Radiological Design Process at the Savannah River Site

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Requirements and Recommendations

- 10 CFR 835, Occupational Radiation Protection

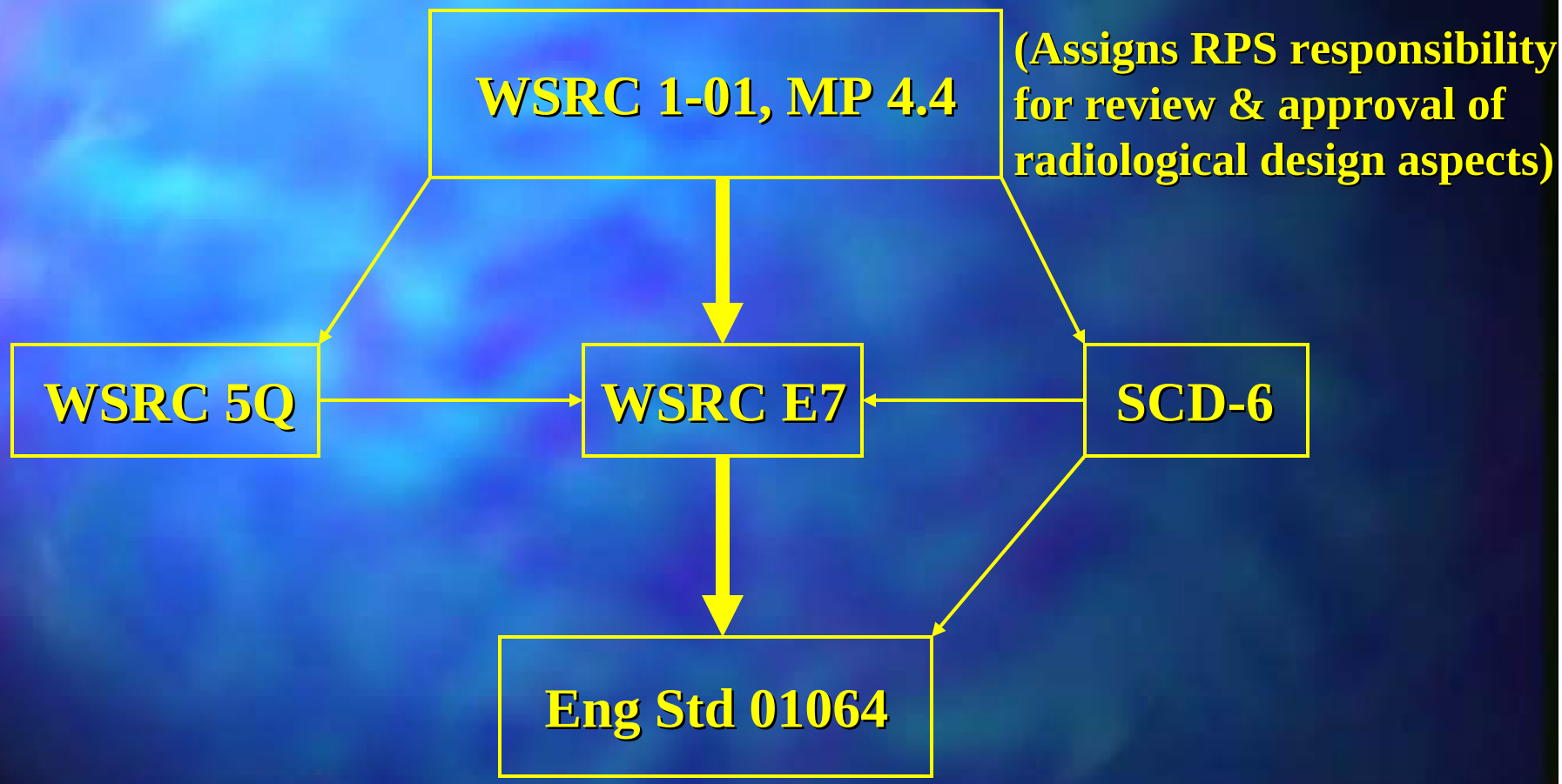
- DOE Orders
  - 420.1A, Facility Safety
  - 435.1, Radioactive Waste Management
  - 5400.5, Radiation Protection of the Public and Environment

- Standards and Handbooks
  - DOE-STD-1098-99, Radiological Control
  - DOE-STD-1128-98, Guide of Good Practices for Occupational Radiological Protection in Plutonium Facilities
  - DOE-STD-1136-2004, Guide of Good Practices for Occupational Radiological Protection in Uranium Facilities
  - DOE-HDBK-1129-99, Tritium Handling and Safe Storage
  - DOE-HDBK-1132-99, Design Considerations

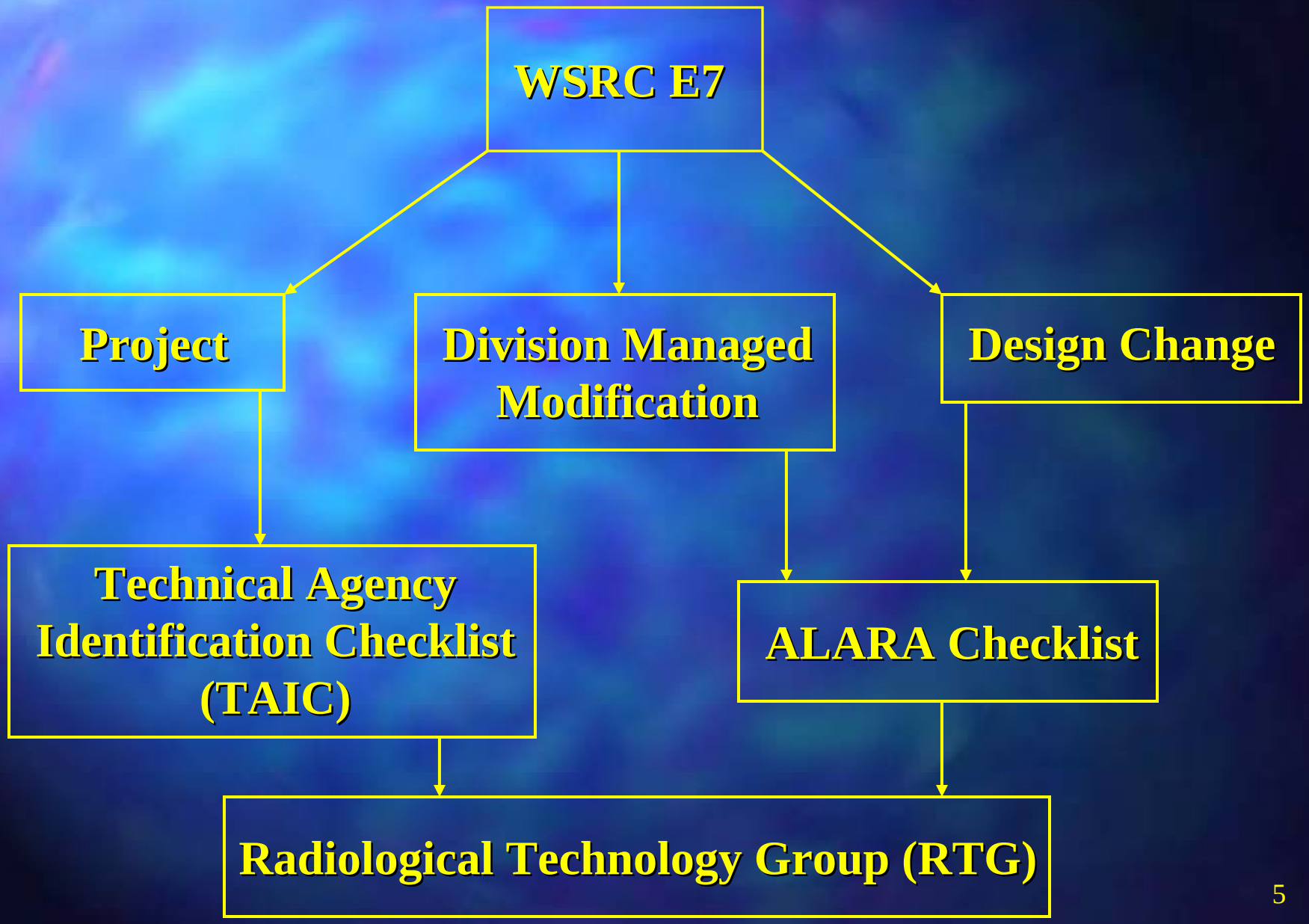
Implementing Documents

- WSRC 1-01, Management Policies,
  MP 4.4, Radiation Protection
- WSRC 5Q, Radiological Control Manual
- WSRC-SCD-6, SRS ALARA Manual
- WSRC E7, Conduct of Engineering and Technical Support,
  Procedure 2.05, Modification Traveler
  and Procedure 2.37, Design Change Form
- WSRC-TM-95-1, SRS Engineering Standards Manual
  Standard 01064, Radiological Design Requirements

Requirement Integration



Design Process Flow



Technical Agency Identification Checklist (TAIC)

- Part A (Required) Technical Agency Concurrence

  ES&H Radiological Technology
  ES&H Industrial Hygiene
  Area Fire Protection
  Area Pressure Protection Coordinator
  Area NEPA Coordinator

- Designate level of involvement

- Designate review or approval requirements

Modification Checklist for Radiological Technology (ALARA Checklist)

- A series of questions about changes to any of the following which will require RTG involvement in the modification

Radioactive Materials
Shielding
Surface Contamination
Airborne Radioactivity
Ventilation
Radiological Monitoring Equipment
Area Dose Rates
Radiation Generating Devices
Confinement

Who Provides Radiological Engineering Support?

Projects

- Washington Safety Management Solutions (WSMS) [SRS Design]
- Subcontractor [entire project design subcontracted and SRS is the Design Authority]
- Oversight by Radiological Technology Group (RTG)

Division Managed Modifications and Design Change Forms

- Radiological Technology Group (RTG)

Engineering Standard 01064
Radiological Design Requirements

5.1 Radiation Exposure Limits
5.2 Facility and Equipment Layout
5.3 Access Control
5.4 External Radiation Exposure
5.5 Internal Radiation Exposure
5.6 Radiological Monitoring Systems
5.7 Personnel Decontamination
5.8 Facility Operations, Maintenance, Decontamination, and Decommissioning
5.9 Change Rooms / Areas
5.10 Breathing Air Systems
5.11 Contamination Control
5.12 Material Radiation Tolerance & Compatibility
5.13 Radioactive Waste
5.14 Spill Prevention and Control
5.15 Radiological Control Space Requirements
5.16 ALARA

ALARA (Optimization)

- Engineered controls are used instead of administrative controls to meet design limits and requirements
- ALARA analyses or Optimization begins only after the design limits have been met
- Analyses use an SRS value of $6600 per person-rem based on a 1 rem/year dose limit
- Detailed analyses are not required for modifications with associated low doses
- SCD-6 provides a table of dollars/person-rem for use with other dose control limits

Radiological Design Summary Report

- Addresses each section of Eng. Std. 01064 using a graded approach
- Describes how the design meets the requirements of the standard
- Recommends any administrative controls that may be needed to meet design limits or requirements
- Provides the bases or limitations on use of the design
- Combines all Radiological Protection features of the facility or modification into a single document

TRU Visual Examination Facility

Radiological Design

- Should be addressed early in design
- Important part of ALARA