doses received by those individuals. The received doses of those individuals shall be reported to RPU/EPD and copies shall be kept in the organization of those individuals.

5. RADIATION INCIDENT RESPONSE AND NOTIFICATION

The primary responsibility to respond to emergencies associated with radiation sources on Saudi Aramco property, or involving Saudi Aramco radiation sources outside Saudi Aramco property, falls upon the user's organization. Other Saudi Aramco organizations may respond in a supporting role to assist the user's organization in responses to incidents involving radiation sources. Therefore the following requirements are to be fulfilled:

5.1 Each user's organization shall develop a written contingency plan covering the potential emergency scenarios associated with radiation sources under their custody and detailing the necessary response measures. The contingency plan shall delineate the appropriate safety work zones for the emergency responders at any potential radiation incident site, if applicable.

5.2 Each user's organization shall obtain the necessary equipment and supplies to adequately respond to incidents associated with radiation sources under their custody.

5.3 Each user's organization shall provide the necessary training to their radiation workers to be adequately ready to respond to incidents associated with radiation sources under their custody.

5.4 The user's organization shall adhere to the notification requirements specified by GI 6.001, Notification Requirements for Incidents (including Fires).

5.5 The user's organization shall notify promptly FrPD in case of incidents involving radiation sources under the organization's custody which can not be handled by the user and require intervention by FrPD.

5.6 FrPD shall respond promptly to radiation incidents which fall within FrPD domain of responsibilities as specified in section 3.5 of this GI. The priority of FrPD response to the incident shall be given to personal rescue and/or fire control. In incidents where radiation sources are the primary concern or in situations where radiation presents a hazard to firefighters, FrPD response actions (in relation to radiation protection matters) shall be under the direction of the user organization's RPO.

5.7 The user organization's RPO shall show up promptly at the incident location involving radiation source(s) within his jurisdiction to assess the radiation hazard and provide advice to the FrPD Commander in the incidents require intervention by FrPD.

5.8 The user organization's RPO shall notify promptly his direct management, RPU/EPD and LPD of incidents involving radiation sources under his organization's custody. Subsequently, RPU/EPD shall notify government regulatory authority of radiation incidents involving Saudi Aramco owned radiation sources.

5.9 The user organization's RPO shall notify promptly the nearest and/or appropriate emergency clinic of Saudi Aramco Medical Services in case of radiation incidents involving individuals requiring admission for urgent health care due to radiation exposure.

5.10 The user organization's RPO shall notify PMSD promptly in case of suspected acute radiation dose involving Saudi Aramco employees.

5.11 Saudi Aramco Medical Services shall be adequately prepared for providing medical care and necessary follow up to individuals involved in radiation incidents.

5.12 The incident responders shall be familiar with the potential hazards and ready to follow the emergency response guidance detailed in the Emergency Response Guidebook (Reference 7.16) for incidents associated with transporting, storing and using radioactive sources in Saudi Aramco properties.

6. RADIATION INCIDENT INVESTIGATION AND REPORTING

6.1 The user organization's RPO shall conduct an initial investigation of each incident involving radiation sources under his organization's custody (except in cases of potential conflict of interest). In cases of acute injury, other general instructions such as 155.003 and 6.005 may become applicable.

6.2 The user organization's RPO shall prepare a preliminary report and submit it to the RPU/EPD within two working days of the radiation incident occurrence.

6.3 Following investigation and review of data, the user organization's RPO shall prepare a final incident report, identifying causes, corrective actions and preventive measures against reoccurrence. This final report shall be submitted to RPU/EPD within 15 working days of the radiation incident.

6.4 RPU/EPD shall review the user final incident report and conduct an independent investigation if necessary. The final incident report concurred by RPU/EPD shall be sent by the manager of the user organization to managers of EPD and LPD. If FrPD personal are involved in the response actions, a copy of the final report shall be sent to FrPD Hazardous Materials Coordinator.

6.5 The user organization's management shall implement the recommendations of the final incident report.

7. REFERENCES

7.1 Saudi Government Regulations issued by KACST "General Instructions of Ionizing Radiation Protection in Kingdom of Saudi Arabia" 2007

7.2 Saudi Government Regulations Issued by KACST "Instructions of Safe Transport of Radioactive Material in Kingdom of Saudi Arabia" 2007

7.3 Saudi Government Regulations issued by KACST "Instructions of Radioactive Waste Management in Kingdom of Saudi Arabia" 2007

7.4 Saudi Aramco General Instructions 6.001, 6.005 and 155.003

7.5 Saudi Aramco Engineering Procedures 358 and 1141

7.6 International Commission on Radiological Protection, ICRP 60, 1990

7.7 International Atomic Energy Agency (IAEA) Safety Series No. 115, 1996

7.8 International Atomic Energy Agency (IAEA), Code of Conduct on the Safety and Security of Radioactive Sources, 2004

7.9 International Organization for Standardization (ISO), Radiation Protection – Sealed Radioactive Sources – General Requirements & Classification, ISO 2919:1999

7.10 US Code of Federal Regulations, Title 10 Energy, Chapter 1 Part 20 - Nuclear Regulatory Commission

7.11 US Code of Federal Regulations, Title 10, Energy, Chapter 1 Part 34 - Nuclear Regulatory Commission

7.12 US Code of Federal Regulations, Title 29 Labor, Chapter 17 - Occupational Safety & Health Standards: 1910.96 Ionizing Radiation, 2007

7.13 US Code of Federal Regulations, Title 49, Transportation, Subpart I—Class 7 (Radioactive) Materials, 1995

7.14 Health Protection Society, http://hps.org/

7.15 (UK) Health Protection Agency, http://www.hpa.org.uk/

7.16 Emergency Response Guidebook developed jointly by US Department of Transportation, Transport Canada, and the Secretariat of Communications and Transportation of Mexico (SCT)

RECOMMENDED: _____ DATE: _____
MANAGER,
ENVIRONMENTAL PROTECTION DEPARTMENT

CONCURRED: _____ DATE: _____
VICE PRESIDENT,
ENGINEERING SERVICES

CONCURRED: _____ DATE: _____
EXECUTIVE DIRECTOR,
SAFETY & INDUSTRIAL SECURITY

CONCURRED: _____ DATE: _____
VICE PRESIDENT,
MEDICAL SERVICES

APPROVED: _____ DATE: _____
PRESIDENT & CHIEF EXECUTIVE OFFICER