ADDENDUM 6A

RESTORATION ACTION PLAN
WITH FINANCIAL ASSURANCE ESTIMATE

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List of Tables (Attachment 1)

PREAMBLE

This preamble provides NRC staff with a brief discussion of legal and regulatory context for the contents of the attached Restoration Action Plan (RAP) for AUC LLC's (AUC) proposed Reno Creek *in-situ* leach uranium recovery (ISR) project (Proposed Project) near the town of Wright in Campbell County, Wyoming. AUC is submitting this RAP as a stand-alone document to assist NRC staff in reviewing AUC's license application to assess the Proposed Project's financial assurance calculation methodology as it relates to relevant construction, operation, groundwater restoration, and decontamination and decommissioning (D&D) requirements. The RAP also provides preliminary cost estimates calculated using this methodology to estimate costs associated with groundwater restoration and site D&D at the proposed Reno Creek ISR Project in one document rather than having NRC Staff search the entirety of the license application for all relevant D&D and financial assurance information. In addition, preparation of the attached RAP is in accordance with the NRC's requirements for ISR licensing as defined in 10 CFR Part 40, Appendix A, Criterion 9 and all regulations and guidance relevant to ISR site D&D. Given that, as discussed below, previous site-specific RAPs have been submitted as stand-alone documents, AUC has determined that submission of a stand-alone RAP is appropriate.

RAPs find their origin in the Commission's interpretation of 10 CFR Part 40, Appendix A, Criterion 9 in the Hydro Resources, Inc. (HRI RAP, 2001) administrative litigation regarding HRI's proposed ISR project at Church Rock and Crownpoint, New Mexico (hereinafter the Crownpoint Uranium Project or "CUP"). Beginning in 1997, HRI and several intervenors entered into administrative litigation before NRC's Atomic Safety and Licensing Board (Licensing Board) to determine whether several aspects of HRI's CUP license application and NRC Staff review of that application satisfied the Atomic Energy Act of 1954 as amended (AEA) and NRC's implementing regulations pursuant thereto. During this litigation, in 1998, NRC staff issued HRI License SUA-1508 to construct and operate the proposed CUP. After concluding initial litigation with respect to the Licensing Board's determination that the proposed CUP adequately addressed groundwater restoration and financial assurance the Commission in 2000 considered an appeal of that decision. The Commission determined that a license applicant for a proposed ISR project must have an NRC-approved RAP, including a detailed financial assurance calculation methodology and preliminary cost estimates, prior to being issued a license to operate any proposed ISR project. Importantly, while the Commission determined that a license applicant must have the aforementioned RAP in place prior to being issued a license, the Commission determined that HRI's license should not be vacated, but rather held in abeyance pending submission and approval of the aforementioned RAPs. The Commission also determined that the actual financial assurance mechanism (e.g., surety bond, letter of credit, cash deposit, etc.) need not be in place until the licensee is prepared to commence licensed operations. Accordingly, when submitting a license application for a new ISR project, a license applicant is required to prepare and submit a detailed financial assurance calculation methodology and preliminary cost estimates based solely on the information permissibly obtained by the license applicant under NRC regulations pre-license issuance; however, a license applicant is not required to have a final financial assurance cost estimate and a financial assurance mechanism in place until right before it is ready to commence licensed operations and after issuance of an NRC license.

The HRI litigation also provides ISR license applicants with additional guidance on methodology for preparing RAPs and for calculating preliminary financial assurance cost estimates for such RAPs. For example, the Licensing Board, NRC, and United States Court of Appeals for the Tenth Circuit all have agreed that 10 CFR Part 40, Appendix A, Criterion 9 permits ISR license applicants to account for and rely upon the use of existing site equipment such as the central processing plant (CPP), existing wellfields, wellfield equipment, and other already-available site equipment when calculating financial assurance cost estimates for groundwater restoration. This interpretation logically implements the provisions of Criterion 9 as independent contractors likely will rely on the availability of existing wellfields, the CPP, and other site facilities to initiate and/or continue to complete groundwater restoration and site D&D at an ISR site. In addition, existing 11e.(2) byproduct material storage areas and site equipment such as front-end loaders will be required to complete site D&D, including surface reclamation tasks such as soil cleanup in accordance with 10 CFR Part 40, Appendix A, Criterion 6(6).

The HRI decision also permits licensees to utilize qualified site employees for the performance of multiple, unrelated site tasks during the course of groundwater restoration and site D&D in developing financial assurance cost estimates. ISR sites are highly automated and standard industry practices dictate that a single site employee can perform multiple tasks based on the training they receive and expertise they possess.

In addition to the aforementioned requirements, NRC's Criteria at 10 CFR Part 40, Appendix A, Criterion 9 also requires that a licensee submit updates to its financial assurance cost estimates on an annual basis and that such estimates must account for a variety of economic and site-specific factors such as inflation (Consumer Price Index), changes in costs of materials and for personnel, changes in costs of 11e.(2) byproduct material or other waste disposal, changes in costs of required site processes such as well plugging, and changes in site-specific factors such as the level of effort and duration required for groundwater restoration (e.g., pore volumes). This requirement is intended to ensure that all financial assurance mechanisms posted by a licensee remain current and sufficient to perform required groundwater restoration and site D&D as required and in a timely fashion. Based on this requirement, ISR license applicants also only are required to present preliminary financial assurance cost estimates in license applications that account for the first year of proposed activities or the first stage of licensed operations, including construction of the CPP and the initial wellfield(s). Since an ISR licensee cannot proceed beyond certain initial site activities in the first year and given that a financial assurance mechanism, which will be updated annually per Criterion 9, need not be in place until the commencement of operations, requiring up-to-date cost estimates for licensed operations is unnecessary. Accordingly, ISR licensees submitting RAPs with NRC-approved financial assurance calculation methodologies will continue to post adequate financial assurance cost estimates in accordance with NRC regulations and guidance.

To comply with the NRC's directives noted above from the HRI litigation, HRI proposed four RAPs, one for each of its proposed CUP ISR sites and each of which was approved by NRC staff subject to minor adjustments by the Licensing Board. Each of these RAPs, with the Licensing Board's adjustments, was approved by the Commission and, effectively, the United States Court of Appeals for the Tenth Circuit over the full course of that litigation.

Using these RAPs as guidance and considering that NRC staff does not currently have guidance for the composition of stand-alone RAPs, AUC is proposing a RAP for its Proposed Project that closely follows the HRI (and subsequently Strata Energy, Inc.) RAP format. AUC, however, has used updated assumptions reflecting current standard industry practices and conditions specific to the Proposed Project, and has included the work required and associated costs to reclaim all facilities associated with the CPP and the first five wellfields of the first Production Unit, rather than just the first year's estimated construction. In the attached RAP, AUC is including a comprehensive site D&D plan, including groundwater restoration for the first five wellfields and D&D of the CPP and all other site activities required to be completed to return the Proposed Project site to unrestricted use. These activities include D&D of site equipment, demolition of the CPP, reclamation of the initial wellfields, and off-site disposal of all wastes, including 11e.(2) byproduct material. The RAP also includes preliminary financial assurance cost estimates for all site D&D activities.

As can be seen from the RAP, AUC has accounted for all NRC interpretations offered in the HRI case to reflect the most current NRC practices for financial assurance. AUC has also taken into account the revisions to the HRI model as manifested in Strata's recent license application for the Ross project, which document was accepted for review by NRC on June 30, 2011. AUC believes that this RAP provides NRC staff with a user-friendly, stand-alone guide to AUC's approach to site D&D and financial assurance.

1 RESTORATION ACTION PLAN

1.1 Introduction

The following summarizes the Restoration Action Plan (RAP) for the CPP, first five wellfields (Production Unit 1) and all related facilities anticipated to be constructed during the first year of licensed activities of the Reno Creek ISR Project near Wright, Wyoming. The estimate puts the costs of D&D to be performed by an independent contractor at $ 7,004,586 over a period of up to 3 years, during which the CPP, the initial five wellfields, and associated infrastructure would be reclaimed to conditions approved by NRC that will allow the site to be released for unrestricted use. The RAP encompasses the full cycle of activities necessary for:

- Groundwater restoration and well plugging;
- Facility decommissioning;
- Radiological survey and environmental monitoring;
- Project management and miscellaneous costs; and
- Labor and equipment overhead and contractor profit.

AUC's submittal presented herein employs assumptions that are based on best professional judgment given the data currently available. Annual reviews will provide the iterative format by which NRC can update the financial assurance cost estimate based on work completed at the site and any newly available information.

1.1.1 Financial Assurance Mechanism

AUC will provide an appropriate financial assurance mechanism for the approved financial estimate in accordance with the conditions as set forth in 10 CFR Part 40 Appendix A, Criterion 9, prior to commencement of uranium recovery operations. The estimated surety amount will be calculated using the method presented in Section 1.2 and included as tables in Attachment 1 of this document.

1.1.2 Consolidation of State, EPA and NRC Financial Assurance Instruments

In addition to being crafted to comply with NRC criteria, AUC's proposed financial assurance estimate is designed to address the U.S. Environmental Protection Agency (EPA) Underground Injection Control (UIC) criteria and the Wyoming Environmental Quality Act (WEQA) requirements for a reclamation performance bond. These multi-compliant sureties will require multi-agency concurrence as to amounts and surety forms and will be designed to be consistent with 10 CFR Part 40, Appendix A, Criterion 9

(Financial Criteria). Criterion 9 allows for consolidation of State and Federal financial or surety arrangements established to meet groundwater restoration, reclamation, and decommissioning costs provided that "the portion of the surety which covers the decommissioning and reclamation of the mill, mill tailings site and associated areas is clearly identified and committed for use in accomplishing these activities." Absent a mill or tailings, essentially all of the process facility, wellfield, and ancillary components of the operations also will be subject to the decommissioning requirements of the Wyoming Department of Environmental Quality (WDEQ), EPA, and NRC.

1.2 Details for Groundwater Restoration and Reclamation Activities

1.2.1 First Year of Construction/Operation for Reno Creek Project

Attachment 1 contains details concerning methodologies and calculations, assumptions, and criteria to determine the work necessary for the full cycle of groundwater restoration, well plugging and abandonment, surface decommissioning and decontamination, reclamation, closure and ultimate license termination

This information is designed to be descriptive enough for the NRC staff to determine the acceptability of AUC's proposed cost estimates and is based on the estimated costs for an independent contractor to perform the decommissioning and reclamation work in accordance with 10 CFR Part 40, Appendix A, Criterion 9 and the Wyoming Environmental Quality Act (WEQA) and its accompanying rules and regulations and guidelines. AUC has developed its cost estimates to address all items in Appendix C of NRC's "Standard Review Plan for In Situ Leach Uranium Extraction License Applications" (NUREG-1569, dated June 2003).

The following tabulation summarizes the preliminary costs necessary to hire an independent contractor to assume all decommissioning and reclamation activities required after full development of the CPP, first five wellfields and associated facilities. Descriptions of the work are provided below, and detailed preliminary cost estimates for each major item of work are provided in Attachment 1.

Restoration Action Plan Cost Summary

Item	Cost
Groundwater Restoration	$ 2,500,834
Facility Area Decommissioning and Reclamation	$ 1,538,088
Wellfield Equipment Removal	$ 1,803,985
Miscellaneous Reclamation Activities	$ 143,919
Subtotal	$ 5,986,826
Project Management (2%)	$119,737
Contingency (15%)	$ 898,024
Total	**$ 7,004,586**

1.2.2 Groundwater Restoration

AUC's proposed groundwater restoration program is based on the successes and lessons learned from previous and current ISR operations. The basic methods are described in NUREG-1910, *Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities* and have proven effective at restoring groundwater in both pilot and commercial in situ uranium recovery operations, including an earlier demonstration operation at the Reno Creek site. Rocky Mountain Energy's Restoration Report for Pattern 2 is included as Addendum 1-A of the proposed project's Technical Report (TR).

AUCs proposed groundwater restoration program will be conducted in two phases:

1) Active groundwater restoration; and
2) Stability monitoring.

The active groundwater restoration phase will include the following:

- Groundwater Transfer;
- Groundwater Sweep (targeted or selective); and
- Reverse Osmosis Treatment with Permeate Injection and Reductant Addition.

The application of each method and sequencing will be determined by AUC based on operating experience, restoration treatment system capacity, and wastewater disposal capacity. Not all methods of groundwater restoration will be used if deemed unnecessary by AUC. AUC will combine these methods selectively to improve groundwater restoration efficiency and decrease groundwater consumption and the time needed to restore a given Production Unit. As an example, since each Production Unit will be made up of several wellfields, the groundwater transfer method could be applied to one wellfield while the reverse osmosis (RO) method is applied to a second wellfield within that Production Unit, and targeted groundwater sweep could be applied throughout the Production Unit.

AUC will install the infrastructure necessary to accomplish groundwater restoration concurrently with the equipment needed for uranium recovery operations. This means AUC will have its restoration RO units installed and operational prior to the cessation of uranium recovery from the first production unit in operation. To ensure that a production unit will be able to begin groundwater restoration, additional restoration pipelines will be installed along with production pipelines as necessary. The pumps used for production will remain in the wells for use in restoration.

AUC commits to begin restoration following cessation of ISR operations in production units, along with close monitoring and groundwater transfer to improve restoration efficiency. AUC also expects to reduce the consumptive use of groundwater with these measures and to expedite restoration by having appropriate infrastructure in place prior to the start of the restoration process. Examples of in-place infrastructure include:

- 1,000 gpm operational RO units prior to the start of restoration;
- Dedicated pipelines for the exclusive use of groundwater restoration will be installed, so that restoration is not delayed until uranium recovery operations are completed in other production units as required;
- In-place production pumps, monitoring, and instrumentation/control equipment will be utilized to facilitate restoration when uranium recovery is complete in specific production units; and
- Having wastewater disposal capacity in-place to handle effluent generated from restoration processes.

The costs for restoration are broken down into separate phases of work as follows:

- Reverse Osmosis Treatment with Permeate Injection;
- Groundwater Transfer & Groundwater Sweep;
- Monitoring;
- Labor and Vehicles;
- Miscellaneous;
- Reverse Osmosis Operating Costs; and
- Deep Disposal Well Operating Costs.

As discussed in TR Section 6.1.4.5, AUC estimates that seven pore volumes of active groundwater restoration will be required to reach the stated restoration goal. AUC expects that six pore volumes of Reverse Osmosis Treatment with Permeate Injection and one pore volume of combined Groundwater Transfer and Groundwater Sweep will be required to complete active groundwater restoration for a Production Unit. Therefore, these pore volume amounts are used in the financial assurance calculation for groundwater restoration. A detailed discussion of the pore volume calculation method is provided in Section 3.1.9 of the TR.

The tables provided in Attachment 1 provide the technical criteria, assumptions, and unit prices for all the work necessary to complete each category of work for the first five wellfields. A summary sheet is provided showing the total costs for each category, followed by detailed calculation sheets to show how the total costs were derived.

The duration of the active groundwater restoration phase is based on the processing and circulation of 7 pore volumes of groundwater at the flow rates specified in the calculation work sheets for each stage in the Groundwater Restoration section of Attachment 1. The financial assurance will be maintained at this level until the number of pore volumes required to satisfactorily complete each phase has been demonstrated. The preliminary groundwater restoration costs for the first five wellfields are estimated to be:

Groundwater Restoration Cost Summary

Item	Cost
Reverse Osmosis Treatment with Permeate Injection Cost	$107,907
Groundwater Restoration Transfer & Sweep Costs	$43,581
Monitoring Costs During Groundwater Restoration	79,000
Labor and Vehicle Restoration Costs	$1,876,755
Miscellaneous Restoration Costs	$139,500
Groundwater Restoration RO Operating Costs	$191,630
Deep Disposal Well Operating Costs	$62,462
Total Groundwater Restoration Costs	**$2,500,834**

AUC will adjust the financial assurance budget for groundwater restoration during each annual update review to reflect experience gained from actual restoration processes and any changes in ISR operations, industry standards or economic conditions that require or potentially affect financial assurance. Because the restoration equipment such as wellfield pumps, restoration fluid pipelines, lined backup pond, the deep disposal wells, the RO units, laboratory equipment, trucks, and field equipment will have been incurred for production process operations, they are considered operational capital and are not included as capital requirements in any of the RAP budget items. NRC will be able to verify the availability of the restoration equipment during routine inspections

1.2.2.1 Description of Work

Groundwater transfer involves moving groundwater between one production unit in groundwater restoration and another production unit or wellfield in the beginning phase of uranium recovery, or moving water between two areas within a single Production Unit that are in different stages of restoration (NUREG-1910). Direct transfer of groundwater will lower the total dissolved solids (TDS) in the production unit being restored by displacing groundwater affected by ISR operations with baseline quality groundwater. Because groundwater is transferred from one production unit to another, groundwater transfer typically will not create additional wastewater. AUC will decide when the use of groundwater transfer is appropriate. Prior to injection, the groundwater recovered during groundwater transfer may be passed through ion exchange columns for additional uranium recovery.

The groundwater sweep method may be used as a stand-alone process or may be used in conjunction with the other two processes. During groundwater sweep, groundwater is pumped without injection from the Production Zone Aquifer (PZA) causing an influx of groundwater from beyond the perimeter of the uranium recovery area that sweeps the portion of the aquifer affected by any flare of lixiviant outside of the uranium recovery area. This will be a primary recovery operation goal for using groundwater sweep--to recover any flared lixiviant outside of the uranium recovery area. To achieve this goal, AUC will use targeted groundwater sweep around the perimeter of a production unit at any time during groundwater restoration. The purpose of targeted groundwater sweep is to minimize the consumptive use of groundwater since WDEQ-LQD has determined that groundwater sweep with direct disposal of produced water is not considered BPT due to excessive consumption of groundwater and resultant impacts to groundwater resources (LCI 2009).

The groundwater produced from the groundwater sweep method will be processed in the CPP by ion exchange and the secondary RO unit. Permeate generated from groundwater sweep will be re-injected into a wellfield undergoing RO treatment with permeate injection. The re-injection of permeate generated by this process will decrease the amount of bleed removed by the RO method (as described below) by increasing the amount of permeate injected. This will enhance groundwater restoration and will limit the potential interference by groundwater restoration with nearby, ongoing uranium recovery operations.

The RO Treatment with permeate injection method will be the primary method applied at the proposed project. For this method of groundwater restoration, which may be used in conjunction with groundwater transfer and/or groundwater sweep, groundwater will be pumped from one or more production units to the CPP for processing by pressurized down-flow ion exchange columns reserved for restoration and RO treatment. RO is a high-pressure filtration process that reduces contaminants in the affected groundwater, by producing a clean permeate and a rejected brine wastewater. The clean permeate water will be re-injected to flush contaminants from the PZA affected by uranium recovery, and the reject brine will be sent to a secondary RO unit for further treatment. The RO passes a high percentage of the water through the membranes, leaving up to 90 percent of the dissolved salts in the brine water.

The primary use of an RO unit through the injection of permeate is to reduce the TDS in the affected groundwater. However additional benefits of RO treatment include:

- A decrease in the quantity of water that must be removed from the aquifer to meet restoration target values (RTV) limits;
- Concentration of the dissolved contaminates in a smaller volume of brine to facilitate wastewater disposal; and
- Enhancement of the exchange of ions from the formation due to the large difference in ion concentration.

As discussed in Section 6.1.4.3 of the TR, AUC will use two stages of RO treatment (primary and secondary) as needed, during groundwater restoration to maximize permeate and minimize brine production. The interference from groundwater restoration with ongoing uranium recovery operations will be kept to a minimum by maximizing the quantity of permeate re-injected into wellfields undergoing RO treatment and will hasten the clean-up of the affected groundwater.

AUC will use a chemical reductant such as sulfide and/or sulfite compounds during the active phase of groundwater restoration to lower the oxidation-reduction potential (Eh) in the PZA. The lowering of the Eh decreases the solubility of any trace metal elements that were oxidized and mobilized during uranium recovery operations. Dissolved metals such as arsenic, molybdenum, selenium, vanadium and uranium which cannot be removed fully by ion exchange columns or RO treatment alone can be precipitated out of the groundwater by the addition of a reductant. AUC will add the reductant (sodium sulfide) to the RO permeate prior to re-injection into the PZA.

AUC will install four deep disposal wells at the Reno Creek ISR Project to be used for disposal of liquid 11e.(2) byproduct. However, only three deep disposal wells are anticipated to be installed during the first year of licensed activities. The capital costs will have been borne by AUC during construction of the plant facilities, but there will be operating and maintenance costs and costs for antiscalant and corrosion inhibitors.

The final step in groundwater restoration will be the stability monitoring phase to ensure that constituents of concern do not exhibit a statistically increasing trend in concentration subsequent to restoration. The stability monitoring phase is described in Section 6.1.5 of the TR and includes well sampling, data analysis and reporting. If the stability monitoring indicates that one or more dissolved constituents in the restored wellfield are trending above the RTV for that parameter, it may be necessary to repeat one or more of the active restoration methods.

1.2.3 Facilities Area Decommissioning and Reclamation

Following regulatory approval of groundwater restoration and stability monitoring of the final wellfield reclamation can begin on the surface facilities. Procedures are described fully in Sections 6.2 and 6.3 of the TR. The methodology includes the recovery, characterization, transport and disposal of all byproduct, including 11e.(2) and non-11e.(2) byproduct materials from the Proposed Project. Detailed preliminary cost estimates for the facilities area decommissioning and reclamation are provided in the Facilities Area Decommissioning and Reclamation section of Attachment 1. The following tabulation shows a summary of the major cost items for this phase of work.

Facilities Area Decommissioning and Reclamation

Item	Cost
Facilities, Excluding Concrete	$332,961
Equipment Removal And Disposal Costs	$358,408
Concrete Removal And Disposal	$762,765
Backup Storage Pond Material Removal And Disposal	$14,580
Earthworks	$69,374
Total Facilities Cost	**$1,538,088**

1.2.3.1 Facilities, Equipment, and Concrete Removal and Disposal

Structures and equipment will be decontaminated or deposited at an NRC or Agreement State licensed 11e.(2) byproduct disposal facility. Details regarding disposal of structures and equipment are discussed in Section 6.3 of the TR. Buildings to be removed include the CPP, warehouse/maintenance building, and administration building. Decontamination of salvageable building materials, equipment, pipe, and other materials to be released for unrestricted use will be accomplished by completing a preliminary radiological survey to determine the location and extent of the contamination and to identify any hazards as described in Section 6.4 of the TR. Note that the process building used at the Reno Creek Pilot Plant was decontaminated to NRC specifications and was transferred to the property owner for unrestricted use. Processing and water treatment equipment, including tanks, filters, IX columns, pipes, and pumps, will be prepared, including decontamination if necessary, for use at another location or dismantled and disposed of in accordance with applicable regulations. Materials contaminated with other industrial constituents will be disposed of at an appropriately permitted facility. Decontaminated and non-contaminated materials will be removed for salvage or disposed of at an appropriately permitted solid waste facility. Structures will be decontaminated, if necessary, and moved to a new location and salvaged or disposed at an appropriately permitted solid waste facility. Concrete flooring, foundations, and foundation materials will be decontaminated, if necessary, broken up, and disposed of at an appropriately permitted facility.

1.2.4 Backup Storage Pond

Work required to reclaim the backup storage pond will include liquid 11e.(2) byproduct disposal, if any, in the deep disposal wells and removal of the liners and pond residue to a licensed 11e.(2) disposal site. Disposal of all non-11e.(2) solid wastes from the backup storage pond including uncontaminated portions of the leak detection system will be sent to an approved landfill. Following removal of the pond infrastructure, the land surface will be re-graded to restore original topography, topsoil replacement and revegetation as described in Section 6.2 of the TR. The detailed quantities and unit prices used to estimate the preliminary reclamation costs are provided in Attachment 1.

1.2.5 Earthwork

After the buildings and pond are demolished and removed, the entire site will be re-graded to restore the original topography. Topsoil will be replaced to approximate its original depth, and the area will be re-graded. Earthwork costs to complete the re-grading of the CPP, parking areas, and access roads are provided in Attachment 1. The work is described in detail in Section 6.2 of the TR.

1.2.6 Wellfield Equipment Removal

Decommissioning and reclamation of the wellfields will include removal of the header house buildings and all pipes and utilities connecting the wells to the header house buildings and the CPP, shredding or chipping the solid materials to reduce the volume, and disposing of these materials in an approved municipal landfill or licensed 11e.(2) disposal site as appropriate, and reclaiming the surface as described for the other surface facilities. The unit quantities and prices for each item of work in this task are included in the Wellfield Equipment Removal section of Attachment 1. The preliminary cost estimates for this phase of work are summarized as follows:

Wellfield Equipment Removal Cost Summary

Item	Cost
Wellfield Piping Removal and Disposal	$1,036,503
Wellfield Buildings	$8,646
Production Unit Valve Stations	$277
Wellhead Reclamation	$1,686
Access Roads Reclamation	$14,793
Well Abandonment	$338,948
Submersible Recovery Well Pumps	$1,199
Deep Disposal Well Abandonment	$401,934
Total Wellfield Cost	**$1,803,985**

1.2.7 Miscellaneous Reclamation Activities

Preliminary cost estimates for miscellaneous reclamation activities not covered in the preceding sections are provided in the Miscellaneous Reclamation Activities section of Attachment 1 and are summarized as follows:

Miscellaneous Reclamation Activities

Item	Cost
Radiological Surveys	$35,500
Revegetation	$13,500
Other D&D Costs	$94,919
Total Miscellaneous Reclamation Activities Costs	**$143,919**

1.3 Radiological Surveys

During equipment decontamination, smear samples of building and equipment surfaces will be collected and analyzed for radiological contamination. The results of these samples will drive decontamination efforts. Following removal of all structures and re-grading of the site to approximate original contours, and before topsoil is spread on the re-graded area, a gamma survey and soil sampling will be conducted as described in Section 6.4 of the TR. Soils will be cleaned up in accordance with the requirements of 10 CFR Part 40, Appendix A, Criterion 6(6) including consideration of ALARA goals and the chemical toxicity of uranium. The proposed limits and ALARA goals for cleanup of soils are summarized in Section 6.4of the TR. Any areas which do not meet these limits will be remediated by removing contaminated soils to an appropriately licensed site and the area re-graded. This process will be repeated until all sites meet the as low as reasonably achievable (ALARA) goals for cleanup. The preliminary unit costs and areas subject to these surveys are provided in the Attachment RAP-2(E).

1.4 Revegetation

At the completion of the previous tasks, and after topsoil has been spread all re-graded areas and all of the disturbed lands will be seeded with vegetation species mixture approved by the WDEQ, NRC, and the landowner for that specific area. The surface reclamation plan goals will be to return the land to equal or better condition than existed prior to uranium recovery, thus making it available for "unrestricted use.” Baseline soils, vegetation, and radiological data will be used to guide the reclamation activities. Unit prices and the area to be re-vegetated are provided in the Miscellaneous Reclamation Activities section of Attachment 1.

1.5 Other D&D Costs

Additional preliminary costs that are not in the preceding sections are covered in this section and are provided in in the Miscellaneous Reclamation Activities section of Attachment 1.

1.6 References

HRI RAP (Hydro Resources, Inc. Restoration Action Plan), NRC License No. SUA-1580; document ML012620529; document dated Sept. 14, 2001; accessed July 16, 2012 at NRC website: http://www.nrc.gov/site-help/search.cfm?q=HRI+RAP

LCI (Lost Creek Inc.). 3rd Round WDEQ/LQD Comment Responses, October 22, 2009, NRC ADAMS Accession No. ML100610158.

NRC (U.S. Nuclear Regulatory Commission), 2009, NUREG-1910, Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities, Final Report, May 2009.

ATTACHMENT 1
COST TABLES

Table 1: Restoration Action Plan Cost Summary

Item	Table	Cost
Groundwater Restoration	2-1 through 2-9	$ 2,500,834
Facility Area Decommissioning and Reclamation	3-1 through 3-6	$ 1,538,088
Wellfield Equipment Removal	4-1 through 4-9	$ 1,803,985
Miscellaneous Reclamation Activities	5-1 through 5-4	$ 143,919
Subtotal		**$** 5,986,826
Project Management (2%)		$ 119,737
Contingency (15%)		$ 898,024
Total		**$ 7,004,586**

Table 2-1: Groundwater Restoration Summary

Item	Cost	
Reverse Osmosis Treatment with Permeate Injection Costs	$	107,907
Groundwater Restoration Transfer and Sweep Costs	$	43,581
Monitoring Costs During Groundwater Restoration	$	79,000
Labor and Vehicle Restoration Costs	$	1,876,755
Miscellaneous Restoration Costs	$	139,500
Groundwater Restoration RO Operating Costs	$	191,630
Deep Disposal Well Operating Costs	$	62,462
Total Groundwater Restoration Costs	**$**	**2,500,834**

Table 2-2: Groundwater Restoration- ***Restoration Technical Assumptions***

Item	Value	Unit	Notes
Wellfield Area			
Average wellfield area	300,000	sq. ft	ER Figure 1-6 (typical)
Average wellfield area	6.9	acre	Calculated
Average completed thickness	12	feet	TR Section 6
Affected Volume			
Vertical flare factor	20%		TR Section 2.7
Horizontal flare factor	20%		TR Section 2.7
Combined flare factor	1.44		Calculated
Porosity	24%		Core Labs data
Gallons per cubic foot	7.48		Conversion factor
Gallons per pore volume (PV)	9,306,317		Calculated
Total number of wellfields	5		TR Section 3
Number of Wells			
Recovery wells per wellfield	30		Preliminary wellfield design
Injection wells per wellfield	42		Preliminary wellfield design
Total production wells per wellfield	72		Calculated
Overlying monitor wells per wellfield	2		One overlying per 4 acres*
Total overlying monitor wells (OM)	10		Calculated
Perimeter wells per Wellfield	6		Prorated among WFs in PU
Total Perimeter wells (RM)	30		Calculated
Total number of production wells PU1	360		Calculated
Total number of monitor wells PU1	40		Calculated
Total number of wells PU1	400		Calculated

***No monitoring of underlying or surficial units required**

Table 2-3: Groundwater Restoration- *Reverse Osmosis Treatment with Permeate Injection Cost*

Item	Value	Units	Notes
Operating Assumptions			
Average flow rate	600	gpm	Preliminary wellfield flow calculation
PVDs required	6		TR Section 6
Total RO/permeate injection volume	55,837,901	gallons	Calculated
Total RO/permeate injection volume	55,838	kgals	Calculated
Duration /RO permeate injection	93,063	minutes	Calculated
Duration /RO permeate injection	1,551	hours	Calculated
Duration /RO permeate injection	65	days	Calculated
Duration /RO permeate injection	2.1	months	Calculated
Recovery Well Pumping Costs			
Average flow rate per pump	20	gpm	TR Section 2.7
Number of pumps required	30		Preliminary wellfield design
Power input per pump	2.2	kW	Electric Motor Guide (3 hp)
Electrical requirement	66	kW	Calculated
Electrical consumption	102,369	kWh	Calculated
	$ 0.05		PreCorp
Recovery Well Pumping Costs	***$ 5,118***		Calculated
Reverse Osmosis Treatment			
Restoration RO Treatment costs	$ 0.15	per kgal	RO Operating Unit Costs
Total RO Treatment Cost	***$ 8,193***		Calculated
Brine Disposal			
Restoration RO Brine to DDW	4,467	kgals	
Cost	$ 1.52	$/kgal	DDW Operating Cost
Total Cost Brine Disposal	***$ 6,810***		
CPP Permeate Pumps			
Average permeate flow rate	956	gpm	TR Section 3
Electrical requirement	30	kW	Electric Motor Guide (40 hp)
Electrical consumption	46,532	kWh	Calculated
Power cost	$ 0.05		PreCorp
Total CPP permeate pumps cost	***$ 2,327***		Calculated
Wellfield permeate pump cost	***$ 1,460***		Calculated
Cost Per Wellfield	**$ 21,581**		Calculated
Total Reverse Osmosis Treatment Cost	**$ 107,907**		Calculated

Table 2-4: Groundwater Restoration- *Transfer and Sweep Costs*

Item	Value		Units	Notes
Operating Assumptions				
Average flow rate		50	gpm	TR Section 6
PVDs required		1	PVD	TR Section 6
Total transfer/sweep volume		9,306,317	gal	Calculated
Total transfer/sweep volume		9306	kgal	Calculated
Duration in minutes		186126		Calculated
Duration in hours		3102		Calculated
Duration in days		129		Calculated
Recovery Well Pumping Costs				
Average flow rate per pump		20	gpm	TR Section 2.7
Number of pumps required		3		Calculated
Power input per pump		2.2	kW	Franklin Electric Motor Guide (3 hp)
Electrical requirement		6.6	kW	Calculated
Electrical consumption		20,474	kWh	Calculated
Power cost	$	0.05	$/kWh	PreCorp
Total cost	***$***	***1,024***		Calculated
RO Treatment				
Secondary RO treatment cost	$	0.22	$/kgal	Calculated RO Operating Costs
Total costs	***$***	***2,018***		Calculated
Brine Disposal				
Secondary Brine to DDW from GWS		3,723	kgal	
Deep disposal well cost	$	1.52	$/kgal	
Total cost	***$***	***5,675***		
Total Cost Per Wellfield	**$**	**8,716**		
Total Transfer and Sweep Costs	**$**	**43,581**		

Table 2-5: Groundwater Restoration- *Monitoring Costs per Wellfield*

Item	Value	Unit	Notes
Excursion Monitoring (OM and RM Wells)			
Monitoring period	9	months	TR Section 6
Number of overlying wells to sample (OM)	2	wells	One overlying per 4 acres
Number of perimeter wells to sample (RM)	6	wells	Prorated among WFs in PU
Total number of wells to sample	8	wells	Calculated
Number of samples during active restoration (UCL's in house)	4		TR Section 6
Price per sample	$ 50		Estimated
Total cost	***$ 1,600***		Calculated
Restoration Monitoring (PZM Wells)			
Monitoring period	9	months	TR Section 6
Number of wells to sample	2	wells	1 per 4 acres
Number of samples per month per well	1		TR Section 6
Price per sample	$ 350		IML
Total cost	***$ 6,300***		
Restoration Monitoring (Wells undergoing active restoration)			
Monitoring period	3	months	TR Section 6
Number of wells to sample	30	wells	Preliminary wellfield design
Number of samples per month per well	2		TR Section 6
Price per sample	$ 20.00		Estimated
Active well monitoring cost	***$ 3,600***		Calculated
Total Active Restoration monitoring cost	***$ 14,650***		
Stability Monitoring			
Excursion Monitoring (OM and RM Wells)			
Monitoring period	9	months	TR Section 6
Number of overlying wells to sample (OM Wells)	0	wells	TR Section 6
Number of perimeter wells to sample (RM Wells)	6	wells	Prorated among WFs in PU
Total number of wells to sample	6	wells	Calculated
Number of samples during stability monitoring (UCL's in house)	4		TR Section 6
Price per sample	$ 50		Estimated
Excursion monitoring cost	***$ 1,200***		Calculated
Stability Monitoring (PZM Wells)			
Monitoring period	9	months	TR Section 6
Number of wells to sample	2	wells	1 per 4 acres
Number of samples per well	4	samples	TR Section 6
Total number of samples	12	samples	Calculated
Price per sample	$ 350		IML
Well monitoring cost	***2,800***		Calculated
Total stability monitoring cost	***$ 4,000***		Calculated

Table 2-5: Groundwater Restoration- *Monitor Costs per Wellfiled (Cont.)*

Item	Value	Unit	Notes
Post Stability Monitoring			
Excursion Monitoring (OM and RM Wells)			
Monitoring period	6	months	Estimated
Number of interior wells to sample (OM Wells)	0	wells	TR Section 6
Number of perimeter wells to sample (RM Wells)	6	wells	TR Section 6
Total number of wells to sample	6	wells	TR Section 6
Number of samples during stability monitoring (UCL's in house)	1		TR Section 6
Price per sample	$ 50		Estimated
Excursion monitoring cost	***$ 300***		Calculated
Total post stability monitoring costs	***$ 300***		Calculated
Monitoring Costs During Groundwater Restoration per WF	**$ 15,800**		Calculated
Total Monitoring Costs During Groundwater Restoration	**$ 79,000**		Calculated

Table 2-6: Groundwater Restoration- ***Labor and Vehicle Restoration Costs***

Item	Value	Unit	Notes
Operating Assumptions			
Time of active aquifer restoration	9	months	TR Section 6
Time of stability monitoring	9	months	TR Section 6
Employees			
Number of Employees in active restoration	18		Preliminary Project Design
Monthly Salary in active restoration (fully loaded plus 10% profit)	$ 7,200		Preliminary Project Design
Total employee cost in active restoration	***$ 1 ,166,400***		
Number of employees in stability monitoring	10		Preliminary Project Design
Monthly Salary in stability monitoring (fully loaded plus 10% profit%)	$ 7,700		Preliminary Project Design
Total employee cost in stability monitoring	***$ 693,000***		
Total labor costs for groundwater restoration	***$ 1,859,400***		
Vehicles			
Number of vehicles	5		
Miles per day per vehicle	10	miles	Estimated
Cost per mile	$ 0.65		IRS mileage rate
Days per year	356	days	
Number of years	1.5	years	
Total Vehicle Cost in Restoration	**$ 17,355**		
Total Labor and Vehicle Costs	**$ 1,876,755**		

Table 2-7: Groundwater Restoration- *Miscellaneous Restoration Cost*

Item	Value	Unit	Notes
Operating Assumptions			
Time of active aquifer restoration (5 wellfields)	9	months	TR Section 6
Time of stability monitoring	9	months	TR Section 6
Utilities-Active Restoration			
Electrical cost; CPP non-process related costs	$ 8,000	*PPD	Monthly
Gas cost; CPP non-process related costs	$ 6,000	PPD	Monthly
Total active restoration utility costs	***$ 126,000***		
Stability Monitoring/Decommissioning			
Electrical cost; Administration estimated cost	$ 1,000	PPD	Monthly
Gas cost; Warehouse and maintenance building estimated costs.	$ 500	PPD	Monthly
Total stability monitoring/decommissioning utility costs	***$ 13,500***		
Capital			
Pumping systems	$ -		Pump & piping systems in place during operation
RO systems	$ -		RO units in place during operation
Deep disposal wells	$ -		DDWs in place during operation
Total capital costs	*$* -		
Total Miscellaneous Restoration Costs	**$ 139,500**		

***(PPD) - Preliminary Project Design**

Table 2-8: Groundwater Restoration- ***RO Operating Costs***

Item	Value	Units	Notes
Operating Assumptions			
Wellfield portion of restoration RO feed rate	600	gpm	Calculated
Wellfield portion of secondary RO feed rate	174	gpm	Calculated
Total groundwater sweep volume	9,306,317	gals	Calculated
Total RO with permeate injection volume	55,837,901	gals	Calculated
Total volume treated per wellfield	65,144,218	gals	Calculated
Duration of RO treatment with permeate injection	2.1	months	Calculated
Antiscalant			
Antiscalant concentration for Restoration RO	3	mg/L	Avista Technologies
Antiscalant concentration for Secondary RO	4.4	mg/L	Avista Technologies
Restoration RO antiscalant addition	155	gals	Calculated
Secondary RO antiscalant addition	66	gals	Calculated
Antiscalant cost per gallon	$ 25.00		Avista Technologies
Restoration RO antiscalant cost	$ 3,881		Calculated
Secondary RO antiscalant cost	$ 1,651		Calculated
Total antiscalant cost	**$ 5,531**		Calculated
Restoration RO antiscalant cost	$ 0.07	/kgal	Calculated
Secondary RO antiscalant cost	$ 0.08	/kgal	Calculated
Total antiscalant cost	**$ 0.15**	/kgal	Calculated
Pre-Filtration Cartridge Filter Costs			
Number of replacement cartridges during wellfield restoration	60		Estimated
Cost per cartridge	$ 15.00		H2O Distributors
Cartridge replacement cost	***$ 900***		Calculated
Cartridge replacement cost	***$ 0.02***	/kgal	Calculated
Restoration RO Feed Pumps (2)			
Restoration RO feed pump power requirement	22	kw	Electric Motor Guide (30 hp)
Electrical consumption per wellfield	34,123	kWh	Calculated
Power cost	$ 0.05	kWh	PreCorp
Restoration RO feed pump cost	***$ 3,412.32***		Calculated
Restoration RO feed pump cost	***$ 0.06***	/kgal	Calculated
Secondary RO Feed Pump			
Secondary RO feed pump power requirement	37	kw	Franklin Electric Motor Guide (50 hp)
Electrical consumption per wellfield	57,389	kWh	Calculated
Power cost	$ 0.05	/kWh	PreCorp
Secondary RO Feed Pump Cost	***$ 2,869.45***		Calculated
Secondary RO Feed Pump Cost	***$ 0.14***	/kgal	
Reductant Addition; Sodium Sulfide (Na2S)			
Reductant concentration for restoration RO permeate injection	200	mg/L	Estimated

Table 2-8: Groundwater Restoration - *RO Operating Costs (Cont.)*

Item	Value		Units	Notes
Restoration RO Na2S addition (lbs)		93,138	lbs	Calculated
Na2S cost per pound	$	0.28		Estimated
Cost for restoration RO reductant	***$***	***25,612.85***		Calculated
Cost for restoration RO reductant	***$***	***0.46***	/kgal	Calculated
Total RO Operating Cost per Wellfield	***$***	***38,325***		
RO Operating Cost per Wellfield	***$***	***0.82***	/kgal	
Total RO Operating Costs	***$***	***191,630***		
Secondary RO Feed Pump				
Secondary RO feed pump power requirement		37	kw	Franklin Electric Motor Guide (50 hp)
Electrical consumption per wellfield		57,389	kWh	Calculated
Power cost	$	0.05	/kWh	PreCorp
Secondary RO Feed Pump Cost	***$***	***2,869.45***		Calculated
Secondary RO Feed Pump Cost	***$***	***0.14***	/kgal	
Reductant Addition; Sodium Sulfide (Na2S)				
Reductant concentration for restoration RO permeate injection		200	mg/L	Estimated
Restoration RO Na2S addition (lbs)		93,138	lbs	Calculated
Na2S cost per pound	$	0.28		Estimated
Cost for restoration RO reductant	***$***	***25,612.85***		Calculated
Cost for restoration RO reductant	***$***	***0.46***	/kgal	Calculated
Total RO Operating Cost per Wellfield	**$**	**38,325**		
RO Operating Cost per Wellfield	**$**	**0.82**	/kgal	
Total RO Operating Costs	**$**	**191,630**		

Table 2-9: Groundwater Restoration- *Deep Disposal Well Operating Costs*

Item	Value	Units	Notes
Operating Assumptions			
Secondary RO brine flowrate	104	gpm	TR Section 3
Active groundwater restoration period	9	months	TR Section 6
Total volume of brine to DDW	40,974,336	gal	Calculated
Total transfer/sweep volume	40,974	kgal	Calculated
Duration in minutes	393,984	minutes	Calculated
Duration in hours	6,566	hours	Calculated
Duration in days	274	days	Calculated
Brine Pumps to DDWs			
Average flow rate per pump	52	gpm	TR Section 3
Number of pumps required	2		Calculated
Power input per pump	3.7	kW	Electric Motor Guide (5 hp)
Electrical requirement	7.4	kW	Calculated
Electrical consumption	48,591	kWh	Calculated
Power cost	$ 0.05		PreCorp
Brine to DDW pumping costs	***$ 2,430***		Calculated
Brine to DDW pumping costs	***$ 0.06***	$/kgal	Calculated
High Pressure DDW Pumps			
Average flow rate per pump	40	gpm	TR Section 2.7
Number of pumps required	3		Calculated
Power input per pump	55	kW	Motor Guide (75 hp)
Electrical requirement	165	kW	Calculated
Electrical consumption	1,083,456	kWh	Calculated
Power cost	$ 0.05		PreCorp
High pressure DDW pumping costs	***$ 54,173***		Calculated
High pressure DDW Pumping costs	***$ 1.32***	$/kgal	Calculated
DDW Chemical Treatment			
Antiscalant	$ 0.09	$/kgal	Avista Technologies
Corrosion inhibitor	$ 0.05	$/kgal	Estimated
Chemical cost	***$ 0.14***	$/kgal	Calculated
Total chemical cost	***$ 5,859***		Calculated
DDW Operating Cost	**$ 1.52**	$/kgal	Calculated
Total DDW Operating Cost	**$ 62,462**		Calculated

Table 3-1: Facilities Decommissioning and Reclamation Cost Summary

Item	Cost	
Facilities Excluding Concrete	$	332,961
Equipment Removal and Disposal Costs	$	358,408
Concrete Removal and Disposal	$	762,765
Backup Pond Material Removal and Disposal	$	14,580
Earthworks	$	69,374
Total Facilities Cost	**$**	**1,538,088**

Table 3-2: Facilities Decommissioning and Reclamation- *Facilities Excluding Concrete*

Item	Value		Unit	Notes
CPP				
Length		350	feet	Preliminary design
Width		200	feet	Preliminary design
Height		30	feet	Preliminary design
Footprint		70,000	sq. feet	Calculated
Volume		2,100,000	cu feet	Calculated
Demolition unit cost	$	0.125	per cu ft	WDEQ/LQD Guideline 12, app K
Demolition Cost	***$***	***262,500***		Calculated
Unit building weight		15	lb/sq ft	ASCE 7-05
Building weight		525	tons	Calculated
Salvage %		60%		Assumes no net salvage value
Weight of material to dispose		315	tons	Calculated
Density of construction debris		1	ton/cu yd	Typical of construction debris
Volume of material to dispose		315	cu yd	Calculated
Volume per truck		20	cu yd	Estimated
Number of trucks		16	trucks	Calculated
Distance to landfill		60	miles	Campbell County Landfill
Transport unit cost	$	3.00	per mile	Estimated
CPP transportation cost	***$***	***2,835***		Calculated
Disposal fee	$	60.00	per ton	Campbell County Landfill rate sheet
Disposal cost	***$***	***18,900***		Calculated
Total CPP cost	***$***	***284,235***		
Warehouse Shop				
Length		100	ft	Preliminary design
Width		60	ft	Preliminary design
Height		30	ft	Preliminary design
Footprint		6,000	sq ft	Calculated
Volume		180,000	cu ft	Calculated
Demolition unit cost	$	0.125	per cu ft	WDEQ/LQD Guideline 12, app K
Demolition cost	***$***	***22,500***		
Unit building weight		15	lb/sq ft	ASCE 7-05
Building weight		45	tons	Calculated
Salvage %		60%		Assumes no net salvage value
Weight of material to dispose		27	tons	Calculated
Density of construction debris		1	ton/cu yd	Typical of construction debris
Volume of material to dispose		27	cu yd	Calculated
Volume per truck		20	cu yd	Estimated
Number of trucks		1.4	trucks	Calculated
Distance to landfill		60	miles	Campbell County Landfill
Transport unit cost	$	3.00	per mile	Estimated
Transporation Cost	***$***	***243***		Calculated

Table 3-2: Facilities Decommissioning and Reclamation- *Facilities Excluding Concrete (Cont.)*

Item	Value	Unit	Notes
Disposal fee	$ 60.00	per ton	Campbell County Landfill rate sheet
Disposal cost	***$ 1,620***		Calculated
Total maintenance building cost	***$ 24,363***		
Office Building			
Length	100	ft	Preliminary design
Width	60	ft	Preliminary design
Height	30	ft	Preliminary design
Footprint	6,000	sq ft	Calculated
Volume	180,000	cu ft	Calculated
Demolition Unit Cost	$ 0.125	per cu ft	WDEQ/LQD Guideline 12, app K
Demolition cost	***$ 22,500***		Calculated
Unit building weight	15	lb/sq ft	ASCE 7-05
Building weight	45	tons	Calculated
Salvage %	60%		Assumes no net salvage value
Weight of material to dispose	27	tons	Calculated
Density of construction debris	1	ton/cu yd	Typical of construction debris
Volume of material to dispose	27	cu yd	Calculated
Volume per truck	20	cu yd	Estimated
Number of trucks	1.4	trucks	Calculated
Distance to landfill	60	miles	Campbell County Landfill
Transport unit cost	$ 3.00	per mile	Estimated
Transportation cost	***$ 243***		Calculated
Disposal fee	$ 60.00	per ton	Campbell County Landfill rate sheet
Disposal cost	***$ 1,620***		Calculated
Total Office Building Cost	**$ 24,363**		
Total Facilities Excluding Concrete	**$ 332,961**		

Table 3-3: Facilities Decommissioning and Reclamation- *Equipment removal and Disposal Costs*

Item	Value	Unit	Notes
CPP Equipment (included chem storage, admin and warehouse bldgs.)			
Lab equipment	75	cu ft	TR Fig 3-8
IX column	19,800	cu ft	TR Table 3-2
IX guard column	1,800	cu ft	TR Table 3-2
Elution vessel	1,800	cu ft	TR Table 3-2
Restoration IX	1,800	cu ft	TR Table 3-2
Barren eluant	5,542	cu ft	TR Table 3-2
Intermediate eluant	5,542	cu ft	TR Table 3-2
Pregnant eluant	5,542	cu ft	TR Table 3-2
Precip tank	5,542	cu ft	TR Table 3-2
Plant water	4,072	cu ft	TR Table 3-2
Resin transfer water	2,771	cu ft	TR Table 3-2
Waste water	11,084	cu ft	TR Table 3-2
NaCl brine mix tank	2,036	cu ft	TR Table 3-2
NaCl silo	2,036	cu ft	TR Table 3-2
Soda ash silo	4,825	cu ft	TR Table 3-2
Soda ash (Na2CO3) mix tank	2,771	cu ft	TR Table 3-2
NaHCO3 mix tank	2,771	cu ft	TR Table 3-2
Soda ash NaHCO3 storage	2,771	cu ft	TR Table 3-2
HCl	2,771	cu ft	TR Table 3-2
NaOH	1,357	cu ft	TR Table 3-2
H2O2	1,477	cu ft	TR Table 3-2
Filter press	183	cu ft	TR Table 3-2
Dryer	183	cu ft	TR Table 3-2
Thickener	18,146	cu ft	TR Table 3-2
Total volume	***106,695***	cu ft	Calculated
Total volume	***3,952***	cu yd	Calculated
D&D			
Duration	90	days	estimate
Daily dismantle/demo cost	$ 1,525	per day	RS Means
Dismantle/demo cost	***$ 137,250***		Calculated
Dismantled/demo volume	1976	cu yd	50% of total volume estimated calculation
Decontamination unit cost	$ 31.00	per cu yd	Industry comparison
Decontamination cost	***$ 61,251***		
Total D&D cost	***$ 198,501***		
Transportation			
Salvage percent	50%		estimate
Salvage volume	988	cu yd	Assumes no net salvage value
Volume to landfill	741	cu yd	75% of demo'd, not salvaged volume
Volume to 11e.(2) disposal site	247	cu yd	25% of demo'd, not salvaged volume
Volume per truckload	20	cu yd	
Number trucks to landfill	37	trucks	Calculated
Distance to landfill	60	miles	Campbell County Landfill
Number trucks to 11e.(2) site	12	trucks	Calculated

Table 3-3: Facilities Decommissioning and Reclamation- *Equipment removal and Disposal Costs (Cont.)*

Item	Value	Unit	Notes
Distance to 11e.(2) site	150	miles	Pathfinder Shirley Basin
Transportation unit cost	$ 3.00	per mile	Estimated
Transportation cost	***$ 12,225***		Calculated
Disposal			
Disposal fee	$ 60.00	per ton	Campbell County Landfill rate sheet
Equipment debris bulk density	1	ton/cu yd	Typical construction debris
Equipment weight	741	tons	
Disposal cost	***$ 44,456***		
11e.(2) disposal fee	$ 405.00	cu yd	Industry comparison
11e.(2) disposal cost	***$ 100,026***		
Total disposal cost	***$ 144,482***		
CPP Piping & Equipment Disposal			
Quantity	10	cu yd	Estimate
Demolition unit cost	***$ -***		Included in building
Transportation			
Volume to landfill	3	cu yd	Estimate
Volume to 11e.(2) facility	7	cu yd	Estimate
Volume per truck	20	cu yd	
Number trucks to landfill	0.2		Calculated
Distance to landfill	60	miles	Campbell County Landfill
Number of trucks to 11e.(2) facility	0.4		Calculated
Distance to 11e.(2) facility	150	miles	Shirley Basin
Transport unit cost	$ 3.00	per mile	Estimate
Transport cost	***$ 185***		Calculated
Disposal			
Landfill disposal fee	$ 60.00	per ton	Campbell County Landfill rate sheet
Equipment debris bulk density	1	ton/cu yd	Typical construction debris
Equipment weight	3	tons	Estimate
Landfill disposal cost	***$ 180.00***		Calculated
11e.(2) disposal fee	$ 405.00	$/cu yd	Industry comparison
11e.(2) disposal cost	***$ 2,835***		Calculated
Total piping & equipment disposal	***$ 3,200***		Calculated
Total Equipment Removal and Disposal Cost	**$ 358,408**		

Table 3-4: Facilities Decommissioning and Reclamation- *Concrete Removal and Disposal*

Item	Value	Unit	Note
CPP Dimensions			
Floor areas			
CPP	70,000	sq feet	Preliminary design
Total floor slab area	70,000	sq feet	Preliminary design
Ave thickness	0.5	ft	Preliminary design
Total concrete volume	35,000	cu ft	Calculated
Total concrete volume	1,296	cu yd	Calculated
Footer			
CPP Total linear feet	1,100	feet	Preliminary design
Ave width	2	ft	Preliminary design
Ave thickness	3	ft	Preliminary design
Total concrete volume	6,600	cu ft	Calculated
Total concrete volume	244	cu yd	Calculated
Demolition			
Floor slab area	70,000	sq feet	Calculated
Floor slab demo unit cost	$ 5.05	per sq ft	WDEQ/LQD Guideline 12
Floor slab milling unit cost	$ 0.20	per sq ft	RSMeans
Floor slab demo cost	***$ 353,500***		Calculated
Floor slab milling cost	***$ 14,000***		Calculated
Footer demo unit cost	$ 18.14		WDEQ/LQD Guideline 12
Footer demo cost	***$ 19,954***		Calculated
Total demo cost	***$ 387,454***		Calculated
Transportation			
Volume to landfill	1,834	cu yd	Volume of footer plus 90% CPP floor slab, estimate; includes 30% swell factor for void space.
Volume to 11e.(2) disposal site	169	cu yd	10% CPP floor slab, estimate; includes 30% swell factor for void space.
Volume per truckload	20	cu yd	
Number trucks to landfill	92		Calculated
Distance to landfill	60	miles	Campbell County Landfill
Number trucks to 11e.(2) site	8		Calculated

Table 3-4: Facilities Decommissioning and Reclamation- *Concrete Removal and Disposal (Cont.)*

Item	Value	Unit	Note
Distance to 11e.(2) site	150	miles	Shirley Basin
Transportation unit cost	$ 3.00	per mile	Estimated
Transportation cost	***$ 20,301***		Calculated
Disposal			
Landfill disposal feel	$ 60.00	per ton	Campbell County Landfill rate sheet
Concrete density	100	lb/ft3	Estimate for demolished concrete
Concrete weight	2477	ton	Calculated
Landfill cost	***$ 148,590***		Calculated
11e.(2) disposal fee	$ 405.00	cu yd	Industry average
11e.(2) disposal cost	***$ 68,250***		Calculated
Total disposal cost	***$ 216,840***		
Total CPP Concrete Cost	***$ 624,596***		
Administration and Warehouse Buildings Dimensions			
Floor areas			
Admin	6,000	sq feet	Preliminary design
Warehouse	6,000	sq feet	Preliminary design
Total floor slab area	12,000	sq feet	Calculated
Ave thickness	0.33	ft	4" slab
Total concrete volume	3,960	cu ft	Calculated
Total concrete volume	147	cu yd	Calculated
Footer			
Admin	320	feet	Preliminary design
Warehouse	320	feet	Preliminary design
Total linear feet	640	feet	Calculated
Width	2	ft	Preliminary design
Thickness	3	ft	Preliminary design
Total footer concrete volume	142	cu yd	Calculated
Demolition			
Floor slab area	12,000	sq feet	Calculated
Floor slab demo unit cost	$ 5.05	sq feet	WDEQ/LQD Guideline 12
Floor slab milling unit cost	$ -		Assumes no radiological contamination
Floor slab demo cost	***$ 60,600***		Calculated

Table 3-4: Facilities Decommissioning and Reclamation- ***Concrete Removal and Disposal (Cont.)***

Item	Value	Unit	Note
Floor slab milling cost	**$ -**		Assumes no radiological contamination
Footer demo unit cost	$ 18.14	per ft	WDEQ/LQD Guideline 12
Footer demo cost	***$ 11,610***		Calculated
Total demo cost	***$ 72,210***		Calculated
Transportation			
Volume to landfill	376	cu yd	Volume of footer plus floor slab; includes 30% swell factor for void space.
Volume to 11e.(2) disposal site	0	cu yd	No contaminated material.
Volume per truckload	20	cu yd	
Number trucks to landfill	19		Calculated
Distance to landfill	60	miles	Campbell County Landfill
Number trucks to 11e.(2) site	0		
Distance to 11e.(2) site	150	miles	Shirley Basin
Transportation unit cost	$ 3.00	per mile	
Transportation cost	***$ 3,380***		Calculated
Disposal			
Landfill disposal feel	$ 60.00	per ton	Campbell County Landfill rate sheet
Concrete density	100	lb/ft3	Estimate for demolished concrete
Concrete weight	507	ton	Calculated
Landfill cost	**$ 30,420**		Calculated
11e.(2) disposal fee	$ 405.00	cu yd	Industry average
11e.(2) disposal cost	***$ -***		
Total disposal cost	***$ 30,420***		Calculated
Total admin and warehouse concrete cost	***$ 106,010***		Calculated
Chemical Storage Containment Dimensions			
Floor areas			
Chem storage--outside	3,000	sq feet	Preliminary design
Ave thickness	0.5	ft	Preliminary design
Total concrete volume	1,500	cu ft	Calculated
Total concrete volume	56	cu yd	Calculated

Table 3-4: Facilities Decommissioning and Reclamation- *Concrete Removal and Disposal (Cont.)*

Item	Value	Unit	Note
Curb			
Chem storage total linear feet	280	feet	Preliminary design
Height	4	ft	Preliminary design
Thickness	1	ft	Preliminary design
Curb area	1,120	sq ft	Calculated
Total curb concrete volume	41	cu yd	Calculated
Demolition			
Floor slab/curb area	4,120	sq feet	Calculated
Floor slab/curb demo unit cost	$ 5.05	sq feet	WDEQ/LQD Guideline 12
Floor slab milling unit cost	$ -	per ft2	Assumes no radiological contamination
Floor slab/curb demo cost	***$ 20,806***		
Floor slab milling cost	$ -		
Total Floor slab/curb demo cost	***$ 20,806***		
Transportation			
Volume to landfill	126	cu yd	Volume of slab/curb; includes 30% swell factor for void space.
Volume to 11e.(2) disposal site	0	cu yd	
Volume per truckload	20	cu yd	
Number trucks to landfill	6		Calculated
Distance to landfill	60	miles	Campbell County Landfill
Number trucks to 11e.(2) site	0		Calculated
Distance to 11e.(2) site	150	miles	Shirley Basin
Transportation unit cost	$ 3.00	per mile	
Transportation cost	***$ 1,135.33***		
Disposal			
Landfill disposal feel	$ 60.00	per ton	Campbell County Landfill rate sheet
Concrete density	100	lb/ft3	Estimate for demolished concrete
Concrete weight	170	ton	Calculated
Landfill cost	***$ 10,218***		Calculated

Table 3-4: Facilities Decommissioning and Reclamation- *Concrete Removal and Disposal (Cont.)*

Item	Value	Unit	Note
11e.(2) disposal fee	$ 405.00	cu yd	Industry average
11e.(2) disposal cost	***$ -***		
Disposal cost	***$ 10,218***		
Total Chemical Storage Concrete Cost	***$ 32,159***		
Total Concrete Removal and Disposal Cost	**$ 762,765**		

Table 3-5: Facilities Decommissioning and Reclamation- *Backup Pond Removal and Disposal*

Item	Value	Unit	Note
Liner Demolition & Disposal			
Primary backup storage pond liner			
Surface Area	25,000	sq ft	Preliminary design
Thickness	36	mil	Preliminary design
Volume	2.8	cu yd	Calculated
Swell factor	50	percent	
Liner disposal volume	4.2	cu yd	Calculated
Demolition			
Liner demolition unit cost	$ 0.11	$/sq ft	10% of installation cost: RS
Liner demolition cost	***$ 2,750***		
Transportation			
Volume of material	4.2	cu yd	Calculated
Volume per truck	20	cu yd	
Number of trucks	0.2		Calculated
Distance to 11e.(2) site	150	miles	Shirley Basin
Transportation unit cost	$ 3.00	per mile	Estimated
Transportation cost	***$ 94***		
Disposal			
11e.(2) disposal fee	$ 405	$/cu yd	Industry average
11e.(2) disposal cost	***$ 1,688***		
Total cost for primary liner D&D	***$ 4,531***		
Secondary Backup Storage Pond Liner			
Surface Area	25,000	sq ft	
Thickness	36	mil	
Volume	2.8	cu yd	Calculated
Swell factor	50	percent	
Liner disposal volume	4.2	cu yd	Calculated
Demolition			
Liner demolition unit cost	$ 0.11	$/sq ft	10% of installation cost: RS Means….
Liner demolition cost	***$ 2,750***		
Transportation			
Volume of material	4.2	cu yd	Calculated
Volume per truck	20	cu yd	
Number of trucks	0.2		Calculated
Distance to 11e.(2) site	150	miles	Shirley Basin
Transportation unit cost	$ 3.00	per mile	Estimated
Transportation cost	***$ 94***		
Disposal			
11e.(2) disposal fee	$ 405	$/cu yd	Industry average
11e.(2) disposal cost	***$ 1,688***		
Total cost for secondary liner D&D	***$ 4,531***		
Geocomposite Liner			
Surface Area	22,000	sq ft	
Thickness	220	mil	

Table 3-5: Facilities Decommissioning and Reclamation- *Backup Pond Removal and Disposal (Cont.)*

Item	Value		Unit	Note
Volume		15	cu yd	Calculated
Swell factor		50	percent	
Liner disposal volume		22	cu yd	Calculated
Liner density		6	lb/cu ft	
Demolition				
Liner demolition unit cost	$	0.11	$/sq ft	10% of installation cost: RS Means….
Liner demolition cost	***$***	***2,420***		Calculated
Transportation				
Volume of material		22	cu yd	Calculated
Volume per truck		20	cu yd	
Number of trucks		1		Calculated
Distance to landfill		60	miles	Campbell County Landfill
Transportation unit cost	$	3.00	per mile	Estimated
Transportation cost	***$***	***202***		Calculated
Disposal				
Landfill disposal fee	$	60	$/cu yd	Campbell County Landfill rate sheet
Landfill disposal cost	***$***	***1,344***		Calculated
Total cost geocomposite liner D&D	***$***	***3,966***		Calculated
Leak Detection Piping				
Total length of leak detection pipes		610	ft	Calculated
OD		4.5	in	4" Sch 40 PVC
Wall thickness		0.237	in	PVC Pipe Dimensions
Unit weight		3.118	lb/ft	PVC Pipe Dimensions
Pipe material volume		13	cu ft	Calculated
Chipped/shredded volume		20	cu ft	Estimated at volume x 1.5
Bulk weight		94	lb/ft3	Calculated
Volume per truckload		540	cu ft	
Total number of truckloads		0.04		Calculated
Removal				
Demolition unit cost	$	2.02	per ft	RS Means 2011
Removal cost	**$**	**1,232**		Calculated
Transportation				
Loads to 11e.(2) facility		0.04		Calculated
Distance to 11e.(2) facility		150	miles	PathfinderShirley Basin
Transport unit cost	$	3.00	per mile	Estimated
Transport Cost	**$**	**17**		
Disposal				
11e.(2) disposal fee	$	405		Industry comparison
Total 11e.(2) disposal cost	**$**	**303**		Calculated
Total leak detection piping cost	**$**	**1,552**		Calculated
Total Backup Pond Removal and Disposal	**$**	**14,580**		

Table 3-6: Facilities Decommissioning and Reclamation- *Earthworks*

Items	Value	Unit	Note
Gravel			
Area			
Parking lot	6,400	ft3	Preliminary design
Total gravel	296	BCY	Calculated
Removal			
Unit cost	$ 1.09	per BCY	WDEQ/LQD Guideline 12, Appendix C, level ground. 1000 ft distance
Gravel removal cost	***$ 323***		Calculated
Topsoil			
Volume	62,374	BCY	Volume is from distured area (ER Table 3-5) x 2' of topsoil removal.
Unit cost	$ 1.09	per BCY	WDEQ/LQD Guideline 12, Appendix C, level ground. 1000 ft distance
Topsoil cost	***$ 67,987***		Calculated
Final Regrading			
Volume	15.5	ac	ER Table 3-5
Unit cost	$ 68.61	per ac	WDEQ/LQD Guideline 12, Appendix G
Final regrade cost	***$ 1,063.46***		Calculated
Total Earthwork Cost	**$ 69,374**		

Table 4-1: Wellfield Equipment Removal Cost Summary

Item	Cost	
Wellfield Piping Removal and Disposal	$	1,036,503
Wellfield Buildings	$	8,646
Production Unit Valvel Stations	$	277
Wellhead Reclamation	$	1,686
Access Road Reclamation	$	14,793
Well Abandonment	$	338,948
Submersible Recovery Well Pumps	$	1,199
Deep Disposal Well Abandonment	$	401,934
Total Wellfield Costs	**$**	**1,803,985**

Table 4-2: Wellfield Equipment Removal Cost- *Wellfiled Piping Removal and Disposal*

Item	Value	Unit	Notes
Well Data			
Recovery wells per HH	30		Preliminary wellfield design
Injection wells per HH	42		Preliminary wellfield design
Production wells per HH	72		Preliminary wellfield design
No of HHs	5		Preliminary wellfield design
Total Production wells	***360***		Calculated
OM Wells	10		Calculated
RM Wells	30		Calculated
Total Production Unit 1 Wells	***400***		Calculated
Main Production Trunklines-Pipe Data			
Length- main recovery trunkline	5,400	ft	Preliminary wellfield design
Length- main injection trunkline	5,400	ft	Preliminary wellfield design
Total length-main production trunklines	10,800	ft	Calculated
OD	24	in	24" SDR 11 HDPE
Wall thickness	2.18	in	HDPE Pipe Dimensions
Pipe material volume	11,209	cu ft	Calculated
Chipped/shredded volume	16,814	cu ft	Estimated at volume x 1.5
Volume per truckload	540	cu ft	
Total number of truckloads	31		Calculated
Removal			
Unit cost	$ 9.50	per ft	RS Means 2011; excavation and backfill costs reduced by 50% to account for common trench
Removal cost	***$ 102,600***		Calculated
Transportation			
Loads to 11e.(2) facility	31		Calculated
Distance to 11e.(2) facility	150	miles	Pathfinder Shirley Basin
Transport unit cost	$ 3.00	per mile	Estimated
Transport cost	***$ 14,012***		Calculated
Disposal			
11e.(2) disposal fee	$ 405	$/cu yd	Industry comparison
Total 11e.(2) main trunkline disposal cost	***$ 252,209***		Calculated
Total trunkline D&D Cost	***$ 368,821***		Calculated

Table 4-2: Wellfield Equipment Removal Cost- ***Wellfiled Piping Removal and Disposal (Cont.)***

Item	Value	Unit	Notes
Restoration Pipeline Removal & Disposal- Pipe Data			
Length- restoration trunklines (out)	5,400	ft	Preliminary wellfield design
Length-restoration trunklines (in)	5,400	ft	Preliminary wellfield design
Total length-restoration pipelines	10,800	ft	Calculated
OD	10.75	in	10" SDR 11 HDPE
Wall thickness	0.977	in	HDPE Pipe Dimensions
Pipe material volume	2,250	cu ft	Calculated
Chipped/shredded volume	3,375	cu ft	Estimated at volume x 1.5
Volume per truckload	540	cu ft	
Total number of truckloads	6.3		Calculated
Removal			
Unit cost	$ 6.99	per ft	RS Means 2011…..; excavation and backfill costs reduced by 50% to account for common trench
Removal cost	***$ 75,492***		Calculated
Transportation			
Loads to 11e.(2) facility	6.3		Calculated
Distance to 11e.(2) facility	150	miles	Pathfinder Shirley Basin
Transport unit cost	$ 3.00	per mile	Estimated
Transport cost	***$ 2,813***		Calculated
Disposal			
11e.(2) disposal fee	$ 405	$/cu yd	Industry comparison
Total 11e.(2) disposal cost	***$ 50,626***		Calculated
Total Restoration Lines D&D Cost	***$ 128,930***		Calculated
Production Unit Feeder Trunklines-Pipe Data			
Length - recovery feeder lines	1,800	ft	Preliminary wellfield design
Length - injection feeder lines	1,800	ft	Preliminary wellfield design
Total length- header house production pipelines	3,600	ft	Calculated
OD	12.75	in	12" SDR 11 HDPE
Wall thickness	1.159	in	HDPE Pipe Dimensions
Pipe material volume	1,055	cu ft	Calculated
Chipped/shredded volume	1,583	cu ft	Estimated at volume x 1.5
Volume per truckload	540	cu ft	

Table 4-2: Wellfield Equipment Removal Cost- ***Wellfiled Piping Removal and Disposal (Cont.)***

Item	Value	Unit	Notes
Total number of truckloads	2.9		Calculated
Removal			
Unit cost	$ 6.99	per ft	RS Means 2011; excavation and backfill costs reduced by 50% to account for common trench
Removal cost	***$ 25,164***		Calculated
Transportation			
Loads to 11e.(2) facility	2.9		Calculated
Distance to 11e.(2) facility	150	miles	Pathfinder Shirley Basin
Transport unit cost	$ 3.00	per mile	Estimated
Transport cost	***$ 1,319***		Calculated
Disposal			
11e.(2) disposal fee	$ 405.00	$/cu yd	Industry comparison
Total 11e.(2) disposal cost	***$ 23,743***		Calculated
Total Production Unit Feeder Trunklines D&D Cost	***$ 50,226***		Calculated
Header House Feeder Pipelines-Pipe Data			
Length-recovery feeder lines	4,500	ft	Preliminary wellfield design
Length -injection feeder lines	4,500	ft	Preliminary wellfield design
Total length- header house production pipelines	9,000	ft	Calculated
OD	8.625	in	8" SDR 11 HDPE
Wall thickness	0.78	in	HDPE Pipe Dimensions
Pipe material volume	1,202	cu ft	Calculated
Chipped/shredded volume	1,802	cu ft	Estimated at volume x 1.5
Volume per truckload	540	cu ft	
Total number of truckloads	3.3		Calculated
Removal			
Unit cost	$ 5.10	per ft	RS Means 2011…..; excavation and backfill costs reduced by 50% to account for common trench
Removal cost	***$ 45,900***		Calculated
Transportation			
Loads to 11e.(2) facility	3.3		Calculated
Distance to 11e.(2) facility	150	miles	Pathfinder Shirley Basin
Transport unit cost	$ 3.00	per mile	Estimated

Table 4-2: Wellfield Equipment Removal Cost- *Wellfiled Piping Removal and Disposal (Cont.)*

Item	Value	Unit	Notes
Transport cost	***$ 1,502***		Calculated
Disposal			
11e.(2) disposal fee	$ 405.00	$/cu yd	Industry comparison
Total 11e.(2) disposal cost	***$ 27,037***		Calculated
Total HH Feeder Pipelines D&D Cost	**$ 74,439**		Calculated
Individual Production Well Pipelines- Pipe data			
Length of recovery well pipelines	6,612	ft	Preliminary wellfield design
Length of injection well pipelines	11,074	ft	Preliminary wellfield design
Total length of production well pipelines	17,686	ft	Calculated
Total length for 5 HHs	88,430	ft	Calculated
OD	2.375	in	2" SDR 11 HDPE
Wall thickness	0.216	in	HDPE Pipe Dimensions
Pipe material volume	822	cu ft	Calculated
Chipped/shredded volume	1,232	cu ft	Estimated at volume x 1.5
Volume per truckload	540	cu ft	
Total number of truckloads	2.3		Calculated
Removal			
Unit cost	$ 3.16	per ft	RS Means 2011…..; excavation and backfill costs reduced by 50% to account for common trench
Removal cost	***$ 279,439***		Calculated
Transportation			
Loads to 11e.(2) facility	2.3		Calculated
Distance to 11e.(2) facility	150	miles	Pathfinder Shirley Basin
Transport unit cost	$ 3.00	per mile	Estimated
Transport cost	***$ 1,027***		Calculated
Disposal			
11e.(2) disposal fee	$ 405	$/cu yd	Industry comparison
Total 11e.(2) disposal cost	***$ 18,484***		Calculated
Total individual production well pipelines D&D cost	***$ 298,950***		Calculated

Table 4-2: Wellfield Equipment Removal Cost- *Wellfiled Piping Removal and Disposal (Cont.)*

Item	Value	Unit	Notes
Down Hole Well Pipe- Pipe Data			
Length - recovery drop pipe (2") per HH	9,000	ft	Calculated
Length - injection stingers (1.5) per HH	11,550	ft	Calculated
Total length - recovery drop pipe per PU	45,000	ft	Calculated
Total length - injection stingers per PU	57,750		Calculated
Recovery drop pipe OD (2")	2.375	in	2" SDR 11 HDPE
Wall thickness	0.216	in	HDPE Pipe Dimensions
Pipe material volume	458	cu ft	Calculated
Chipped/shredded volume	687	cu ft	Estimated at volume x 1.5
Volume per truckload	540	cu ft	
Total number of truckloads	1.3		Calculated
Removal Pipes and Pumps			
Unit cost	$ 1.01	per ft	Estimated
Removal cost	***$ 45,450***		Calculated
Injection stinger pipe OD (1.5")	1.9	in	1.5" SDR 11 HDPE
Wall thickness	0.173	in	HDPE Pipe Dimensions
Pipe material volume	387	cu ft	Calculated
Chipped/shredded volume	581	cu ft	Estimated at volume x 1.5
Volume per truckload	540	cu ft	
Total number of truckloads	1.1		Calculated
Removal			
Unit cost	$ 1.01	per ft	Estimated
Removal cost	***$ 58,328***		
Transportation			
Loads to 11e.(2) facility	2.3		Calculated
Distance to 11e.(2) facility	150	miles	Pathfinder Shirley Basin
Transport unit cost	$ 3.00	per mile	Estimated
Transport cost	***$ 1,056***		Calculated
Disposal			
11e.(2) disposal fee	$ 405	$/cu yd	Industry comparison
Total 11e.(2) disposal cost	***$ 10,303***		Calculated
Total downhole pipe D&D Cost	***$ 115,136***		Calculated
Total Wellfield Piping Removal and Disposal Cost	**$ 1,036,503**		

Table 4-3: Wellfield Equipment Removal Cost- *Wellfield Buildings*

Item	Value	Unit	Notes
Header House Building Demolition			
Length	12	ft	Preliminary design
Width	30	ft	Preliminary design
Height	9	ft	Preliminary design
Footprint	360	sq ft	Calculated
Volume	3,240	cu ft	Calculated
Demolition			
Demo unit cost	$ 0.125	$/cu ft	WDEQ/LQD Guideline 12, less 50% for lack of interior walls
Demolition cost	***$ 405.00***		Calculated
Transportation			
Unit building weight	15	lb/sq ft	ASCE 7-05
Building weight	3	ton	Calculated
Salvage %	50%		Assumes net salvage value
Weight of material to dispose	1.4	ton	Calculated
Density of construction material	2,000	lb/cu yd	Typical of construction debris
Volume of material to dispose	1.4	cu yd	Calculated
Volume per truck	20	cu yd	
Number of trucks	0.1		Calculated
Distance to landfill	60	miles	Campbell County Landfill
Cost per mile	$ 3.00	per mile	Estimated
Transport cost	**$ 12**		Calculated
Disposal			
Landfill disposal fee	$ 60	per ton	Campbell County Landfill rate sheet
Landfill disposal cost	**$ 81**		
11e.(2) disposal fee	$ 405	$/cu yd	Industry comparison
11e.(2) disposal cost	**$ -**		
Total Building Demolition Cost	**$ 498**		
Foundation Concrete Demolition (2)			
Foundation length	14	ft	Preliminary design
Foundation width	2	ft	Preliminary design
Foundation thickness	0.5	ft	Preliminary design
Foundation volume (2)	28	cu ft	Calculated
Demolition			
Foundation area (2)	56	sq ft	Calculated
Concrete demo unit cost	$ 5.05	$/sq ft	WDEQ Guideline 12
Concrete demo cost	**$ 283**		Calculated
Transportation			
Volume to landfill	28	cu ft	Calculated
Volume to 11e.(2) facility	0	cu ft	Estimate
Volume per truckload	540	cu ft	
Number trucks to landfill	0.1		Calculated
Distance to landfill	60	miles	Campbell County Landfill
Number of trucks to 11e.(2) facility	0		

Table 4-3: Wellfield Equipment Removal Cost- *Wellfield Buildings (Cont.)*

Item	Value	Unit	Notes
Distance to 11e.(2) facility	150	miles	Shirley Basin
Transport unit cost	$ 3.00	per mile	Estimate
Transport cost	***$ 9***		
Disposal			
Density of concrete	100	lb/cu ft	
Landfill disposal fee	$ 60	per ton	Campbell County Landfill rate sheet
Landfill disposal cost	***$ 84***		
11e.(2) disposal fee	$ 405	$/cu yd	Industry comparison
11e.(2) disposal cost	***$ -***		
Total Concrete Demo & Disposal	***$ 376***		
HH Piping & Equipment Disposal			
Quantity	2	cu yd	Estimate
Demolition unit cost	***$ -***		Included in building
Transportation			
Volume to landfill	0		All 11e.(2)
Volume to 11e.(2) facility	2	cu yd	Estimate
Volume per truck	20	cu yd	
Number trucks to landfill	0		All 11e.(2)
Distance to landfill	60	miles	Campbell County Landfill
Number of trucks to 11e.(2) facility	0.1		Calculated
Distance to 11e.(2) facility	150	miles	Shirley Basin
Transport unit cost	$ 3.00	per mile	Estimate
Transport cost	***$ 45***		Calculated
Disposal			
Landfill disposal fee	$ 60	per ton	Campbell County Landfill rate sheet
Landfill disposal cost	***$ -***		All 11e.(2)
11e.(2) disposal fee	$ 405	$/cu yd	Industry comparison
11e.(2) disposal cost	***$ 810***		Calculated
Total Piping & equipment disposal	***$ 855***		Calculated
Total D&D per Headerhouse	***$ 1,729***		
Total Headerhouse D&D Cost	***$ 8,646***		
Total Wellfield Building Removal Cost	**$ 8,646**		

Table 4-4: Wellfield Equipment Removal Cost- *Production Unit Valve Stations*

Item	Value	Unit	Notes
Valve Station Data			
Number of valve stations	7		Preliminary design
Number of valves per station	7		Preliminary design
Total number of valves	49		Calculated
Diameter 8" valve lug	0.875	ft	Bray
Thickness 8" lug valve	0.21	in	Bray
Approximate volume	6.14	cu ft	Calculated
Volume per truckload	540	cu ft	
Total number of truckloads	0.01		Calculated
Transportation			
Loads to 11e.(2) facility	0.01		Calculated
Distance to 11e.(2) facility	150	miles	PathfinderShirley Basin
Transport unit cost	$ 3.00	per mile	Estimate
Transport cost	**$ 5**		
Disposal			
11e.(2) disposal fee	$ 405		Industry comparison
Total 11e.(2) disposal cost	**$ 92**		Calculated
Total Valve Disposal Cost	**$ 97**		Calculated
Valve Station Construction Material			
Galvanized corrugated steel pipe			
Pipe depth	5	ft	
Total length of corrugated pipe x 7 valve stations	35	ft	Calculated
OD	96	in	Pipe dimensions
Wall thickness	0.064	in	Pipe dimensions
Unit weight	87	lb/ft	Pipe dimensions
Pipe material volume	5	cu ft	Calculated
Chipped/shredded volume	7	cu ft	Estimated at volume x 1.5
Bulk weight	433	lb/cu ft	Calculated
Volume per truckload	540	cu ft	
Number of truckloads	0.01		Calculated
Top and Bottom material data (steel plate)			
Area of Pipe End	50.3	sq ft	Calculated

Table 4-4: Wellfield Equipment Removal Cost- *Production Unit Valve Stations* (Cont.)

Item	Value	Unit	Notes
Thickness of top and bottom	0.1875	in	Material dimensions
Weight of top and bottom material	7.65	lbs/sq ft	Material dimensions
Volume of top and bottom material	1.6	cu ft	Calculated
Chipped/shredded volume	2.4	cu ft	Calculated
Total top and bottom volume x 7 valve stations	16.5	cu ft	Calculated
Bulk weight	163	lb/cu ft	Calculated
Volume per truckload	540	cu ft	
Number of truckloads	0.03		Calculated
Total Number of truckloads for 7 valve stations	0.04		Calculated
Total Weight of material to dispose for 7 valve stations	2.9	tons	Calculated
Transportation			
Volume to landfill	24	cu ft	Calculated
Volume per truck	540	cu ft	
Number trucks to landfill	0.04		Calculated
Distance to landfill	60	miles	Campbell County Landfill
Transport unit cost	$ 3.00	per mile	Estimate
Transport cost	**$ 7.85**		Calculated
Disposal			
Landfill disposal fee	60	per ton	Campbell County Landfill rate sheet
Landfill disposal cost	**$ 172.16**		Calculated
Total Valve station construction material disposal cost	**$ 180.00**		Calculated
Total Production Unit Valve Station Removal Cost	**$ 277.15**		

Table 4-5: Wellfield Equipment Removal Cost- *Wellhead Reclamation*

Recovery & Injection Wellheads	Value	Unit	Notes
Wellhead Data			
Number production wells	360	wells	Calculated
Number of monitor wells	40	wells	Calculated
Casing Data			
Length of casing to dispose	6	ft	Casing cut off for abandonment + wellhead coupling
OD	4.95	in	4.5" SDR 17 PVC
Wall thickness	0.291	in	Certainteed
Pipe material volume	0.18	cu ft	Calculated
Chipped/shredded volume	0.27	cu ft	Estimated at volume x 1.5
Volume per truckload	540	cu ft	
Total number of truckloads	0.20		Calculated
Removal	NA		Included in abandonment cost (backhoe)
Transportation			
Loads to 11e.(2) facility	0.20		Calculated
Distance to 11e.(2) facility	150	miles	PathfinderShirley Basin
Transport unit cost	$ 3.00	per mile	Estimated
Transport cost	***$ 89***		
Disposal			
11e.(2) disposal fee	$ 405.00	$/cu yd	Industry comparison
Total 11e.(2) disposal cost	***$ 1,597***		Calculated
Total Wellhead Reclamation Costs	**$ 1,686**		

Table 4-6: Wellfield Equipment Removal Cost- *Access Road Reclamation*

Item	Value	Unit	Notes
Gravel Removal			
Length of primary access road	1,320	ft	Preliminary design
Width of primary access road	32	ft	Preliminary design
Area of primary access road	1.0	ac	Calculated
Length of secondary access roads	2,700	ft	Wellfield layout--to HHs
Width of secondary access roads	12	ft	Wellfield layout--to HHs
Area of secondary access roads	0.7	ac	Calculated
Length of tertiary access roads	7,500	ft	Wellfield layout
Width of tertiary access roads	8	ft	Wellfield layout
Area of tertiary access roads	1.4	ac	Calculated
Ave. gravel thickness	0.5	ft	Estimate
Gravel volume	2,493	cu yd	Calculated
Blade grading unit cost	$ 68.61	$/ac	WDEQ Guideline 12
Blade grading cost	***$ 212***		Calculated
Scraper hauling unit cost	$ 1.41	$/cu yd	WDEQ Guideline 12
Scraper cost	***$ 3,516***		Calculated
Gravel disposal	$ -		Donated with no salvage value
Gravel disposal cost	***$ 3,728***		Calculated
Scarification			
Area of roads	3.1	ac	Calculated
Scarification unit cost	$ 62.93	$/ac	WDEQ Guideline 12
Scarification cost	***$ 195***		Calculated
Topsoil Replacement			
Topsoil volume	9,973	cu yd	Assumes 2' thickness
Topsoil replacement unit cost	$ 1.09	$/cu yd	WDEQ Guideline 12
Topsoil replacement cost	***$ 10,871***		
Revegetation	$ -		Included in Revegetation costs
Total Access Road Reclamation Costs	**$ 14,793**		

Table 4-7: Wellfield Equipment Removal Cost- *Well Abandonment*

Assumptions	Value	Unit	Notes
Production and Monitor Wells			
Number of production wells (PZA)	360	wells	Calculated
Number of RM monitor wells (PZA)	30	wells	Calculated
Number of OM monitor wells	10	wells	Calculated
Average depth of PZA wells	310	ft	AUC Delineation Drilling for PU1
Average depth of OM wells	150	ft	AUC Delineation Drilling for PU1
Diameter of wells	4.5	in	TR Section 3
Diameter of wells	0.38	ft	Calculated
Radius of wells	0.19	ft	Calculated
Well Abandonment Materials			
Volume PZA wells	34.2	cu ft	Calculated
Volume OM wells	16.6	cu ft	Calculated
Cement unit cost	$ 14.50	per bag	
Cement cost PZA wells	$ 135,720		Calculated
Cement cost OM wells	$ 1,740		Calculated
Bentonite unit cost	$ 2.90	per bag	
Bentonite cost PZA wells	$ 1,470		Calculated
Bentonite cost OM wells	$ 17		Calculated
Total materials cost	***$ 138,948***		Calculated
Equipment Rental			
Time required to plug well	2.5	hours	
Cementer unit cost	$ 125.00		Actual costs during AUC drilling program
Backhoe unit cost	$ 75.00		Actual costs during AUC drilling program
Equipment cost per hour	$ 200.00		
Equipment cost per well	***$ 500.00***		Calculated
Total equipment cost	***$ 200,000***		Calculated
Total Well Abandonment Costs	**$ 338,948**		

Table 4-8: Wellfield Equipment Removal Cost- *Submersible Recovery Well Pumps*

Items	Value	Unit	Notes
Pump and Motor Data			
Number of recovery wells	150	wells	Calculated
Length of pump and motor	5.9	ft	Grundfos Product Guide
Diameter	0.33	ft	Grundfos Product Guide
Volume	0.5	cu ft	Calculated
Volume per truckload	540	cu ft	
Total number of truckloads	0.14		Calculated
Transportation			
Loads to 11e.(2) facility	0.14		Calculated
Distance to 11e.(2) facility	150	miles	Pathfinder Shirley Basin
Transport unit cost	$ 3.00		Estimated
Transport cost	***$ 63***		Calculated
Disposal			
11e.(2) disposal fee	$ 405	$/cu yd	Industry Comparison
Total 11e.(2) disposal cost	***$ 1,136***		Calculated
Total Submersible Well Pump Cost	**$ 1,199**		

Table 4-9: Wellfield Equipment Removal Cost- *Disposal Well Abandonment*

Assumptions	Value	Unit	Notes
Number of deep disposal wells (DDWs)	3	wells	Calculated
Well plugging and abandonment cost	$ 80,851		AUC Application for Class I UIC, Appendix G (replacement)
Surface plant removal	$ 4,844		AUC Application for Class I UIC, Appendix G (replacement)
Pipeline removal (12,000 ft of 6 inch pipeline)	$ 21,479		AUC Application for Class I UIC, Appendix G (replacement)
Disposal of waste	$ 14,584		AUC Application for Class I UIC, Appendix G (replacement)
Power line removal (no cost per Guideline 12)	$ -		AUC Application for Class I UIC, Appendix G (replacement)
Fence removal	$ 600		AUC Application for Class I UIC, Appendix G (replacement)
Reclamation and vegetation	$ 3,929		AUC Application for Class I UIC, Appendix G (replacement)
Cost per Well (2010 estimate)	**$ 126,287**		
Cost per Well (2012 estimate)	**$ 133,978**		3% cost increase per year for 2 years
Total Well Abandonment Costs	**$ 401,934**		

Table 5-1: Miscellaneous Reclamation Activities Summary

Item	Cost	
Radiological Surveys	$	35,500
Revegetation	$	13,500
Other D&D Costs	$	94,919
Total Miscellaneous Reclamation Activities Costs	**$**	**143,919**

Table 5-2: Miscellaneous Reclamation Activities- *Radiological Survey Costs*

Item	Value	Unit	Notes
Gamma Survey			
Area required	60	acres	Preliminary design
Survey cost per acre	$ 205.00	$/ac	Pre application baseline survey cost
Total cost	***$ 12,300***		Calculated
Soil Samples			
Number of samples required	20		Assume 8 in CPP and 12 in wellfields
Cost	$ 660.00	$/sample	Pre application baseline survey cost
Total cost	***$ 13,200***		Calculated
Equipment & Building Smear Samples			
Number of samples required	100		Estimate
Cost	$ 100	$/sample	Estimate
Total cost	***$ 10,000***		Calculated
Total Radiological Survey Costs	**$ 35,500**		

Table 5-3: Miscellaneous Reclamation Activities- *Revegetation Costs*

Item	Value	Unit	Notes
Area requiring revegetation	30	acre	Disturbed area
Cost per acre	$ 450.00	$/ac	Drill program revegetation costs
Total Revegetation Cost	**$ 13,500**		

Table 5-4: Miscellaneous Reclamation Activities- *Other D&D Costs*

Item	Value	Unit	Notes
Fence Removal			
Chain Link Fence			
Length of fence at CPP	2,750	ft	Preliminary design
Unit cost for fence removal	$ 4.00	$/ft	RS Means
Total removal cost	***$ 11,000***		Calculated
Barbed Wire Fence			
Length of fence at Production Unit	5,000	ft	Preliminary wellfield design
Unit cost for fence removal	$ 0.35	$/ft	
Total removal cost	***$ 1,750***		Calculated
Overhead Power line Removal			
Length of overhead power lines	5,500	ft	Preliminary design
Unit costs for removal	$ -	$/ft	Removed by power company for salvage
Total removal cost	***$ -***		
Gas Line Removal (propane)			
Length of gas line	200	ft	Preliminary CPP layout
Unit cost for removal	$ 5.50	$/ft	RS Means
Total removal cost	***$ 1,100***		Calculated
Transformer Removal and Disposal			
Number of transformers	35		Calculated
Unit removal/disposal cost	$ 450	per transformer	RSMeans
Total removal cost	***$ 15,750***		Calculated
Air Quality/Weather Station Removal			
Number of stations	6		5 AQ and 1 Met station
Unit removal/disposal cost	$ 886	per unit	WDEQ Guideline 12
Total removal costs	***$ 5,319***		Calculated
Chipper/shredder	***$ 60,000***		Estimated
Total Other D&D Costs	**$ 94,919**		

ADDENDUM 6-B
RESRAD DATA INPUT BASIS

Addendum 6-B presents or references details supporting the RESRAD calculations performed to develop an allowable residual uranium concentration associated with the AUC Reno Creek ISR license application. Addendum 6-B is called out in Section 6.4.1 of the Technical Report (TR), which summarizes methods and presents results detailed in this appendix. The RESRAD analysis and associated output files produced specifically for the AUC TR are presented here. A set of uncertainty analyses applicable to this RESRAD analysis was performed in 2007 by Energy Metals Corporation, for the Moore Ranch ISR license application; that uncertainty analysis is referenced here in support of the AUC RESRAD calculations. To review the Moore Ranch RESRAD raw data review the Moore Ranch SER.

Addendum 6-B consists of the following set of attached documents, which are recommended for review in this order:

- **RC RESRAD Summary**: Presents the results of the RESRAD analysis performed for the AUC Technical Report.
- **RC RESRAD Detailed Report**: Presents a more detailed version of the RESRAD analysis.
- **RC RESRAD Alldose**: A plot of the RESRAD-calculated dose over time.

ADDENDUM 6-B
RC RESRAD Summary

Summary : RESRAD Default Parameters

File : C:\USERS\BOB\DOCUMENTS\1 AUC RENO CREEK\RESRAD DATA\RENOCREEK22NOV.RAD

Table of Contents

Part I: Mixture Sums and Single Radionuclide Guidelines

Dose Conversion Factor (and Related) Parameter Summary

Dose Library: FGR 12 & FGR 11

Menu	Parameter	Current Value#	Base Case*	Parameter Name
A-1	DCF's for external ground radiation, (mrem/yr)/(pCi/g)			
A-1	At-218 (Source: FGR 12)	5.847E-03	5.847E-03	DCF1(1)
A-1	Bi-210 (Source: FGR 12)	3.606E-03	3.606E-03	DCF1(2)
A-1	Bi-214 (Source: FGR 12)	9.808E+00	9.808E+00	DCF1(3)
A-1	Pb-210 (Source: FGR 12)	2.447E-03	2.447E-03	DCF1(4)
A-1	Pb-214 (Source: FGR 12)	1.341E+00	1.341E+00	DCF1(5)
A-1	Po-210 (Source: FGR 12)	5.231E-05	5.231E-05	DCF1(6)
A-1	Po-214 (Source: FGR 12)	5.138E-04	5.138E-04	DCF1(7)
A-1	Po-218 (Source: FGR 12)	5.642E-05	5.642E-05	DCF1(8)
A-1	Ra-226 (Source: FGR 12)	3.176E-02	3.176E-02	DCF1(9)
A-1	Rn-222 (Source: FGR 12)	2.354E-03	2.354E-03	DCF1(10)
A-1	Tl-210 (Source: no data)	0.000E+00	-2.000E+00	DCF1(11)
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(1)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(2)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(1)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(2)
D-34	Food transfer factors:			
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(1,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(1,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(1,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(2,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(1,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(2,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(2,2)

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.
*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.000E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.500E-01	2.000E+00	---	THICK0
R011	Fraction of contamination that is submerged	0.000E+00	0.000E+00	---	SUBMFRACT
R011	Length parallel to aquifer flow (m)	1.000E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	1.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Pb-210	5.000E+00	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Ra-226	5.000E+00	0.000E+00	---	S1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(2)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	4.300E+03	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	5.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	7.500E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	3.000E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	0.000E+00	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.000E+03	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	4.300E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	3.300E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	2.000E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	5.550E+03	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	2.000E-02	2.000E-02	---	HGWT
R014	Saturated zone b parameter	5.300E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	2.200E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	2.100E+01	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	1.500E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	4.000E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	2.000E-01	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	2.000E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	5.300E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	4.300E+03	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	2.700E+02	1.000E+02	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	2.700E+02	1.000E+02	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	2.700E+02	1.000E+02	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	9.872E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	5.000E+02	7.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+02	7.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	5.000E+02	7.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.332E-04	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R017	Inhalation rate (m**3/yr)	8.400E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	5.500E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	5.000E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.500E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	1.600E+02	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	1.400E+01	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	6.300E+01	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	5.100E+02	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	2.500E-01	-1	---	FPLANT
R018	Contamination fraction of meat	2.500E-01	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	6.800E+01	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	3.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	3.000E-01	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	1.000E+00	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	8.000E-02	8.000E-02	---	TE(3)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R19B	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	active
5 -- milk ingestion	suppressed
6 -- aquatic foods	suppressed
7 -- drinking water	active
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	suppressed

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	5.000E+00
Thickness:	0.15 meters	Ra-226	5.000E+00
Cover Depth:	0.00 meters		

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 2.500E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	3.953E+01	3.934E+01	3.895E+01	3.759E+01	3.358E+01	1.745E+01	0.000E+00	0.000E+00
M(t):	1.581E+00	1.574E+00	1.558E+00	1.503E+00	1.343E+00	6.980E-01	0.000E+00	0.000E+00

Maximum TDOSE(t): 3.953E+01 mrem/yr at t = 0.000E+00 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.502E-02	0.0004	2.894E-03	0.0001	0.000E+00	0.0000	7.766E+00	0.1965	3.781E-01	0.0096	0.000E+00	0.0000	9.769E-01	0.0247
Ra-226	2.412E+01	0.6103	1.134E-03	0.0000	0.000E+00	0.0000	5.869E+00	0.1485	2.014E-01	0.0051	0.000E+00	0.0000	1.954E-01	0.0049
Total	2.414E+01	0.6107	4.029E-03	0.0001	0.000E+00	0.0000	1.363E+01	0.3449	5.795E-01	0.0147	0.000E+00	0.0000	1.172E+00	0.0297

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.139E+00	0.2312
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.039E+01	0.7688
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.953E+01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.454E-02	0.0004	2.784E-03	0.0001	0.000E+00	0.0000	7.471E+00	0.1899	3.638E-01	0.0092	0.000E+00	0.0000	9.397E-01	0.0239
Ra-226	2.405E+01	0.6113	1.213E-03	0.0000	0.000E+00	0.0000	6.064E+00	0.1541	2.118E-01	0.0054	0.000E+00	0.0000	2.235E-01	0.0057
Total	2.406E+01	0.6117	3.998E-03	0.0001	0.000E+00	0.0000	1.353E+01	0.3440	5.756E-01	0.0146	0.000E+00	0.0000	1.163E+00	0.0296

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.792E+00	0.2235
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.055E+01	0.7765
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.934E+01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.362E-02	0.0003	2.576E-03	0.0001	0.000E+00	0.0000	6.912E+00	0.1774	3.366E-01	0.0086	0.000E+00	0.0000	8.695E-01	0.0223
Ra-226	2.390E+01	0.6135	1.360E-03	0.0000	0.000E+00	0.0000	6.414E+00	0.1647	2.301E-01	0.0059	0.000E+00	0.0000	2.759E-01	0.0071
Total	2.391E+01	0.6138	3.936E-03	0.0001	0.000E+00	0.0000	1.333E+01	0.3421	5.667E-01	0.0145	0.000E+00	0.0000	1.145E+00	0.0294

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.135E+00	0.2088
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.082E+01	0.7912
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.895E+01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.084E-02	0.0003	1.960E-03	0.0001	0.000E+00	0.0000	5.259E+00	0.1399	2.561E-01	0.0068	0.000E+00	0.0000	6.615E-01	0.0176
Ra-226	2.335E+01	0.6212	1.763E-03	0.0000	0.000E+00	0.0000	7.345E+00	0.1954	2.799E-01	0.0074	0.000E+00	0.0000	4.217E-01	0.0112
Total	2.336E+01	0.6215	3.722E-03	0.0001	0.000E+00	0.0000	1.260E+01	0.3353	5.360E-01	0.0143	0.000E+00	0.0000	1.083E+00	0.0288

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.189E+00	0.1647
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.140E+01	0.8353
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.759E+01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	5.621E-03	0.0002	8.840E-04	0.0000	0.000E+00	0.0000	2.372E+00	0.0706	1.155E-01	0.0034	0.000E+00	0.0000	2.984E-01	0.0089
Ra-226	2.162E+01	0.6439	2.243E-03	0.0001	0.000E+00	0.0000	8.217E+00	0.2447	3.348E-01	0.0100	0.000E+00	0.0000	6.116E-01	0.0182
Total	2.163E+01	0.6440	3.127E-03	0.0001	0.000E+00	0.0000	1.059E+01	0.3153	4.503E-01	0.0134	0.000E+00	0.0000	9.099E-01	0.0271

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.792E+00	0.0832
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.079E+01	0.9168
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.358E+01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	5.010E-04	0.0000	3.879E-05	0.0000	0.000E+00	0.0000	1.041E-01	0.0060	5.076E-03	0.0003	0.000E+00	0.0000	1.309E-02	0.0008
Ra-226	1.282E+01	0.7347	1.172E-03	0.0001	0.000E+00	0.0000	3.996E+00	0.2290	1.695E-01	0.0097	0.000E+00	0.0000	3.391E-01	0.0194
Total	1.282E+01	0.7348	1.210E-03	0.0001	0.000E+00	0.0000	4.100E+00	0.2350	1.746E-01	0.0100	0.000E+00	0.0000	3.522E-01	0.0202

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.228E-01	0.0070
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.733E+01	0.9930
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.745E+01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mren/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mren/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.828E+00	1.758E+00	1.627E+00	1.238E+00	5.585E-01	2.457E-02	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	6.045E+00	6.020E+00	5.971E+00	5.796E+00	5.270E+00	2.929E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	3.347E-02	8.957E-02	1.925E-01	4.830E-01	8.875E-01	5.365E-01	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		6.078E+00	6.110E+00	6.164E+00	6.279E+00	6.157E+00	3.466E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	1.368E+01	1.422E+01	1.537E+01	2.020E+01	4.476E+01	1.018E+03	*7.634E+13	*7.634E+13
Ra-226	4.113E+00	4.092E+00	4.056E+00	3.981E+00	4.060E+00	7.214E+00	*9.885E+11	*9.885E+11

*At specific activity limit

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Pb-210	5.000E+00	0.000E+00	1.828E+00	1.368E+01	1.828E+00	1.368E+01
Ra-226	5.000E+00	15.29 ± 0.03	6.303E+00	3.966E+00	6.078E+00	4.113E+00

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	Pb-210	1.000E+00	9.139E+00	8.792E+00	8.135E+00	6.189E+00	2.792E+00	1.228E-01	0.000E+00	0.000E+00
Pb-210	Ra-226	1.000E+00	1.673E-01	4.478E-01	9.627E-01	2.415E+00	4.437E+00	2.682E+00	0.000E+00	0.000E+00
Pb-210	∑DOSE(j)		9.306E+00	9.239E+00	9.097E+00	8.604E+00	7.230E+00	2.805E+00	0.000E+00	0.000E+00
Ra-226	Ra-226	1.000E+00	3.022E+01	3.010E+01	2.986E+01	2.898E+01	2.635E+01	1.465E+01	0.000E+00	0.000E+00

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	Pb-210	1.000E+00	5.000E+00	4.842E+00	4.541E+00	3.628E+00	1.910E+00	2.024E-01	3.316E-04	5.904E-14
Pb-210	Ra-226	1.000E+00	0.000E+00	1.529E-01	4.439E-01	1.323E+00	2.945E+00	4.334E+00	3.739E+00	1.901E+00
Pb-210	∑S(j):		5.000E+00	4.995E+00	4.985E+00	4.951E+00	4.855E+00	4.537E+00	3.739E+00	1.901E+00
Ra-226	Ra-226	1.000E+00	5.000E+00	4.995E+00	4.986E+00	4.952E+00	4.857E+00	4.539E+00	3.742E+00	1.902E+00

THF(i) is the thread fraction of the parent nuclide.

RESCALC.EXE execution time = 1.09 seconds

ADDENDUM 6-B
RC RESRAD Detailed Report

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Part II: Source Terms, Factors, and Parameters for Individual Pathways

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Part II: Source Terms, Factors, and Parameters for Individual Pathways

Iteration Log for Computation of the Time of Maximum Ra-226 Dose/Source Ratio
All Pathways Summed

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	1.42510E+01	6.30227E+00		
1	1.53825E+01	6.30316E+00	1.13150E+00	parabolic
2	1.53267E+01	6.30317E+00	-5.58200E-02	parabolic
3	1.53020E+01	6.30317E+00	-2.46644E-02	parabolic
4	1.52867E+01	6.30317E+00	-1.53020E-02	parabolic
5	1.48911E+01	6.30303E+00	-3.95606E-01	golden section
6	1.51356E+01	6.30314E+00	-1.51108E-01	golden section
7	1.52290E+01	6.30316E+00	-5.77180E-02	golden section
8	1.52647E+01	6.30317E+00	-2.20464E-02	golden section
9	1.52867E+01	6.30317E+00	0.00000E+00	direct

Notes:

1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Source Factors for Ingrowth and Decay
Radioactivity Factors Only
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	ID(j,t) = THF(j)*S1(j,t)/S1(i,0) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.000E+00	9.694E-01	9.110E-01	7.328E-01	3.936E-01	4.468E-02	8.918E-05	3.169E-14
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	9.996E-01	9.987E-01	9.957E-01	9.871E-01	9.576E-01	8.781E-01	6.484E-01
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	3.060E-02	8.897E-02	2.666E-01	6.019E-01	9.258E-01	8.904E-01	6.576E-01

Source Factors for Ingrowth and Decay
Combined Radioactivity and Leaching Factors
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	SF(j,t) = THF(j)*S1(j,t)/S1(i,0) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.000E+00	9.684E-01	9.083E-01	7.256E-01	3.821E-01	4.048E-02	6.632E-05	1.181E-14
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	9.990E-01	9.971E-01	9.904E-01	9.714E-01	9.079E-01	7.483E-01	3.804E-01
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	3.057E-02	8.877E-02	2.646E-01	5.889E-01	8.668E-01	7.478E-01	3.802E-01

The effect of volatilization was also considered when computing the source factors for H-3 and C-14.

Parameters Used for Calculating Cover Depth and Contaminated Zone Thicknesses

```
            Cover Erosion rate (vcv):  0.001000 m/yr
Contaminated Zone Erosion rate (vcz):  0.001000 m/yr
         Water Table Drop rate (vwt):  0.001000 m/yr
            Precipitation rate (Pr):  0.300000 m/yr
            Cover Removal Time (Tc): 0.000E+00 yr
Overhead irrigation rate (Irr):  0.000 m/yr          Runoff coefficient (Cr):  0.200
Evapotranspiration coeff. (Ce):  0.750                Infiltration rate (In):  0.060 m/yr
      Bulk soil density (rhob):  1.500 g/cm**3       Effective porosity (pe):  0.000
```

Radio-nuclide (i)	Distribution Coefficient Kd(i),cm**3/g	Leaching Ratio q(i)
Pb-210	2.700000E+02	4.936E-04
Ra-226	5.000000E+02	2.666E-04

Time Dependence of Source Geometry

Time Dependence of Cover Depth [Cd(i,t)]

Nuclide (i)	Cd(i,t) (meters) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Ra-226	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Time Dependence of Contaminated Zone Thicknesses [T(i,t)]

Nuclide (i)	T(i,t) (meters) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	1.5000E-01	1.4900E-01	1.4700E-01	1.4000E-01	1.2000E-01	5.0000E-02	0.0000E+00	0.0000E+00
Ra-226	1.5000E-01	1.4900E-01	1.4700E-01	1.4000E-01	1.2000E-01	5.0000E-02	0.0000E+00	0.0000E+00

Occupancy, Cover/Depth, and Area Factors for Ground Pathway

Occupancy Factor (FO1):	0.525
Area (A):	10000. sq. meters
Initial cover depth (Cd):	0.000 meters
Initial contaminated zone thickness (T):	0.150 meters

Time Dependence of Cover/Depth Factor [FCTR_COV_DEPTH(i,t)]

Nuclide (i)	FCTR_COV_DEPTH(i,t) (dimensionless) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
At-218	9.998E-01	9.998E-01	9.998E-01	9.997E-01	9.990E-01	9.496E-01	0.000E+00	0.000E+00
Bi-210	9.565E-01	9.556E-01	9.538E-01	9.468E-01	9.208E-01	6.799E-01	0.000E+00	0.000E+00
Bi-214	8.311E-01	8.292E-01	8.253E-01	8.110E-01	7.633E-01	4.798E-01	0.000E+00	0.000E+00
Pb-210	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.999E-01	9.801E-01	0.000E+00	0.000E+00
Pb-214	9.252E-01	9.239E-01	9.213E-01	9.115E-01	8.761E-01	6.004E-01	0.000E+00	0.000E+00
Po-210	8.776E-01	8.760E-01	8.726E-01	8.600E-01	8.165E-01	5.280E-01	0.000E+00	0.000E+00
Po-214	8.735E-01	8.718E-01	8.684E-01	8.557E-01	8.121E-01	5.266E-01	0.000E+00	0.000E+00
Po-218	8.733E-01	8.716E-01	8.681E-01	8.554E-01	8.117E-01	5.255E-01	0.000E+00	0.000E+00
Ra-226	9.553E-01	9.544E-01	9.525E-01	9.453E-01	9.179E-01	6.614E-01	0.000E+00	0.000E+00
Rn-222	8.983E-01	8.968E-01	8.938E-01	8.823E-01	8.420E-01	5.579E-01	0.000E+00	0.000E+00
Tl-210	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

Time Dependence of Area Factor [FCTR_AREA(i,t)]

Nuclide (i)	FCTR_AREA(i,t) (dimensionless) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
At-218	9.702E-01	9.704E-01	9.707E-01	9.718E-01	9.750E-01	9.861E-01	1.000E+00	1.000E+00
Bi-210	9.770E-01	9.771E-01	9.772E-01	9.777E-01	9.791E-01	9.840E-01	1.000E+00	1.000E+00
Bi-214	9.766E-01	9.766E-01	9.767E-01	9.767E-01	9.768E-01	9.772E-01	1.000E+00	1.000E+00
Pb-210	9.813E-01	9.814E-01	9.815E-01	9.818E-01	9.828E-01	9.862E-01	1.000E+00	1.000E+00
Pb-214	9.766E-01	9.766E-01	9.768E-01	9.773E-01	9.787E-01	9.839E-01	1.000E+00	1.000E+00
Po-210	9.770E-01	9.770E-01	9.771E-01	9.773E-01	9.779E-01	9.800E-01	1.000E+00	1.000E+00
Po-214	9.760E-01	9.761E-01	9.762E-01	9.765E-01	9.775E-01	9.810E-01	1.000E+00	1.000E+00
Po-218	9.770E-01	9.770E-01	9.771E-01	9.773E-01	9.779E-01	9.800E-01	1.000E+00	1.000E+00
Ra-226	9.749E-01	9.750E-01	9.752E-01	9.760E-01	9.782E-01	9.861E-01	1.000E+00	1.000E+00
Rn-222	9.770E-01	9.770E-01	9.771E-01	9.775E-01	9.785E-01	9.820E-01	1.000E+00	1.000E+00
Tl-210	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

Dose Conversion and Environmental Transport Factors for the Ground Pathway (p=1)

Nuclide (i)	DCF(i,1)*	ETFG(i,t) At Time in Years (dimensionless) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
At-218	5.847E-03	5.093E-01	5.094E-01	5.095E-01	5.100E-01	5.114E-01	4.916E-01	0.000E+00	0.000E+00
Bi-210	3.606E-03	4.906E-01	4.902E-01	4.893E-01	4.860E-01	4.733E-01	3.512E-01	0.000E+00	0.000E+00
Bi-214	9.808E+00	4.261E-01	4.252E-01	4.232E-01	4.159E-01	3.914E-01	2.461E-01	0.000E+00	0.000E+00
Pb-210	2.447E-03	5.152E-01	5.152E-01	5.153E-01	5.154E-01	5.159E-01	5.075E-01	0.000E+00	0.000E+00
Pb-214	1.341E+00	4.743E-01	4.737E-01	4.725E-01	4.677E-01	4.502E-01	3.101E-01	0.000E+00	0.000E+00
Po-210	5.231E-05	4.502E-01	4.493E-01	4.476E-01	4.412E-01	4.192E-01	2.717E-01	0.000E+00	0.000E+00
Po-214	5.138E-04	4.476E-01	4.468E-01	4.450E-01	4.387E-01	4.168E-01	2.712E-01	0.000E+00	0.000E+00

Dose Conversion and Environmental Transport Factors for the Ground Pathway (p=1)

Nuclide (i)	DCF(i,1)*	ETFG(i,t) At Time in Years (dimensionless) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Po-218	5.642E-05	4.479E-01	4.471E-01	4.453E-01	4.389E-01	4.167E-01	2.704E-01	0.000E+00	0.000E+00
Ra-226	3.176E-02	4.889E-01	4.885E-01	4.877E-01	4.843E-01	4.714E-01	3.424E-01	0.000E+00	0.000E+00
Rn-222	2.354E-03	4.608E-01	4.600E-01	4.585E-01	4.528E-01	4.325E-01	2.876E-01	0.000E+00	0.000E+00
Tl-210	0.000E+00	5.250E-01	5.250E-01	5.250E-01	5.250E-01	5.250E-01	5.250E-01	5.250E-01	5.250E-01

* - Units are (mrem/yr)/(pCi/g) at infinite depth and area. Multiplication by ETFG(i,t) converts to site conditions.

Dose/Source Ratios for External Radiation from the Ground (p=1)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,1,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	3.004E-03	2.908E-03	2.724E-03	2.168E-03	1.124E-03	1.002E-04	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	4.825E+00	4.810E+00	4.779E+00	4.669E+00	4.322E+00	2.562E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	4.692E-05	1.387E-04	3.130E-04	8.367E-04	1.777E-03	2.181E-03	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		4.825E+00	4.810E+00	4.780E+00	4.670E+00	4.324E+00	2.564E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Inhalation Pathway, Excluding Radon (p=2)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,2,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	5.789E-04	5.568E-04	5.152E-04	3.919E-04	1.768E-04	7.758E-06	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	2.178E-04	2.162E-04	2.128E-04	2.013E-04	1.691E-04	6.548E-05	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	9.031E-06	2.654E-05	5.918E-05	1.512E-04	2.795E-04	1.689E-04	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		2.269E-04	2.427E-04	2.720E-04	3.525E-04	4.486E-04	2.343E-04	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Pathway Factors for the Inhalation Pathway (radon excluded)

Area (A):	1.0000E+04 m**2	Occupancy Factor (FO2):	4.5000E-01
Area Factor (FA2):	6.7306E-02	Annual Air Intake (F12):	8.4000E+03 m**3/yr
Cover Depth [Cd(0)]:	0.0000E+00 m	Mass Loading (ASR2):	1.0000E-04 g/m**3
Contaminated Zone Thickness [T(0)]:	1.5000E-01 m	FA2 * FO2 * F12 * ASR2:	2.5442E-02 g/yr

Nuclide (i)	Depth Factor [FD(i,2,t)] (dimensionless) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	1.0000E+00	9.9333E-01	9.8000E-01	9.3333E-01	8.0000E-01	3.3333E-01	0.0000E+00	0.0000E+00
Ra-226	1.0000E+00	9.9333E-01	9.8000E-01	9.3333E-01	8.0000E-01	3.3333E-01	0.0000E+00	0.0000E+00

Dose Conversion and Environmental Transport Factors for the Inhalation Pathway, Excluding Radon (p=2)

Parent (i)	Product (j)	DCF(j,2)*	ETF(j,2,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	2.320E-02	2.544E-02	2.527E-02	2.493E-02	2.375E-02	2.035E-02	8.481E-03	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	8.594E-03	2.544E-02	2.527E-02	2.493E-02	2.375E-02	2.035E-02	8.481E-03	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	2.320E-02	2.544E-02	2.527E-02	2.493E-02	2.375E-02	2.035E-02	8.481E-03	0.000E+00	0.000E+00

* - The dose conversion factor units are mrem/pCi.

Parameters Used for Calculating Indoor and Outdoor Radon Flux

	*Floor Material	Cover Material	Contaminated Zone
Radon Diffusion Coefficient (m**2/s)	3.000E-07	2.000E-06	2.000E-06
Total Porosity	1.000E-01	4.000E-01	4.000E-01
Volumetric Water Content	3.000E-02	5.000E-02	2.000E-01
Bulk Density (g/cm**3)	2.400E+00	1.500E+00	1.500E+00
Rn-222 Emanation Coefficient	2.500E-01	2.500E-01	2.500E-01
Initial Thickness (m)	1.500E-01	0.000E+00	1.500E-01

Building Depth Below Ground Surface *(DMFL): -1.000E+00 (m)
Negative DMFL shows building depth adjusted (if necessary) for no penetration
of contaminated zone. Actual values used *(DMFLACT), m:

t=	0.0000E+00	1.0000E+00	3.0000E+00	1.0000E+01	3.0000E+01	1.0000E+02	3.0000E+02	1.0000E+03
DMFLACT=	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Building indoor area factor *(FAI):   0.000E+00
FAI <= 0.0 shows calculated time-dependent value based on amount of wall area
extending into the contaminated zone. Actual values used *(FAIACT):

t=	0.0000E+00	1.0000E+00	3.0000E+00	1.0000E+01	3.0000E+01	1.0000E+02	3.0000E+02	1.0000E+03
FAIACT =	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

* - Parameters are used only for indoor radon flux

Time Dependence of Outdoor Radon Flux [FLUXO(i,t)]

Nuclide	FLUXO(i,t) (pCi/m**2/s)							
(i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Time Dependence of Indoor Radon Flux [FLUXI(i,t)]

Nuclide	FLUXI(i,t) (pCi/m**2/s)							
(i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Parameters Used for Calculating Indoor and Outdoor Radon Concentration

Radon Vertical Dimension of Mixing (HMIX):	2.000E+00	(m)
Average Annual Wind Speed (WIND):	5.000E+00	(m/sec)
Building Room Height (HRM):	2.500E+00	(m)
Building Air Exchange Rate (REXG):	5.000E-01	(1/hr)

Time Dependence of Outdoor Radon Concentration [CRNO(i,t)]

Nuclide (i)	CRNO(i,t) (pCi/m**3) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Time Dependence of Indoor Radon Concentration [HCONC(i,r)]

Nuclide (i)	HCONC(i,t) (pCi/m**3) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Outdoor Working Levels of Radon [WLOTD(i,t)]

Nuclide (i)	WLOTD(i,t) (WL) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Indoor Working Levels of Radon [WLIND(i,t)]

Nuclide (i)	WLIND(i,t) (WL) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Fraction of Time Spent Outdoors (FOTD): 2.500E-01
Fraction of Time Spent Indoors (FIND): 5.000E-01

Dose/Source Ratios for Radon Pathway (p=9)
Subpathway: Outdoor and Indoor Radon Flux
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent	Product	Thread	DSR(j,9,t) - DSRRNW(j,t) At Time in Years (mrem/yr)/(pCi/g)							
(i)	(j)	Fraction	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Radon Pathway (p=9)
Subpathway: Indoor Radon from Water Usage
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent	Product	Thread	DSRRNW(j,t) At Time in Years (mrem/yr)/(pCi/g)							
(i)	(j)	Fraction	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Transport Time Parameters for Unsaturated Zone Stratum No. 1

Stratum thickness [h(1)]:	21.000000 m
Bulk soil material density [rhob(1)]:	1.500000 g/cm**3
Effective porosity [peuz(1)]:	0.200000
Hydraulic conductivity [Khuz(1)]:	4300.000000 m/yr
Total porosity [ptuz(1)]:	0.400000
Soil specific b parameter [buz(1)]:	5.300000
Saturation ratio [sruz(1)]:	0.500000

Radio-nuclide (i)	Distribution Coefficient Kduz(i,1), cm**3/g	Retardation Factor Rduz(i,1)	Transport Time Dtuz(i,1), yr
Pb-210	2.7000E+02	2.0260E+03	7.0910E+04
Ra-226	5.0000E+02	3.7510E+03	1.3129E+05

Transport Time Parameters for Unsaturated Zone created by the Falling Water Table

Water table drop rate [vwt]:	0.001000 m/yr
Bulk soil material density [rhobaq]:	1.500000 g/cm**3
Effective porosity [peaq]:	0.330000
Hydraulic conductivity [Khaq]:	5550.000000 m/yr
Total porosity [ptaq]:	0.430000
Soil specific b parameter [baq]:	5.300000
Saturation ratio [sruaq]:	0.465116

Radio-nuclide (i)	Distribution Coefficient Kdaq(i), cm**3/g	Retardation Factor Rduaq(i)	Minimum Transport Time Dtuaq(i), yr
Pb-210	2.7000E+02	2.0260E+03	Infinite
Ra-226	5.0000E+02	3.7510E+03	Infinite

Dilution Factor and Rise Time Parameters for Nondispersion (ND) Model

Aquifer contamination depth at well (z):	5.40541E-02 m
Depth of water intake below water table (dw):	2.20000E+01 m
Infiltration rate (In):	6.00000E-02 m/yr
Aquifer water flow rate (Vwfr):	1.11000E+02 m/yr
Hydraulic gradient (J):	2.00000E-02
Hydraulic conductivity of aquifer (Kszh):	5.55000E+03 m/yr
Contaminated zone extent parallel to gradient (l):	1.00000E+02 m
Distance below contaminated zone to water table (h):	0.21000E+02 m
Initial thickness of uncontaminated cover (Cd):	0.00000E+00 m
Initial thickness of contaminated zone (T):	0.15000E+00 m
Effective porosity of saturated zone (pesz):	0.33000E+00

Radio-nuclide (i)	Dilution Factor f(i)	Retardation Factor Rdsz(i)	Horizontal Transport Time	Onsite Tauh(i), yr	Rise Time dt(i), yr	Decay Time Parameter 1/lamda(i),yr
Pb-210	2.457E-03	9.429E+02		2.803E+02	2.803E+02	3.217E+01
Ra-226	2.457E-03	1.745E+03		5.188E+02	5.188E+02	2.308E+03

Primary Parameters Used for Calculating Water/Soil
Concentration Ratios for Groundwater Pathway Segment

Model used: Nondispersion (ND)
Bulk soil density in contaminated zone (rhob): 1.500 g/cm**3

Radio-nuclide (i)	Dilution Factor f(i)	Retardation Factor Rdcz(i)	Breakthrough Time Chain year	Breakthrough Time Single Nuclide Dt(i), yr	Rise Time dt(i), yr
Pb-210	2.457E-03	2.026E+03	Infinite	Infinite	2.803E+02
Ra-226	2.457E-03	3.751E+03	Infinite	Infinite	5.188E+02

Water/Soil Concentration Ratios [WSR(j,1,t)] for Groundwater Pathway Segment

Parent (i)	Product (j)	Thread Fraction	WSR(j,1,t) At Time in Years (pCi/L)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water/Soil Concentration Ratios [WSR(j,2,t)] for Surface Water Pathway Segment

Watershed Area (Aw) = 1.0000E+03 m**2
Contaminated Zone Area (A) = 1.0000E+04 m**2
Dilution Factor (f') = 1.0000E+01
Soil Density (rhob) = 1.5000E+00 kg/m**3

Parent (i)	Product (j)	Thread Fraction	WSR(j,2,t) At Time in Years (pCi/L)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Storage Times For Contaminated Foodstuffs

k	Food Item	STOR_T(k), days
1	non-leafy plants	14.
2	leafy plants	1.
3	milk	1.
4	meat	20.
5	fish	7.
6	crustacea	7.
7	well water	1.
8	surface water	1.
9	livestock fodder	45.

Storage Time Ingrowth and Decay Factors
Storage Time for k'th Foodstuff: t = STOR_T(k), days

Parent (i)	Product (j)	Thread Fraction	STOR_ID(i,j,t) = CONCE(i,j,t)/CONCE(i,i,0) t= 1.400E+01	1.000E+00	1.000E+00	2.000E+01	7.000E+00	7.000E+00	1.000E+00	1.000E+00	4.500E+01
Pb-210	Pb-210	1.000E+00	9.988E-01	9.999E-01	9.999E-01	9.983E-01	9.994E-01	9.994E-01	9.999E-01	9.999E-01	9.962E-01
Ra-226	Ra-226	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.999E-01
Ra-226	Pb-210	1.000E+00	1.191E-03	8.510E-05	8.510E-05	1.701E-03	5.955E-04	5.955E-04	8.510E-05	8.510E-05	3.822E-03

CONCE(i,j,t)/CONCE(i,i,0) is the concentration ratio of Product(j) at time t to Parent(i) at start of storage time.

Storage Time Correction Factors
Drinking Water from Well and/or Surface
Harvest Time = t - 2.74E-03 yr; Consumption Time = t yr

Parent (i)	Product (j)	Thread Fraction	CFWW(j,t,1)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.000E+00	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors
Irrigation Water for Nonleafy Plants from Well and/or Surface
Harvest Time = t - 4.11E-02 yr; Consumption Time = t - 3.83E-02 yr

Parent (i)	Product (j)	Thread Fraction	CFWW(j,t,2)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.000E+00	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors
Irrigation Water for Leafy Plants from Well and/or Surface
Harvest Time = t - 5.48E-03 yr; Consumption Time = t - 2.74E-03 yr

Parent (i)	Product (j)	Thread Fraction	CFWW(j,t,3)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.000E+00	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors
Irrigation Water for Livestock (Milk) Fodder from Well and/or Surface
Harvest Time = t - 1.29E-01 yr; Consumption Time = t - 1.26E-01 yr

Parent (i)	Product (j)	Thread Fraction	CFWW(j,t,5)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.000E+00	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors
Irrigation Water for Livestock (Meat) Fodder from Well and/or Surface
Harvest Time = t - 1.81E-01 yr; Consumption Time = t - 1.78E-01 yr

Parent (i)	Product (j)	Thread Fraction	CFWW(j,t,7)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.000E+00	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors
Livestock (Milk) Water from Well and/or Surface
Harvest Time = t - 5.48E-03 yr; Consumption Time = t - 2.74E-03 yr

Parent (i)	Product (j)	Thread Fraction	CFWW(j,t,4)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.000E+00	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors
Livestock (Meat) Water from Well and/or Surface
Harvest Time = t - 5.75E-02 yr; Consumption Time = t - 5.48E-02 yr

Parent	Product	Thread	CFWW(j,t,6)# At Time in Years							
(i)	(j)	Fraction	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.000E+00	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors for Nonleafy Plants
Harvest Time = t - 3.83E-02 yr; Consumption Time = t yr

Parent	Product	Thread	CF3(j,1,t)# At Time in Years							
(i)	(j)	Fraction	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.000E+00	9.988E-01	9.988E-01	9.988E-01	9.988E-01	9.988E-01	9.988E-01	9.988E-01
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors for Leafy Plants
Harvest Time = t - 2.74E-03 yr; Consumption Time = t yr

Parent	Product	Thread	CF3(j,2,t)# At Time in Years							
(i)	(j)	Fraction	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.000E+00	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors for Livestock (Meat) Fodder
Harvest Time = t - 1.78E-01 yr; Consumption Time = t - 5.48E-02 yr

Parent	Product	Thread	CFLF(j,1,t)# At Time in Years							
(i)	(j)	Fraction	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.000E+00	9.962E-01	9.962E-01	9.962E-01	9.962E-01	9.962E-01	9.962E-01	9.962E-01

Storage Time Correction Factors for Livestock (Meat) Fodder
Harvest Time = t - 1.78E-01 yr; Consumption Time = t - 5.48E-02 yr

Parent (i)	Product (j)	Thread Fraction	CFLF(j,1,t)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.602E+00	1.178E+00	1.054E+00	1.021E+00	1.012E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors for Livestock (Milk) Fodder
Harvest Time = t - 1.26E-01 yr; Consumption Time = t - 2.74E-03 yr

Parent (i)	Product (j)	Thread Fraction	CFLF(j,2,t)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.000E+00	9.962E-01	9.962E-01	9.962E-01	9.962E-01	9.962E-01	9.962E-01	9.962E-01
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.566E+00	1.175E+00	1.054E+00	1.021E+00	1.012E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors for Meat
Harvest Time = t - 5.48E-02 yr; Consumption Time = t yr

Parent (i)	Product (j)	Thread Fraction	CF45(j,1,t)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.000E+00	9.983E-01	9.983E-01	9.983E-01	9.983E-01	9.983E-01	9.983E-01	9.983E-01
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.138E+00	1.049E+00	1.016E+00	1.006E+00	1.003E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors for Milk
Harvest Time = t - 2.74E-03 yr; Consumption Time = t yr

Parent (i)	Product (j)	Thread Fraction	CF45(j,2,t)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.000E+00	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.009E+00	1.003E+00	1.001E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors for Fish & Crustacea
Harvest Time = t - 1.92E-02 yr; Consumption Time = t yr

Parent	Product	Thread	CFF(j,l,t)# At Time in Years							
(i)	(j)	Fraction	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.000E+00	9.994E-01	9.994E-01	9.994E-01	9.994E-01	9.994E-01	9.994E-01	9.994E-01
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Area and Depth Factors for Plant (p=3), Meat (p=4), and Milk (p=5) Pathways
Root Uptake from Contaminated Soil (q=1)

Area Factor for Plant Foods [FA(3)] = 0.25

Nuclide (i)	Depth Factor FD(i,1,t) (dimensionless) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	5.0000E-01	4.9667E-01	4.9000E-01	4.6667E-01	4.0000E-01	1.6667E-01	0.0000E+00	0.0000E+00
Ra-226	5.0000E-01	4.9667E-01	4.9000E-01	4.6667E-01	4.0000E-01	1.6667E-01	0.0000E+00	0.0000E+00

Area and Depth Factors for Plant (p=3), Meat (p=4), and Milk (p=5) Pathways
Foliar Uptake from Contaminated Dust (q=2)

Area Factor for Plant Foods [FA(3)] = 0.25

Nuclide (i)	Depth Factor FD(i,2,t) (dimensionless) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	1.0000E+00	9.9333E-01	9.8000E-01	9.3333E-01	8.0000E-01	3.3333E-01	0.0000E+00	0.0000E+00
Ra-226	1.0000E+00	9.9333E-01	9.8000E-01	9.3333E-01	8.0000E-01	3.3333E-01	0.0000E+00	0.0000E+00

Area and Depth Factors for Plant (p=3), Meat (p=4), and Milk (p=5) Pathways
Ditch Irrigation (q=3)

Area Factor for Plant Foods [FA(3)] = 0.25

Nuclide (i)	Depth Factor FD(i,3,t) (dimensionless) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00
Ra-226	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00

Area and Depth Factors for Plant (p=3), Meat (p=4), and Milk (p=5) Pathways
Overhead Irrigation (q=4)

Area Factor for Plant Foods [FA(3)] = 0.25

The Depth Factor Value
FD(i,p,q,t) = 1.0000E+00
is applicable for all radionuclides(i) and times(t).

Area and Depth Factors for Meat (p=4) and Milk (p=5) Pathways
Transfer from Livestock Water (q=5) and Soil (q=6) Intake

Area Factor for Meat and Milk [FA(p),p=4,5] = 0.25

The livestock water subpathway (q=5) and livestock soil intake subpathway (q=6)
occur only for the meat (p=4) and milk (p=5) pathways.

Dose Conversion and Environmental Transport Factors for the Plant Food Pathway (p=3)
Subpathway: Root Uptake from Contaminated Soil (q=1)

Parent (i)	Product (j)	DCF(j,3)*	ETF(j,3,1,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	7.276E-03	2.175E+02	2.093E+02	1.937E+02	1.473E+02	6.651E+01	2.937E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.321E-03	8.700E+02	8.636E+02	8.504E+02	8.044E+02	6.763E+02	2.635E+02	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	7.321E+00	1.963E+01	5.439E+01	1.031E+02	6.311E+01	0.000E+00	0.000E+00

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Plant Food Pathway (p=3)
Subpathway: Foliar Uptake from Contaminated Dust (q=2)

Parent (i)	Product (j)	DCF(j,3)*	ETF(j,3,2,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	7.276E-03	6.254E-02	6.017E-02	5.568E-02	4.237E-02	1.912E-02	8.443E-04	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.321E-03	6.254E-02	6.207E-02	6.112E-02	5.782E-02	4.861E-02	1.894E-02	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	1.900E-03	5.442E-03	1.545E-02	2.947E-02	1.808E-02	0.000E+00	0.000E+00

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Plant Food Pathway (p=3)
Subpathway: Ditch Irrigation (q=3)

Parent (i)	Product (j)	DCF(j,3)*	ETF(j,3,3,t) * SF(j,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Plant Food Pathway (p=3)
Subpathway: Overhead Irrigation (q=4)

Parent (i)	Product (j)	DCF(j,3)*	ETF(j,3,4,t) * SF(j,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Meat Pathway (p=4)
Subpathway: Fodder Root Uptake from Contaminated Soil (q=1)

Parent (i)	Product (j)	DCF(j,4)*	ETF(j,4,1,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	7.276E-03	4.284E+00	4.127E+00	3.819E+00	2.906E+00	1.312E+00	5.802E-02	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.321E-03	2.142E+01	2.128E+01	2.096E+01	1.983E+01	1.667E+01	6.506E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	2.080E-01	4.497E-01	1.132E+00	2.083E+00	1.266E+00	0.000E+00	0.000E+00

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Meat Pathway (p=4)
Subpathway: Fodder Foliar Uptake from Contaminated Dust (q=2)

Parent (i)	Product (j)	DCF(j,4)*	ETF(j,4,2,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	7.276E-03	4.958E-03	4.776E-03	4.419E-03	3.363E-03	1.518E-03	6.715E-05	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.321E-03	6.198E-03	6.158E-03	6.064E-03	5.737E-03	4.824E-03	1.882E-03	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	1.529E-04	4.340E-04	1.228E-03	2.342E-03	1.439E-03	0.000E+00	0.000E+00

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Meat Pathway (p=4)
Subpathway: Ditch Irrigation (q=3)

Parent (i)	Product (j)	DCF(j,4)*	ETF(j,4,3,t) * SF(j,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Meat Pathway (p=4)
Subpathway: Overhead Irrigation (q=4)

Parent (i)	Product (j)	DCF(j,4)*	ETF(j,4,4,t) * SF(j,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Meat Pathway (p=4)
Subpathway: Livestock Water (q=5)

Parent (i)	Product (j)	DCF(j,4)*	ETF(j,4,5,t) * SF(j,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Milk Pathway (p=5)
Subpathway: Fodder Root Uptake from Contaminated Soil (q=1)

Parent (i)	Product (j)	DCF(j,5)*	ETF(j,5,1,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Milk Pathway (p=5)
Subpathway: Fodder Foliar Uptake from Contaminated Dust (q=2)

Parent (i)	Product (j)	DCF(j,5)*	ETF(j,5,2,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Milk Pathway (p=5)
Subpathway: Ditch Irrigation (q=3)

Parent (i)	Product (j)	DCF(j,5)*	ETF(j,5,3,t) * SF(j,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Milk Pathway (p=5)
Subpathway: Overhead Irrigation (q=4)

Parent (i)	Product (j)	DCF(j,5)*	ETF(j,5,4,t) * SF(j,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Milk Pathway (p=5)
Subpathway: Livestock Water (q=5)

Parent (i)	Product (j)	DCF(j,5)*	ETF(j,5,5,t) * SF(j,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Fish Pathway (p=6)

Parent (i)	Product (j)	DCF(j,6)*	ETF(j,6,t) * SF(j,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Drinking Water Pathway (p=7)

Parent (i)	Product (j)	DCF(j,7)*	ETF(j,7,t) * SF(j,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* - The dose conversion factor units are mrem/pCi.

Dose/Source Ratios for Internal Radiation from Ingestion of Plant Foods (p=3)
Subpathway: Root Uptake from Contaminated Soil (q=1)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,3,1t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.553E+00	1.494E+00	1.382E+00	1.051E+00	4.743E-01	2.082E-02	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	1.145E+00	1.136E+00	1.119E+00	1.058E+00	8.892E-01	3.444E-01	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	2.868E-02	7.637E-02	1.638E-01	4.105E-01	7.539E-01	4.547E-01	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		1.174E+00	1.213E+00	1.283E+00	1.469E+00	1.643E+00	7.991E-01	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Plant Foods (p=3)
Subpathway: Foliar Uptake from Contaminated Dust (q=2)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,3,2t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	4.464E-04	4.295E-04	3.974E-04	3.023E-04	1.364E-04	5.986E-06	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	8.231E-05	8.168E-05	8.043E-05	7.607E-05	6.392E-05	2.475E-05	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	6.965E-06	2.047E-05	4.564E-05	1.167E-04	2.156E-04	1.303E-04	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		8.927E-05	1.022E-04	1.261E-04	1.927E-04	2.795E-04	1.550E-04	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Plant Foods (p=3)
Subpathway: Ditch Irrigation (q=3)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,3,3t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Plant Foods (p=3)
Subpathway: Overhead Irrigation (q=4)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,3,4t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Plant Foods (p=3)
Total for All Subpathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,3,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.553E+00	1.494E+00	1.382E+00	1.052E+00	4.744E-01	2.083E-02	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	1.145E+00	1.136E+00	1.119E+00	1.058E+00	8.893E-01	3.444E-01	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	2.868E-02	7.639E-02	1.639E-01	4.107E-01	7.541E-01	4.549E-01	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		1.174E+00	1.213E+00	1.283E+00	1.469E+00	1.643E+00	7.993E-01	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Meat (p=4)
Subpathway: Fodder Root Uptake from Contaminated Soil (q=1)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,4,1t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	3.061E-02	2.945E-02	2.725E-02	2.073E-02	9.354E-03	4.113E-04	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	2.822E-02	2.801E-02	2.758E-02	2.608E-02	2.192E-02	8.504E-03	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	9.621E-04	1.967E-03	3.685E-03	8.525E-03	1.523E-02	9.124E-03	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		2.918E-02	2.997E-02	3.126E-02	3.461E-02	3.715E-02	1.763E-02	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Meat (p=4)
Subpathway: Fodder Foliar Uptake from Contaminated Dust (q=2)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,4,2t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	3.543E-05	3.409E-05	3.154E-05	2.400E-05	1.083E-05	4.761E-07	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	8.164E-06	8.103E-06	7.979E-06	7.547E-06	6.343E-06	2.461E-06	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	5.659E-07	1.640E-06	3.638E-06	9.274E-06	1.713E-05	1.037E-05	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		8.730E-06	9.743E-06	1.162E-05	1.682E-05	2.347E-05	1.283E-05	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Meat (p=4)
Subpathway: Ditch Irrigation (q=3)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,4,3t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Meat (p=4)
Subpathway: Overhead Irrigation (q=4)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent	Product	Thread	DSR(j,4,4t) At Time in Years (mrem/yr)/(pCi/g)							
(i)	(j)	Fraction	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Meat (p=4)
Subpathway: Livestock Water (q=5)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent	Product	Thread	DSR(j,4,5t) At Time in Years (mrem/yr)/(pCi/g)							
(i)	(j)	Fraction	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Meat (p=4)
Total for All Subpathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent	Product	Thread	DSR(j,4,t) At Time in Years (mrem/yr)/(pCi/g)							
(i)	(j)	Fraction	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	7.563E-02	7.276E-02	6.732E-02	5.122E-02	2.310E-02	1.015E-03	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	3.859E-02	3.830E-02	3.771E-02	3.567E-02	2.998E-02	1.163E-02	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.681E-03	4.051E-03	8.306E-03	2.031E-02	3.698E-02	2.227E-02	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		4.027E-02	4.235E-02	4.602E-02	5.598E-02	6.696E-02	3.390E-02	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Milk (p=5)
Subpathway: Fodder Root Uptake from Contaminated Soil (q=1)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,5,1t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Milk (p=5)
Subpathway: Fodder Foliar Uptake from Contaminated Dust (q=2)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,5,2t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Milk (p=5)
Subpathway: Ditch Irrigation (q=3)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,5,3t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Milk (p=5)
Subpathway: Overhead Irrigation (q=4)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,5,4t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Milk (p=5)
Subpathway: Livestock Water (q=5)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,5,5t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Milk (p=5)
Total for All Subpathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,5,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from the Ingestion of Fish (p=6)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent	Product	Thread	DSR(j,6,t) At Time in Years (mrem/yr)/(pCi/g)							
(i)	(j)	Fraction	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from the Ingestion of Drinking Water (p=7)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent	Product	Thread	DSR(j,7,t) At Time in Years (mrem/yr)/(pCi/g)							
(i)	(j)	Fraction	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Plant/Air and Plant/Water Concentration Ratios

Mass loading [ASR(3)]: 3.000E-04 g/m**3
Area Factor for Mass Loading [FA(2)]: 6.731E-02

Nuclide (i)	FAR(i,3,2,1) m**3/g	FAR(i,3,2,2) m**3/g	FWR(i,3,3,1) L/g	FWR(i,3,3,2) L/g	FWR(i,3,4,1) L/g	FWR(i,3,4,2) L/g
Pb-210	5.4545E-02	2.6156E-01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Ra-226	5.4545E-02	2.6156E-01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

FAR(i,p,q,k) is the plant/air concentration ratio for airborne contaminated dust, and FWR(i,p,q,k) is the plant/water concentration ratio. See groundwater displays for water/soil concentration ratios.

Plant/Soil Concentration Ratios, FSR(i,3,q,k,t)

Root Uptake (q=1) and Foliar Dust Deposition (q=2)
Nonleafy (k=1) and/or Leafy (k=2) Vegetables

Nuclide(i) Parent	Product	FSR(i,3,1,k)	FSR(i,3,2,1)	FSR(i,3,2,2)
Pb-210+D	Pb-210+D	1.0000E-02	1.1014E-06	5.2813E-06
Ra-226+D	Ra-226+D	4.0000E-02	1.1014E-06	5.2813E-06
Ra-226+D	Pb-210+D	1.0000E-02	1.1014E-06	5.2813E-06

Plant/Soil Concentration Ratio, FSR(j,3,q,k,t)
Ditch Irrigation (q=3)

Parent (i)	Product (j)	Thread Fraction	FSR(j,3,3,k,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Plant/Soil Concentration Ratio, FSR(j,3,q,k,t)
Overhead Irrigation (q=4) and Nonleafy Vegetables (k=1)

Parent (i)	Product (j)	Thread Fraction	FSR(j,3,4,1,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Plant/Soil Concentration Ratio, FSR(j,3,q,k,t)
Overhead Irrigation (q=4) and Nonleafy Vegetables (k=1)

Parent (i)	Product (j)	Thread Fraction	FSR(j,3,4,1,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Plant/Soil Concentration Ratio, FSR(j,3,q,k,t)
Overhead Irrigation (q=4) and Leafy Vegetables (k=2)

Parent (i)	Product (j)	Thread Fraction	FSR(j,3,4,2,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Meat/Fodder, Milk/Fodder, Fodder/Air and Fodder/Water Concentration Ratios

FI(4,q): 68.0 kg/day FI(5,q): 0.0 kg/day q=1,2,3,4
FI(4,q): 50.0 L/day FI(5,q): 0.0 L/day q=5
FI(4,q): 0.5 kg/day FI(5,q):

Nuclide (i)	FQR(i,4) d/kg	FQR(i,5) d/kg	FAR(i,3,2,3) m**3/g	FWR(i,3,3,3) L/g	FWR(i,3,4,3) L/g
Pb-210	8.0000E-04	3.0000E-04	2.8659E-01	0.0000E+00	0.0000E+00
Ra-226	1.0000E-03	1.0000E-03	2.8659E-01	0.0000E+00	0.0000E+00

FI(p,q) are the fodder (q=1,2,3,4), livestock water (q=5) and soil (q=6) intake rates;
FQR(i,p) are the transfer coefficients from contaminated fodder of livestock
water to meat (p=4) or milk (p=5). FAR(i,3,2,3) are the fodder/air
concentration ratios, and FWR(i,3,3,3) and FWR(i,3,4,3) are the fodder/
water concentration ratios for ditch and overhead irrigation, respectively.

Fodder/Soil Concentration Ratios, QSR(i,p,q,t), for Meat and Milk Pathways
Root Uptake (q=1) and Foliar Dust Deposition (q=2)

Nuclide(i) Parent	Product	QSR(i,p,1)	QSR(i,p,2)
Pb-210+D	Pb-210+D	1.0000E-02	5.7868E-06
Ra-226+D	Ra-226+D	4.0000E-02	5.7868E-06
Ra-226+D	Pb-210+D	1.0000E-02	5.7868E-06

Fodder/Soil Concentration Ratio, QSR(j,p,q,t),for Meat and Milk Pathways
Ditch Irrigation (q=3)

Parent	Product	Thread	QSR(j,p,3,t) * SF(j,t) At Time in Years							
(i)	(j)	Fraction	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Fodder/Soil Concentration Ratio, QSR(j,p,q,t),for Meat and Milk Pathways
Overhead Irrigation (q=4)

Parent	Product	Thread	QSR(j,p,4,t) * SF(j,t) At Time in Years							
(i)	(j)	Fraction	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Fodder/Soil Concentration Ratio, QSR(j,p,q,t),for Meat and Milk Pathways
Livestock Water (q=5)

Parent	Product	Thread	QSR(j,p,5,t) * SF(j,t) At Time in Years							
(i)	(j)	Fraction	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Meat/Soil Concentration Ratios, FSR(i,4,q,t)
Root Uptake (q=1) and Foliar Dust Deposition (q=2)

Nuclide(i) Parent	Product	FSR(i,4,1)	FSR(i,4,2)
Pb-210+D	Pb-210+D	2.7200E-04	3.1480E-07
Ra-226+D	Ra-226+D	1.3600E-03	3.9350E-07
Ra-226+D	Pb-210+D	0.0000E+00	0.0000E+00

Meat/Soil Concentration Ratio, FSR(j,4,q,t)
Ditch Irrigation (q=3)

Parent (i)	Product (j)	Thread Fraction	FSR(j,4,3,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Meat/Soil Concentration Ratio, FSR(j,4,q,t)
Overhead Irrigation (q=4)

Parent (i)	Product (j)	Thread Fraction	FSR(j,4,4,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Meat/Soil Concentration Ratio, FSR(j,4,q,t)
Livestock Water (q=5)

Parent (i)	Product (j)	Thread Fraction	FSR(j,4,5,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Milk/Soil Concentration Ratios, FSR(i,5,q,t)
Root Uptake (q=1) and Foliar Dust Deposition (q=2)

Nuclide(i) Parent	Product	FSR(i,5,1)	FSR(i,5,2)
Pb-210+D	Pb-210+D	0.0000E+00	0.0000E+00
Ra-226+D	Ra-226+D	0.0000E+00	0.0000E+00
Ra-226+D	Pb-210+D	0.0000E+00	0.0000E+00

Milk/Soil Concentration Ratio, FSR(j,5,q,t)
Ditch Irrigation (q=3)

Parent (i)	Product (j)	Thread Fraction	FSR(j,5,3,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Milk/Soil Concentration Ratio, FSR(j,5,q,t)
Overhead Irrigation (q=4)

Parent (i)	Product (j)	Thread Fraction	FSR(j,5,4,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Milk/Soil Concentration Ratio, FSR(j,5,q,t)
Livestock Water (q=5)

Parent (i)	Product (j)	Thread Fraction	FSR(j,5,5,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Dose/Source Ratios for Soil Ingestion Pathway (p=8)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,8,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.954E-01	1.879E-01	1.739E-01	1.323E-01	5.967E-02	2.619E-03	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	3.602E-02	3.575E-02	3.520E-02	3.329E-02	2.797E-02	1.083E-02	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	3.048E-03	8.959E-03	1.997E-02	5.105E-02	9.434E-02	5.699E-02	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		3.907E-02	4.471E-02	5.517E-02	8.434E-02	1.223E-01	6.782E-02	0.000E+00	0.000E+00

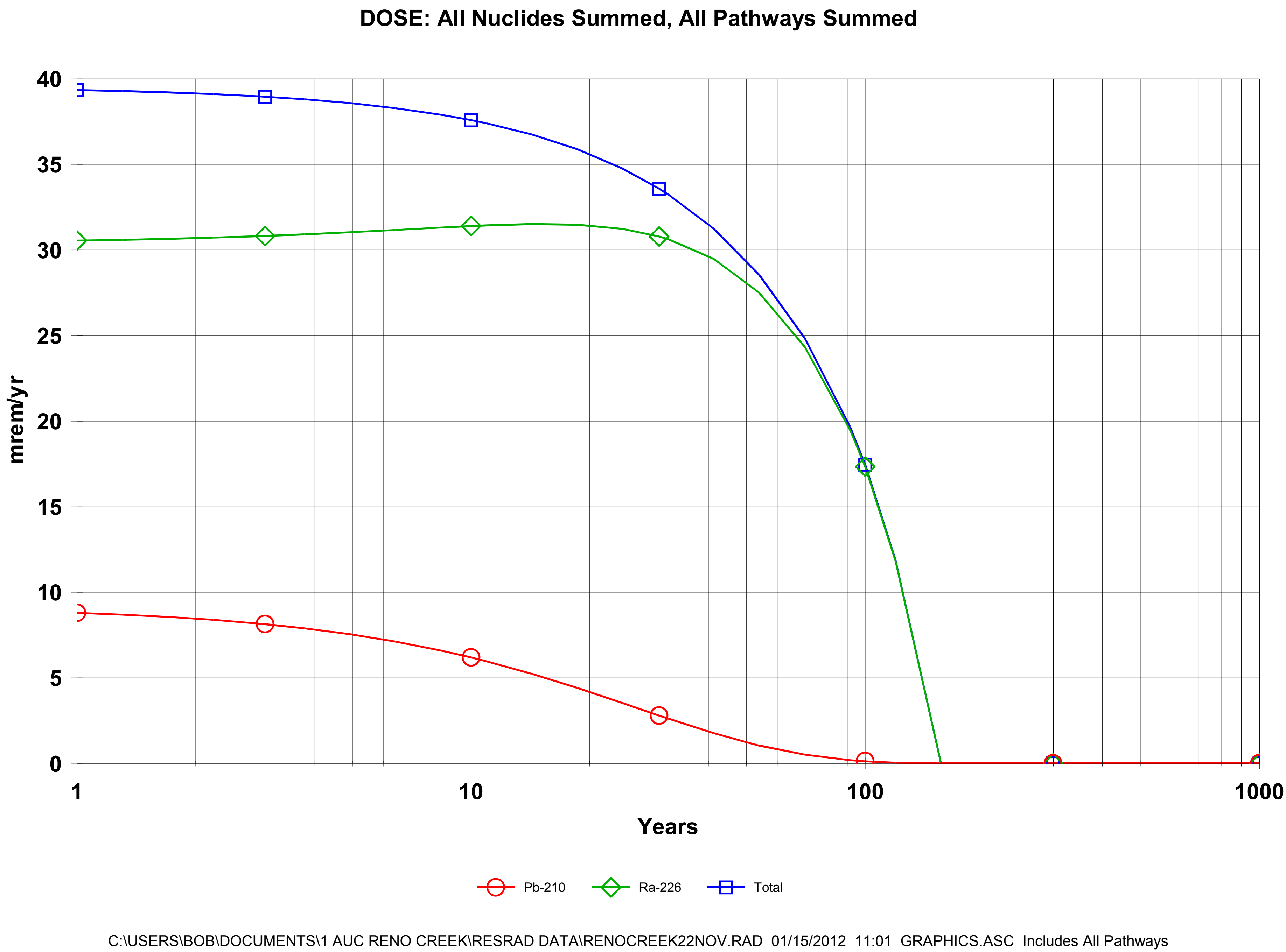
The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose Conversion and Environmental Transport Factors for the Soil Ingestion Pathway (p=8)

Parent (i)	Product (j)	DCF(j,8)*	ETF(j,8,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	7.276E-03	2.738E+01	2.719E+01	2.683E+01	2.555E+01	2.190E+01	9.125E+00	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.321E-03	2.738E+01	2.719E+01	2.683E+01	2.555E+01	2.190E+01	9.125E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	7.276E-03	2.738E+01	2.719E+01	2.683E+01	2.555E+01	2.190E+01	9.125E+00	0.000E+00	0.000E+00

* - The dose conversion factor units are mrem/pCi.

ADDENDUM 6-B
RC RESRAD Alldose


DOSE: All Nuclides Summed, All Pathways Summed
mrem/yr
40
35
30
25
20
15
10
5
0
1
10
100
1000
Years
Pb-210
Ra-226
Total
C:\USERS\BOB\DOCUMENTS\1 AUC RENO CREEK\RESRAD DATA\RENOCREEK22NOV.RAD 01/15/2012 11:01 GRAPHICS.ASC Includes All Pathways