

**38.1 ALARA Review of Facilities and Equipment Design and Modification  
(Tennessee Valley Authority)**

ALARA REVIEW  
OF  
FACILITIES AND EQUIPMENT DESIGN AND MODIFICATIONS

|                                   |                  |                              |  |
|-----------------------------------|------------------|------------------------------|--|
| Plant and Unit                    |                  | Design Output Package Number |  |
| Revision Number                   | Reference Number | RIMS Number                  |  |
| Subject or Description of Change: |                  |                              |  |
| Task Engineer:                    | Section:         | Phone:                       |  |

ALARA Impact of Design/Modification Yes \_\_\_ No \_\_\_ (see attached Radiological Design Review Checklist)

Is Subject Design/Modification Acceptable \_\_\_  
Unacceptable \_\_\_

Comments on section(s) \_\_\_\_\_  
See Page(s) \_\_\_\_\_

Attach checklist(s) and comment sheets.

Submitted: \_\_\_\_\_  
Reviewer

Date: \_\_\_\_\_

Approved: \_\_\_\_\_  
Radiological Protection Manager

Date: \_\_\_\_\_

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### RADIOLOGICAL DESIGN REVIEW CHECKLIST

|       |   | Yes | No |
|-------|---|-----|----|
| A1.1  | Will this modification affect existing shielding or add new shielding to the facility?<br>If yes, complete section B1.0 of Appendix B checklist.  |     |    |
| A1.2  | Will this modification require special contamination control techniques or structures?<br>If yes, complete section B2.0 of Appendix B checklist.  |     |    |
| A1.3  | Will this modification affect existing piping or add new piping to the facility?<br>If yes, complete section B3.0 of Appendix B checklist.  |     |    |
| A1.4  | Will this modification affect existing pumps or add new pumps to the facility?<br>If yes, complete section B4.0 of Appendix B checklist.  |     |    |
| A1.5  | Will this modification affect existing valves or add new valves to the facility?<br>If yes, complete section B5.0 of Appendix B checklist.  |     |    |
| A1.6  | Will this modification affect existing tanks, filters, or demineralizers, or add new tanks, filters, or demineralizers to the facility?<br>If yes, complete section B6.0 of Appendix B checklist. |     |    |
| A1.7  | Will this modification affect existing slurry systems or add new slurry systems to the facility?<br>If yes, complete section B7.0 of Appendix B checklist.  |     |    |
| A1.8  | Will this modification affect existing instrumentation or add new instrumentation to the facility?<br>If yes, complete section B8.0 of Appendix B checklist.                                      |     |    |
| A1.9  | Will this modification affect existing ventilation systems or components, or add new ventilation systems or components to the facility?<br>If yes, complete section B9.0 of Appendix B checklist. |     |    |
| A1.10 | Does this modification involve any special concerns or considerations?<br>If yes, complete section B10.0 of Appendix B checklist.   |     |    |
| A1.11 | Are implementation concerns or considerations addressed by this Radiological Design Review?<br>If yes, complete section B11.0 of Appendix B checklist.  |     |    |
| A1.12 | Are reviewer comments associated with this modification?<br>If yes, complete section B12.0 of Appendix B checklist.   |     |    |

## ALARA Review Checklist

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**B1.0 Shielding**

|               |  | Yes | No | N/A |
|---------------|--|-----|----|-----|
| All Questions |  |     |    |     |
| B1.1          | Will the proposed change impact existing shielding?  |     |    |     |
| B1.2          | Will the proposed change require new shielding?  |     |    |     |
| B1.3          | Has shielding analysis been performed? If yes, give calculation number.                            |     |    |     |
| B1.4          | If new shielding is required, is entrance to new area also shielded (e.g. labyrinth)?              |     |    |     |
| B1.5          | Is there sufficient room inside the shield for access to the equipment for operation?              |     |    |     |
| B1.6          | Is there sufficient room inside the shield for access to the equipment for maintenance?            |     |    |     |
| B1.7          | Is there sufficient room inside the shield for access to the equipment for decontamination?        |     |    |     |
| B1.8          | Are shield penetrations located high on the wall and in a corner to avoid line-of-sight streaming? |     |    |     |
| B1.9          | If the answer to B1.8 is No, are the penetrations adequately shielded or sealed?                   |     |    |     |
| B1.10         | Are provisions made to allow temporary shielding during maintenance evolutions?                    |     |    |     |

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33.0 Liquid Systems - Piping

|               |  | Yes | No | N/A |
|---------------|--|-----|----|-----|
| All Questions |  |     |    |     |
| B3.1          | Are crud traps minimized?                              |     |    |     |
| B3.2          | Are socket welds avoided where possible?               |     |    |     |
| B3.3          | Can all sections of piping be adequately drained?      |     |    |     |
| B3.4          | Are vents provided?                                    |     |    |     |
| B3.5          | Can the piping be flushed?                             |     |    |     |
| B3.6          | Is piping run in a shielded pipe chase where possible? |     |    |     |

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B4.0 Liquid Systems - Pumps

|               |  | Yes | No | N/A |
|---------------|--|-----|----|-----|
| All Questions |  |     |    |     |
| B4.1          | Are pumps located apart from tanks they serve?   |     |    |     |
| B4.2          | Are pumps fitted with catch basins?  |     |    |     |
| B4.3          | Are catch basins properly drained?   |     |    |     |
| B4.4          | Are pump casings provided with equipment drains?   |     |    |     |
| B4.5          | Are pump seals covered to prevent contaminated liquid from being slung away from the pump?   |     |    |     |
| B4.6          | Are vents provided?  |     |    |     |
| B4.7          | Are flush connections provided?  |     |    |     |
| B4.8          | Are pumps requiring frequent maintenance equipped with flanged connections for easy removal? |     |    |     |

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**B5.0** Liquid Systems - Valves

|               |  | Yes | No | N/A |
|---------------|--|-----|----|-----|
| All Questions |  |     |    |     |
| B5.1          | Are valves located away from tanks, filters, demineralizers, etc., where possible? |     |    |     |
| B5.2          | Are process valves remotely operated (reach rods are acceptable)?                  |     |    |     |
| B5.3          | Are valves mounted with the stem facing up where possible?                         |     |    |     |
| B5.4          | Are platforms provided for valve maintenance?                                      |     |    |     |
| B5.5          | Is there sufficient space around the valve for maintenance?                        |     |    |     |
| B5.6          | Are globe valves avoided in radioactive service where possible?                    |     |    |     |

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B6.0 Liquid Systems - Tanks, Filters, Demineralizers

Yes No N/A

| All Questions |   | Yes | No | N/A |
|---------------|---|-----|----|-----|
| B6.1          | Are adequately sized manways and handways provided to accommodate vessel decontaminations and maintenance?          |     |    |     |
| B6.2          | Are vents and relief valve tail pipes routed to drains?   |     |    |     |
| B6.3          | Are vessel bottoms shaped to facilitate complete emptying?  |     |    |     |
| B6.4          | Have filters and demineralizers been assessed as radiation sources? (If yes, give calculation number).              |     |    |     |
| B6.5          | Are multiple filters or demineralizers housed in separate cubicles to permit maintenance with the system operating? |     |    |     |
| B6.6          | Are filter cartridge sizes common to other filters already in use at the plant?                                     |     |    |     |
| B6.7          | Are filters sized to minimize change out frequency?   |     |    |     |
| B6.8          | Will special handling of filter cartridges be required to minimize dose?  |     |    |     |



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**B7.0** Slurry Systems

Yes No N/A

|   |  | Yes | No | N/A |
|---|--|-----|----|-----|
| In addition to considerations for liquid systems, systems containing slurries shall also meet the requirements below. |  |     |    |     |
| <b>All Questions</b>  |  |     |    |     |
| B7.1  | Are sharp bends in pipes avoided? (Five diameter or greater bends are acceptable). |     |    |     |
| B7.2  | Are check valves or strainers provided at interfaces with liquid systems?          |     |    |     |
| B7.3  | Are backflush connections provided?  |     |    |     |
| B7.4  | Are ball valves used whenever possible?  |     |    |     |

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B9.0 Ventilation

|               |   | Yes | No | N/A |
|---------------|---|-----|----|-----|
| All Questions |   |     |    |     |
| B9.1          | Are there provisions for ventilating the area?  |     |    |     |
| B9.2          | Is the flow of air from areas of lesser contamination to areas of greater contamination?                  |     |    |     |
| B9.3          | Are HEPA filters required?  |     |    |     |
| B9.4          | Are charcoal adsorbers required?  |     |    |     |
| B9.5          | Are filters banks readily accessible for maintenance?   |     |    |     |
| B9.6          | Are filter banks separated or shielded from each other to permit working on one with the other operating? |     |    |     |
| B9.7          | Is the ventilation system designed to minimize activity buildup?  |     |    |     |

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310.0 Special

|               |   | Yes | No | N/A |
|---------------|---|-----|----|-----|
| All Questions |   |     |    |     |
| B10.1         | Are components requiring removal for maintenance designed for easy removal?                   |     |    |     |
| B10.2         | Does the new design interfere with access to existing equipment?                              |     |    |     |
| B10.3         | Will special tools be required?   |     |    |     |
| B10.4         | Will special skills be required for operation or installation?                                |     |    |     |
| B10.5         | Will special training be required to operate the new (revised) system?                        |     |    |     |
| B10.6         | Are components selected and specified for long service life and low maintenance requirements? |     |    |     |

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**311.0 Implementation Requirements(Req)/Considerations(Con)**

Req Con N/A

| All Questions |  |  |  |  |
|---------------|--|--|--|--|
| B11.1         | Radiation Work Permit                          |  |  |  |
| B11.2         | Temporary Shielding                            |  |  |  |
| B11.3         | Health Physics Instructions or Precautions     |  |  |  |
| B11.4         | Additional or Temporary Ventilation            |  |  |  |
| B11.5         | Temporary Containments                         |  |  |  |
| B11.6         | Decontamination of System/Components/Work Area |  |  |  |
| B11.7         | System Flushing                                |  |  |  |
| B11.8         | Tool List                                      |  |  |  |
| B11.9         | Special Installation                           |  |  |  |
| B11.10        | QA/QC Inspection/Hold Points                   |  |  |  |
| B11.11        | Support Work (Scaffolding, etc.)               |  |  |  |
| B11.12        | Special Training? (Mock-up, Classroom)         |  |  |  |
| B11.13        | Plant Mode                                     |  |  |  |
| B11.14        | Safety   |  |  |  |

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B12.0 Reviewers' Comments