LUCIP FOR
L-Area Reactor Seepage Basin, 904-064G

Appendix A of Post-Construction Report/Final Remediation Report for the L-Area Reactor Seepage Basin

WSRC-RP-2003-4118, Revision.1, February 2004

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Appendix A

Land Use Control Implementation Plan (LUCIP)

For

L-Area Reactor Seepage Basin

This L-Area Reactor Seepage Basin (LRSB) Land Use Control Implementation Plan (LUCIP) will be appended to the Savannah River Site (SRS) Land Use Control Assurance Plan (LUCAP). SRS is responsible for implementing the land use controls (LUCs) (e.g., inspections and maintenance) outlined in this unit-specific LUCIP.

The selected remedy leaves hazardous substances in place that pose a potential future risk and will require land use restrictions for an indefinite period of time. As negotiated with the United States Environmental Protection Agency (USEPA), and in accordance with USEPA Region IV policy, SRS has developed a LUCAP to ensure that land use restrictions are maintained and periodically verified. This LUCIP provides detailed and specific measures required for the LUCs selected as part of this remedy. The United States Department of Energy (USDOE) is responsible for implementing, maintaining, monitoring, reporting upon, and enforcing the LUCs herein. Upon final approval, the LUCIP will be appended to the LUCAP. It is considered incorporated by reference into the Post-Construction Report/Final Remediation Report (PCR/FRR), establishing land use controls implementation and maintenance requirements enforceable under the Comprehensive Environmental Response, Compensation, and Recovery Act (CERCLA). The approved LUCIP will establish implementation, monitoring, maintenance, reporting, and enforcement requirements for the unit. The plan will remain in effect until modified as needed to be protective of human health and the environment. LUCIP modification will only occur through another CERCLA document.

SRS will maintain institutional controls in accordance with the LUCAP (WSRC-2003). The LUCAP states that the land use for the LRSB operable unit (OU) will be maintained

for industrial land use only. Institutional controls will be in place as long as the risk is greater than 1 x 10^{-6} and the threat to the environment extends beyond 2006.

The additional institution control, fencing, will be required through the year 2006, at which point the risk from potential threat source material (PTSM) (1 x 10^{-3}) will no longer be present due to radioactive decay.

1.0 REMEDY SELECTION

1.1 LRSB Operable Unit

The LRSB OU is located in the central portion of SRS, southeast of the L-Reactor facility. The basin was in an open area with sparse vegetative cover. It was posted as a Soil Contamination Area (SCA) and is currently posted as an underground radioactive material area. The ground slopes to the south toward L-Lake, which is approximately 1,220 ft away. The LRSB is located in an industrial zone identified in the proposed SRS future land use map. The basin was adjacent to a nuclear facility and has been selected to remain an industrial use area. According to the *Savannah River Site Future Use Project Report* (USDOE 1996), residential use of SRS land near nuclear facilities should be prohibited.

1.2 Nature and Extent of Contamination in LRSB

The LRSB was an L-shaped unlined (earthen) basin with dimensions of 200 ft in length for each leg of the L-shape, 36 ft in width, and 7 ft in depth. The basin has been filled, covered, vegetated and is currently closed. The basin area was 0.29 acres. The area inside the LRSB OU fence is 1.34 acres.

In 1958, the process sewer line began conveying low-level radioactive purge water from the L-Area Reactor disassembly basin to the seepage basin. The LRSB received purge water from 1958 to 1968 and from 1985 to 1988. From 1985 to 1988, mixed-bed

deionizers and sand filters intercepted the purge water before it was discharged to the LRSB. In 1988, L-Reactor was placed on warm standby; in 1993, it was shut down. It has not been restarted.

The process sewer line is a 3-inch diameter high density polyethylene (HDPE) pipe that is approximately 450 ft long and extended from the disassembly basin within the L-Reactor facility to the discharge point at the north end of the basin. In addition to the process sewer line, a concrete pad (18 x 18 ft) with metal handles sat adjacent to the basin. This pad was most likely used as an off-loading area. Liquid waste was transferred from tanker trucks at the off-loading pad into the basin via a flexible pipe. The pipe extends from the pad to the north end of the basin.

The LRSB contains PTSM composed of cobalt-60 and is limited to 1 ft below the bottom of the basin. No PTSM is associated with the process sewer lines or the concrete pad.

Strontium-90 was predicted to leach to the groundwater from the seepage basins and buffer area in less than 1,000 years at concentrations above the MCL.

A portion of the L-Area Oil and Chemical Basin (LAOCB) 6-inch pipeline (steel) used to extend between the west end of the LAOCB cap and the east end of the LRSB. Although many radionuclides were discharged to LRSB, most of the radioactivity was attributable to tritium. Other radionuclides include strontium-90, cesium-137, cobalt-60, and promethium-147.

1.3 Remedial Action Overview

The remedy selected for the LRSB OU is a low-permeability soil cover system with institutional controls. According to the *Savannah River Site Future Use Project Report Stakeholder Recommendations for SRS Land and Facilities* (USDOE 1996) residential use of SRS land should be prohibited. This remedy entails the following actions:

- The 6-inch carbon steel pipe was grouted in place, excavated and disposed of in the basin. The 3-inch HDPE pipe was grouted and left in place. The portion of the 1.5-inch abandoned domestic water line inside the LRSB fence line was excavated and dispose of in the basin, and the end of the pipe was capped. Any contaminated soil (i.e., exceeding 20 pCi/g of gross alpha or 50 pCi/g non-volatile beta) surrounding the pipelines was disposed of in the basin.

- The concrete pad, associated piping, and handrails was removed and disposed of in the basin. A minimum 1 ft of soil from beneath the previous concrete pad location was excavated and disposed of in the basin. Any contaminated soil (i.e., exceeding 20 pCi/g gross alpha or 50 pCi/g nonvolatile beta) surrounding the concrete pad was disposed in the basin.

- A low-permeability soil cover system with a perimeter fence was installed to reduce water infiltration, and to protect human health and the environment.

- Institutional controls were implemented to ensure continued protection of human health or the environment.

The post-remedial action (RA) conceptual site model shows the broken pathways and the remaining residual risk to the future industrial worker (Attachment C).

2.0 LAND USE CONTROLS

The following LUC objectives have been developed for the LRSB OU to ensure the protectiveness of the RA:

- Prevent contact, removal, or excavation of buried waste or pipelines in the OU areas designated in the LUCIP and preclude future residential or agricultural use of the area.

- Maintain the use of the site for industrial activities only.

Current access controls and a deed notification needed to maintain the future LUCs are described in the following sections of this LUCIP.

2.1 Access Controls

2.1.1 On-Site Workers

In accordance with WSRC 1D, *Site Infrastructure and Services Manual*, Procedure 3.02, "Site Real Property Configuration Control," use of all lands and waters on SRS shall be coordinated via the Site Use Program. No use of land (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Site Use Permit. In accordance with Procedure 3.02, all work at SRS that adds to or modifies features or facilities portrayed on SRS development maps (i.e., plot plans of facilities/utilities at SRS) will be authorized by a Site Clearance Permit before excavation activities are conducted. All Site Clearance Requests will be reviewed to verify that either an approved Site Use Permit has been obtained or that an existing Site Use Permit has sanctioned the request.

The Site Development, Planning, and Mapping Department at SRS is responsible for updating, maintaining, and reviewing site maps, including Federal Facility Agreement (FFA) OU identifications. If a Site Clearance Request is made that may impact an FFA OU, the Site Clearance Request form is sent to the FFA OU reviewer, who is in the Soil and Groundwater Closure Projects (SGCP), for either approval or disapproval. The roles and responsibilities of each individual are detailed in WSRC 1D, Procedure 3.02. Verification of USDOE approval for intended land use must be obtained before issuance of a Site Clearance Permit. The Site Use and Site Clearance processes are applicable to all activities and personnel on site (including subcontractors).

The processes are controlled within the SRS Quality Assurance (QA) Program. The SRS QA Program is the governing QA Program for all SRS activities, including those in the

SGCP. The activities that are performed in the SGCP must comply with SRS QA Program procedures as well as SGCP-specific procedures.

SRS identifies all buildings and facilities on maps used in the Site Use/Site Clearance Program. This waste unit is identified on these maps as a CERCLA facility.

Any work proposed in these areas will be strictly controlled, and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. No major change in land use or excavation at the LRSB OU shall be undertaken without USEPA and South Carolina Department of Health and Environmental Control (SCDHEC) approval. To prevent unknowing entry and to ensure that unrestricted use of the waste unit does not occur while it is under ownership of the government, identification signs will be posted at the unit.

Custodial responsibilities for maintenance and inspection of the LRSB OU will be maintained by the Post-Closure Maintenance group within the SGCP.

The warning signs for the soil cover will be legible from a distance of at least 25 ft. The soil cover signs will read as shown in the photograph below:

The warning signs for the underground grouted pipeline will be legible from a distance of at least 25 ft. The underground pipeline signs will read as shown in the photograph below:

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2.1.2 Trespassers

While under the ownership of USDOE, access control of the entire SRS will continue to be maintained in accordance with the 1992 Resource Conservation Recovery Act (RCRA) Part B Permit Renewal Application, Volume I, Section F.1. This section describes the 24-hour surveillance system (R.61-79.264.14(b)(1)), artificial or natural barriers (R.61-79.264.14(b)(2)(i)), control entry systems (R.61-79.264.14(b)(2)(ii)), and warning signs (R.61-79.264.14(c)) in place at the SRS boundary to comply with the security requirements for a RCRA-permitted facility.

2.2 Deed Notification

In the long-term, if the property is ever transferred to non-federal ownership, the U.S. Government will take those actions necessary pursuant to Section 120(b) of CERCLA. Those actions will include a deed notification disclosing former waste management and disposal activities as well as RAs taken on the site. The contract for sale and the deed will contain the notification required by CERCLA Section 120(h). The deed notification shall, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of waste. These requirements are also consistent with the intent of the RCRA deed notification requirements at final closure of a RCRA facility if contamination will remain at the unit.

The deed shall also include deed restrictions that preclude residential use of the property. However, the need for these deed restrictions may be re-evaluated at the time of transfer in the event that exposure assumptions differ and/or the residual contamination no longer poses an unacceptable risk under residential use. Any re-evaluation of the need for the deed restrictions will be done through an amended ROD with USEPA and SCDHEC review and approval.

Pursuant to the approved ROD Amendment (WSRC 2002a) and RAIP (WSRC 2002b), if the site is ever transferred to non-federal ownership, a survey plat of the OU will be prepared, certified by a professional land surveyor, and recorded with the appropriate county recording agency.

Note: The "AREA SUBJECT TO LAND USE CONTROLS" are shown on SK-C-53110, Rev. 1.

2.3 Field Walk downs and Maintenance for Institutional Controls

After the remediation of the LRSB, only maintenance activities will be required per this RA. No operations activities will be required.

The results of any events and or actions that indicate some potential compromise of institutional controls will be documented in the FFA Annual Progress Report. All other routine maintenance activities will be documented and maintained in files subject to USEPA and SCDHEC review and audit. A copy of the completed inspection form is maintained in the SGCP Administrative Record Files.

The following steps will be implemented to maintain the low-permeability soil cover:

- Perform periodic (at a minimum annual) visual inspections for evidence of damage to the soil cover due to erosion or intrusion by burrowing animals. The inspection will also address upkeep of the vegetative cover and access control barriers (e.g., the fences and warning signs). (Attachment B provides a unit-specific field inspection checklist for the LRSB OU).

- Perform necessary repairs (when required as identified during inspection) to maintain the functional integrity of the soil cover and the warning signs.

- Enforce SRS institutional controls by restricting access to the closed waste unit. Institutional controls will be maintained as long as the waste remains a threat to human health or the environment.

- As required by the National Oil and Hazardous Substance Contingency Plan (NCP), a five-year review of the Record of Decision (ROD) for the LRSB unit will be performed as long as the waste remains a threat to human health or the environment.

The waste site inspectors are to be trained and certified in Hazardous Waste Operations (HAZWOPER), RCRA well inspectors (SGCP-specific training), SGCP RCRA waste unit inspectors, radiological workers, etc., as applicable for the specific inspection. They will also be trained based on the individual requirements of the regulatory approved closure documents for each waste unit. In addition, the inspectors are to attend yearly refresher courses. Over the years no single person will conduct all of the inspections or grass cutting operations.

This unit-specific LUCIP, including the checklist, will be appended to the SRS LUCAP.

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Appendix A

Attachment A

SK-C-53110, Rev. 1, L-Area Reactor Seepage Basin (904-64G) Closure (U)

Land Use Control Implementation Plan As-Built

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PCR# WSRC-RP-2003-4118

L - AREA REACTOR SEEPAGE BASIN (904-64G) CLOSURE (U) AS-BUILT LAND USE CONTROL IMPLEMENTATION PLAN

90

DRAWING NO. SK-C-53110 , REV. 1

333444444444455555555556666
7890123456789012345678901 23

PSC=
PLOT DATE

DRAWN BY (ORIG):
TIME

LAST CADD REV. BY:
DATE:

Scale shown on this drawing is only applicable when plotted at 30"x42" (actual drawing size)

Appendix A

Attachment B

SGCP Inspection Checklist For L-Area Reactor Seepage Basin

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3	232.14
9	232.32
5	232.83
	233.01
7	233.82

PCR# WSRC-RP-2003-4118

L - AREA REACTOR SEEPAGE BASIN
(904-64G) CLOSURE (U)
AS-BUILT
SAMPLE LOCATIONS
DRAWING NO. SK-C-53111 , REV. 1

60 90

333344444444445555555556666
678901234567890123456789023

PSC=
PLOT DATE

DRAWN BY (ORIG): T.HICKMAN
TIME

LAST CADD REV. BY:
DATE:

Scale shown on this drawing is only applicable when plotted at 30"x42" (actual drawing size)

N 45300

FENCE

N 45200

LEGEND

- AREA SUBJECT TO LAND USE CONTROLS
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- ABANDONED PIPELINE
- BASIN PERIMETER FENCE
- ACCESS WARNING SIGN
- ABANDONED PIPELINE WARNING SIGN
- BOUNDARY MARKER

PCR # WSRC-RP-2003-4118

L - AREA REACTOR SEEPAGE BASIN (904-64G) CLOSURE (U)

AS-BUILT GRADING PLAN

DRAWING NO. SK-C-53112 , REV. 1

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PCR # WSRC-RP-2003-4118

L - AREA REACTOR SEEPAGE BASIN (904-64G) CLOSURE (U)

SECTIONS

DRAWING NO. SK-C-53113 , REV. 1

33334444444444555555555556666 67890123456789012345678901 23	PSC= PLOT DATE	DRAWN BY (ORIG): T.HICKMAN TIME	LAST CADD REV. BY: DATE:	Scale shown on this drawing is only applicable when plotted at 30"x42" (actual drawing size)

FIELD INSPECTION CHECKLIST

L-AREA REACTOR SEEPAGE BASIN

☐ **SCHEDULED** ☐ **UNSCHEDULED**

A= Satisfactory X= Unsatisfactory (Explanation Required)	A or X	Observations/Corrective Action Taken
1. Verify that the roads are accessible.		
2. Verify that the waste unit signs are in acceptable condition, have the correct information, and are legible from a distance of 25 ft.		
3. Verify that there are no excavation, digging, or construction activities on the soil cover or the underground process piping (identified by signs).		
4. Check the integrity of vegetative covers and drainage ditches for presence of excessive erosion, sediment buildup, and any debris restricting flow.		
5. Verify that no woody vegetation is growing on the soil cover. Remove or identify, as needed.		
6. Visually check vegetative cover for grass density, with no bare spots more that 3 ft by 3 ft in area. The height of the vegetative cover should not impair the visual inspection of the soil cover. This will be determined by the inspector.		
7. Check the soil cover for signs of erosion or depressions (subsidence).		
8. Check for signs of burrowing animals (holes).		
9. Verify that the fence is in good condition and that the gate is locked.		

Inspected by:

_____ / _____ Date:_____

(Print Name) (Signature)

Post-Closure Manager:

_____ / _____ Date:_____

(Print Name) (Signature)

CAUTION:

The Inspector shall notify the Post Closure Manager (PCM) and the Environmental Compliance Authority (ECA) IMMEDIATELY if there has been a breach or compromise of this waste unit. Refer to Post Closure Procedures.

NOTE: Monitoring wells associated with this waste unit are maintained in accordance with SGCP Monitoring Well Procedures. See attached map of the LRSB OU.

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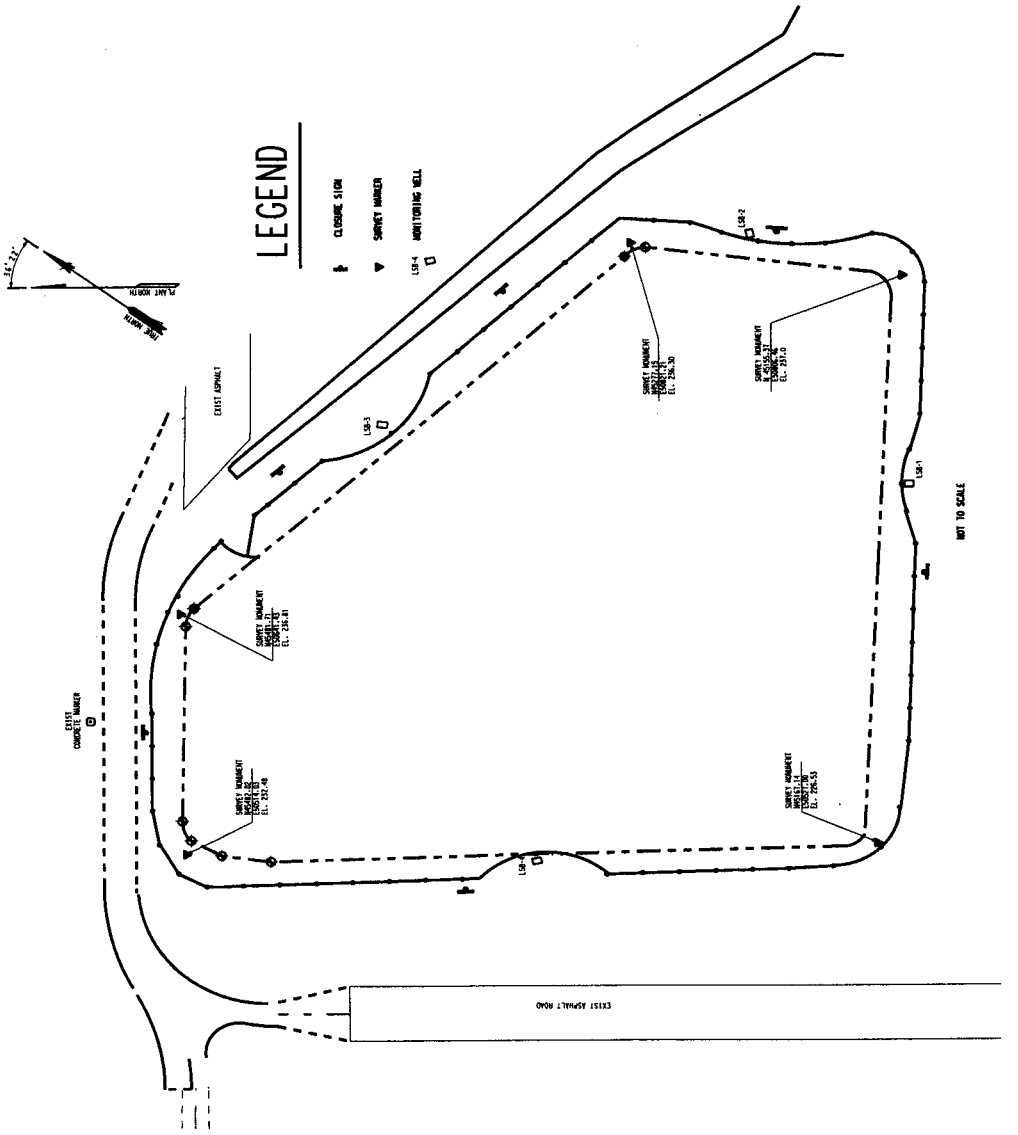

Map L-Area Reactor Seepage Basin (904 – 64G)

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Appendix A

Attachment C

Post-Remedial Action Conceptual Site Model For L-Area Reactor Seepage Basin With Plug-In Remedy Applied

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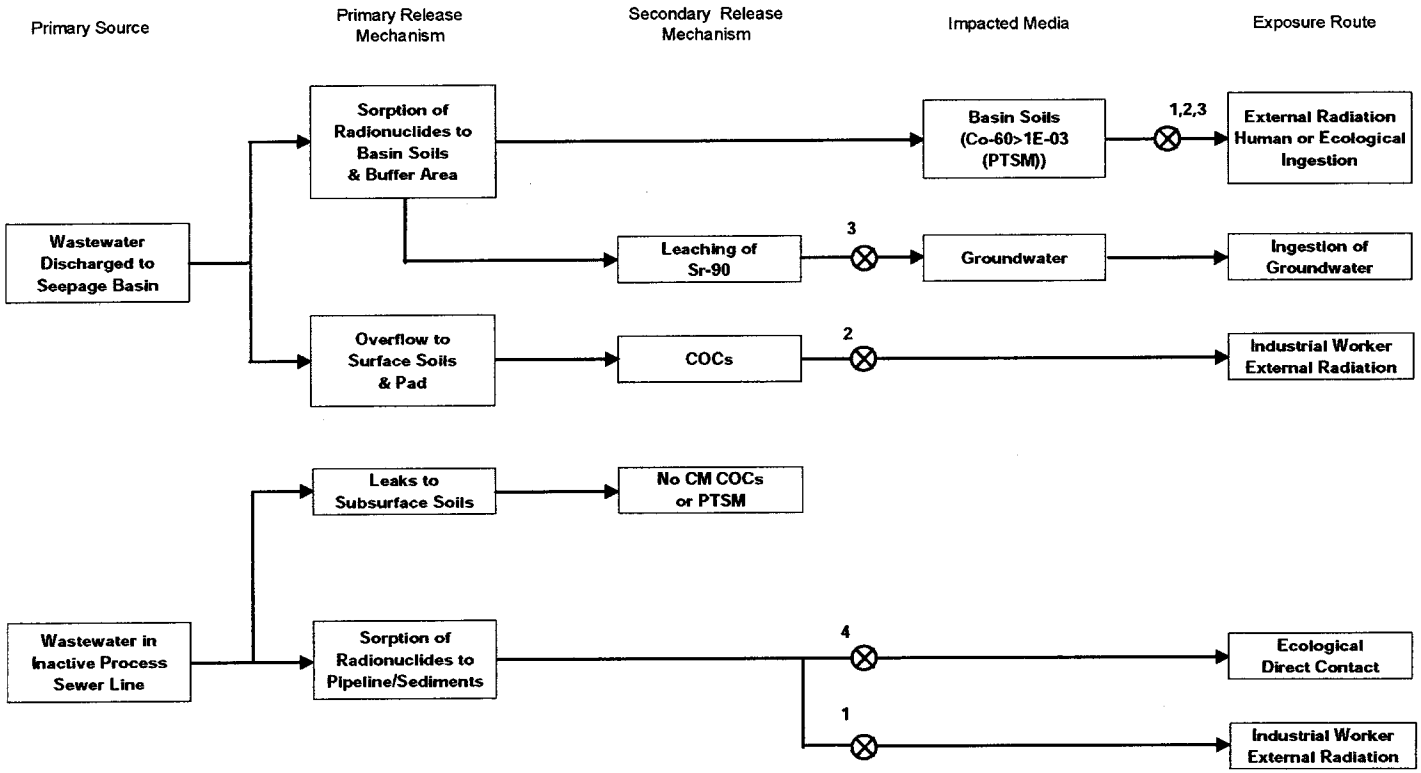

LEGEND:

→ = Pathways -- past, current and hypothetical future
1 = Institutional Controls
2 = Consolidation of Soils into Basin
3 = Low-permeability Soil Cover
4 = Grouting of Pipelines

⊗ Plug-in Remedy breaks this Pathway

PTSM = Principal Threat Source Material

COC = Constituent of Concern

CM COC = Contaminant Migration Constituent of Concern

Post-Remedial Action Conceptual Site Model For L-Area Reactor Seepage Basin With Plug-In Rod

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