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SUBMITTAL OF REQUESTED CHANGE PAGES FOR THE OPERABLE UNIT 1 AND 2 DOCUMENTS (OPERABLE UNIT 1 FS REPORT) REF: 5303, 5305

03/16/94

DOE-1175-94
DOE-FN/EPA
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LETTER
OU1

Department of Energy
Fernald Environmental Management Project
P.O. Box 398705
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MAR 16 1994
DOE-1175-94

Mr. James A. Saric, Remedial Project Director
U. S. Environmental Protection Agency
Region V-5HRE-8J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Graham E. Mitchell, Project Manager
Ohio Environmental Protection Agency
40 South Main Street
Dayton, Ohio 45402-2086

Dear Mr. Saric and Mr. Mitchell:

SUBMITTAL OF REQUESTED CHANGE PAGES FOR THE OPERABLE UNIT 1 AND 2 DOCUMENTS

As requested during the February 24, 1994, meeting between U.S. Environmental Protection Agency (USEPA), Ohio Environmental Protection Agency (OEPA), Department of Energy (DOE), and Fernald Environmental Restoration Management Company (FERMCO), this letter provides a description of the language that will be added to the Operable Unit 1 (OU1) and Operable Unit 2 (OU2) Remedial Investigation and Feasibility Studies (RI/FS) to address the trespassing and recreational exposure scenarios.

The following language will be added to both the OU1 and OU2 RI/FS descriptions of the expanded trespasser scenario.

"For purposes of establishing preliminary remediation goals (PRGs) for the Future Land Use With Continued Federal Ownership, an on-property trespassing receptor was established. Under this exposure scenario, access to the site would be restricted and would be discouraged through the construction and maintenance of signs, fences, and locked gates around the perimeter of the restricted area. Despite these controls, it is assumed that trespassing would occur. The expanded trespassing scenario assumes a youth (ages 6 to 18) trespasses 110 days per year for two hours each day and the same person trespasses as an adult (ages 18 to 50) 40 days per year for one hour each day. This receptor and the associated exposure factors apply only to OUs 1, 2, and 4. The risk assessment for the OU5 FS will include additional trespassing as well as recreational exposure scenarios, which are to be fully developed on a site-wide basis within the OU 5 RI/FS. A full array of trespassing and recreational exposure scenarios from no trespassing through full recreational use of the site will be developed."

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Recycled and Recyclable

Change pages for the OU1 RI and OU2 RI/FS are included as an enclosure to this letter. Change pages containing the agreed upon language for addressing risks from dermal absorption of PAHs and child inhalation rates are also included. A description of the trespassing and recreational exposure scenarios for OU5 along with the associated exposure factors will be submitted to USEPA and OEPA for approval by March 31, 1994.

If you have any comments concerning these conclusions please contact Randy C. Janke at (513) 648-3123 if there are any additional questions regarding this submittal.

Sincerely,

Johnny Reising

for Jack R. Craig
Fernald Remediation Action
Project Manager

FN:RC Janke

Enclosures: As Stated

cc w/enc:

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OPERABLE UNIT 1
FEASIBILITY STUDY
CHANGE PAGES

March 15, 1994

While the RI Report/Baseline Risk Assessment presented risk information for a range of receptors under current and future land use scenarios, these land use assumptions and receptors were refined to provide managers with the range of necessary information to support informed decisions in establishing proposed interim remediation levels. In accordance with the Risk Assessment Work Plan Addendum (DOE 1992), and to ensure consistency with EPA's guidance "Part B, Development of Risk-Based PRGs," the Baseline Risk Assessment for Operable Unit 1 evaluated a future land use scenario, which included the loss of federal ownership of the FEMP and the establishment of a family farm on the property. This land use scenario was evaluated to understand the potential worst-case exposures to site contaminants. This future land use scenario is completely described in the RI Report for Operable Unit 1 (DOE 1994a).

In addition to the future land use scenario examined in the RI Report, it is conceivable, as part of any future land use of the FEMP, that the federal government could retain ownership of the property to preclude further development of the property, including the establishment of residential or farming units. This future land use scenario, termed Future Land Use With Continued Federal Ownership where the land use is a government reserve, assumes that the site will be fenced, and No Trespassing and No Hunting signs will be posted. The fencing and signs will be maintained over the long-term. This retention of ownership would support the application of some form of institutional control. A potential expanded trespasser receptor is proposed merely as an example and to develop an upper bound residual risk, as compared to the off-site farmer or the trespassing child. This scenario, then, typifies a reasonable maximum exposure possible given institutional controls. It is noted that the Future Land Use Scenarios discussed here are considered by DOE to be conservative. Input from the Fernald Citizens Task Force (defined in Appendix G Attachment II) will be integrated into final recommendations for the future land use. The receptors for the two land uses are as follows:

Future Land Use Without Continued Federal Ownership

The FEMP site is owned by private individuals with unrestricted use. The principal land use is for farming. The receptors are:

- On-Property Farmer — A farm family who is living on the FEMP property, growing crops, and raising dairy cows.

- Off-Site Farmer — A family living and actively farming adjacent to the FEMP site boundary. Exposure to contaminants transported by air and groundwater.

Future Land Use With Continued Federal Ownership

The FEMP property is owned by the federal government which controls land use. Fencing and signs to limit site access will be maintained. The land is not used for any purpose. The receptors are:

- Trespassing Child — Infrequent visits to the FEMP remediated property.
- Expanded Trespasser — Occasional visits to the property for hiking, roaming, and hunting by a youth and/or adults.
- Off-Site Farmer — A family living and actively farming adjacent to the FEMP site boundary. Exposure to contaminants transported by air and groundwater.

As a result of this review, the PRGs originally appearing in the SWCR have been revised to more appropriately reflect Operable Unit 1 conditions. The risk-based PRGs presented in Part III of the SWCR were typically based upon the consideration of a single exposure pathway for each media for the identified receptors. For example, for the groundwater media, an ingestion pathway was examined assuming consumption of 2 liters of water per day for 52 years. An exception to this single pathway framework was the development of PRGs for the recreational user (now designated as the expanded trespasser) as defined in the SWCR. For this expanded trespasser, the SWCR report considered ingestion and external exposure for the development of PRGs for the soil media. Subsequent to the SWCR, the Baseline Risk Assessment for Operable Unit 1 provided a more comprehensive quantitative examination of the viable pathways of exposure to each of the receptors considered in which multiple pathways of exposure are considered. Table 2-4 presents the spectrum of land uses and the potential receptors considered at possible risk when comparing the baseline conditions to the amended conditions as described under the FS alternatives.

For purposes of providing additional information for use in decision making, PRGs were developed for both the future land use with and without the assumption of continued federal ownership. To establish the PRGs for the future land use without continued ownership scenario, an on-property resident farmer was adopted as the receptor. For PRG development, the on-property resident farmer was assumed to be exposed to COCs in the soil via the inhalation of dusts, consumption of farm products contaminated by dust deposition, oral ingestion of soil, dermal contact, and external radiation pathways associated with the soils. Additionally, the on-property resident farmer was

assumed to be exposed to COCs in groundwater through ingestion. The equations and parameters used to calculate these PRGs are presented in the revised Risk Assessment Work Plan Addendum and in the Operable Unit 1 Baseline Risk Assessment.

For the purposes of establishing a PRG for a future land use under the continued federal ownership scenario, an on-property receptor was considered assuming a trespassing-type exposure scenario: it includes both adult and child/youth age groups. The frequency of exposure was expanded to account for the lack of active access controls other than maintenance of fencing and signs. The expanded trespassing-type scenario was employed because it represents a reasonable maximum estimate of the exposures a receptor could reasonably be expected to receive under the assumption that the federal government continues to exercise its rights of ownership to preclude site development for residential, farming, industrial/commercial, and recreational uses (i.e. ball fields, jogging trails, biking trails, etc.).

The expanded trespassing receptor considered for PRG development for the future land use with continued federal ownership is an individual who visits the property during childhood then visits during adulthood, perhaps for roaming, hiking, bird watching, or similar type activities. Due to the size of the site, fencing, and signs indicating No Trespassing and No Hunting, it is assumed that hunting is not a likely activity. The expanded trespasser is assumed to be exposed to soil contaminants via the oral ingestion, dermal contact, inhalation of dusts, and external radiation pathways. Groundwater PRGs are not developed for the expanded trespasser since there are no viable pathways of exposure.

Finally, soil PRGs were developed for the off-property farmer. Exposure pathways from soil to this receptor were not considered identical for both the Future Land Use With and Without Continued Federal Ownership scenarios. The distinction is that two separate dust resuspension scenarios were considered. In the government reserve land use scenario, the soil was considered to be undisturbed. However, under the on-property farming land use scenario, the soil was considered to be disturbed through plowing and more dirt was resuspended. The off-site farmer is assumed to be exposed to soils within the Operable Unit 1 area through the inhalation of resuspended dust containing COCs and the consumption of farm products (e.g., milk, meat, and vegetables) contaminated by dust deposition. Since the on-property farmer is a controlling receptor under the farming land use scenario, separate PRGs were not calculated for the off-site farmer. Qualitative information regarding the time periods of exposure can be found in Appendix D, Feasibility Study Risk Evaluation.

for the other radionuclides. However, reduction to background concentrations is necessary to reduce the risk to the on-property farmer to an ICLR of 10^{-6} (a PRG of 0.45 picoCurie per liter). Volumes of soils to be managed would be expected to increase significantly over the volume that would need to be managed to protect the "expanded trespasser" and "off-site farmer." Therefore, the proposed remediation levels for Operable Unit 1 reflect a future land use consistent with the SWCR and the CRARE.

It is noted that the proposed remedial levels presented in this section (and in Section 2.2.4) should be considered as interim, as additional input from the Fernald Citizens Task Force (as defined in Appendix G Attachment II) and the public is essential before making final recommendations on land use from a site-wide perspective. To allow for Operable Unit 5, Task Force, and public input, the Operable Unit 5 FS and Record of Decision (ROD) will revisit the Operable Unit 1 proposed soil remediation levels and modify them appropriately if found to be necessary or feasible. The risk assessment for the Operable Unit 5 Feasibility Study will include additional trespassing as well as recreational exposure scenarios, which are to be fully developed on a site-wide basis within the Operable Unit 5 Remedial Investigation/Feasibility Study. A full array of trespassing and recreational exposure scenarios from no trespassing through full recreational use of the site will be developed.

As previously defined, PRGs are developed from the risk-based PRGs for three receptors and the ARAR/TBC-based PRGs. PRLs are actual soil concentrations and could be considered as the PRG (incremental risk) concentrations plus background. In addition, cost benefit analysis and technology considerations can be used to modify a PRG to develop a PRL. Surface and subsurface soil PRLs will be the only PRLs developed for Operable Unit 1. Groundwater final remediation levels will be developed as part of Operable Unit 5 and will be presented in the Operable Unit 5 ROD.

The three receptors presented in Tables 2-5, 2-6, and 2-7 represent the two future land use scenarios. The expanded trespasser and the off-site resident farmer are the receptors for the government reserve land use (future land use, continued federal ownership). The off-site resident farmer and the on-property resident farmer are the receptors for the farming land use (future land use without continued federal ownership).

2.2.3.1 Basis of Proposed Remediation Levels for Surface Soils

The PRGs for soils presented in Tables 2-5, 2-6, and 2-7 indicate that the on-property resident farmer is the critical receptor for soil contamination. This is consistent with the Baseline Risk Assessment

results, which indicate that the highest risks are associated with the on-property resident farmer, followed by the trespassing child and the off-site resident farmer, in descending order. Accordingly, the PRGs range in magnitude from the off-site resident farmer, to the expanded trespasser, to the on-property resident farmer. To compare these two groups of receptors, the risks associated with the

It is anticipated that to attain the referenced proposed remediation levels, a minimum of 15 centimeters (6 inches) of soils will be removed from contaminated portions of the Operable Unit 1 area. Deeper excavations may also be required to remove identified "hot spots." This is particularly true for the polycyclic aromatic compounds which were found in only one sample. Following excavation, the excavation areas will be backfilled with clean soils and seeded. The following steps were followed in developing PRLs for Operable Unit 1:

- Step 1. The soil concentration representing the PRG for the 10^{-6} risk level for the expanded trespasser from Table 2-6 was adopted as the proposed preliminary soil remediation level.

- Step 2. Pertinent ARARs were identified for the individual COC. If the ARAR concentration level for the COC was less than the value identified above, the ARAR level was adopted.

- Step 3. In the event the proposed soil remediation level from the first two steps was less than the 95th percentile of the background soil data set, the proposed soil action level was considered indistinguishable from background. That is, any soil concentrations at or below background concentrations would be considered acceptable as a conclusion for remedial actions.

- Step 4. The proposed soil remediation level was compared to the 95th percentile of the observed surface and subsurface soil concentrations, which includes the maximum detected values as reported in the RI Report for Operable Unit 1, including the data sets such as Characterization Investigation Study on-property gamma spectrometry analysis. The frequency of detection of the COCs in the soils was also considered in this evaluation. If the PRL was greater than the maximum observed concentrations or it was infrequently detected, consideration was given to eliminating the need to propose remediation levels for those COCs.

The risk or HI to the expanded trespasser and the on-property resident farmer was then calculated for the PRLs to demonstrate effectiveness for the expanded trespasser and to demonstrate the relationship to the on-property farmer. If the PRL was the SQL as in the case for aroclor-1254, the input concentration for the risk calculations was one half the SQL. In the case for the noncarcinogenic effects for uranium, the PRL was the PRG multiplied by 0.5 because other non-carcinogens were present.

2.2.3.2 Proposed Remediation Levels for Surface Soils

Table 2-13 presents the radionuclide and chemical PRLs for soil, formatted in bold print for ease of reference. Carcinogenic risks drive these proposed levels. The radionuclides neptunium-237, plutonium-238, strontium-90, and uranium-234 were present at concentrations below the PRGs soil background concentrations; hence, no remediation is required for these COCs. The surface soil

16. Trucks transporting packages between the rail yard in Las Vegas and NTS are in constant use (i.e., go back and forth between Las Vegas and NTS). The mileage used in risk estimates is the round-trip mileage between Las Vegas and NTS.

17. Impacts from on-property transport (if any) and temporary stockpiling of waste material have been ignored. It is assumed that engineering controls and administrative practices will eliminate any significant (i.e., measurable) impacts.

18. There are no ingestion pathway risks associated with transportation accidents. Any significant crop contamination would trigger crop interdiction.

D.2.6.2 Assumptions for Analysis of Residual Risks

Evaluation of residual risks remaining after Operable Unit 1 remediation required a number of assumptions regarding future land use, receptors, exposure scenarios and exposure parameters. The assumptions listed below have been adopted from EPA guidance documents or have been used as the result of agreement between the FEMP and EPA.

1. Two future land use scenarios are considered: government ownership with access controls (deed restrictions, fencing, signs, etc. that will be maintained over the long-term) and private ownership with a residential farm family on the property.

2. For the case of future government ownership with some limited access controls, evaluated receptors are an off-property farmer and child and an expanded trespasser.

3. For the case of future private ownership, evaluated receptors are an on-property resident farmer and child and an off-property farmer and child.

4. The on-property farmer and child are part of a farm family living on the Operable Unit 1 site, growing crops and raising dairy cows and using groundwater for routine household and agricultural purposes.

5. The off-site farmer and child are part of a family living and actively farming adjacent to the FEMP site boundary. Exposure to contaminants is through groundwater pathways and resuspended surface soil.

6. The expanded trespasser occasionally visits the Operable Unit 1 property for hiking, roaming or bird watching. Activities such as jogging, biking or ball playing will not be feasible because the land is undeveloped.

7. Adult exposure period (70 yrs) and child is (0-6 yrs) receptors are included in the risk analysis. FEMP has agreed with EPA to use a 70-year exposure period for adult residential exposure because residents in the Fernald area tend to remain in the area for their lifetime.

8. All current surface soil within the OU1 boundary not removed by pit remediation,excluding surface soils north of the railroad tracks (unless shown to be contaminated), will be removed to a depth of six inches. The subsurface soil at the six inch depth will be assumed to contain COCs at the soil action level to which the on-

Future Land Use With Continued Federal Ownership With Some Limited Access Controls

Under this land use scenario, the federal government maintains ownership of the property and restricts future residential, farm development, or industrial use. Physical barriers including fencing and signs are used to help to prevent entry. The fencing and signs will be maintained over the long-term. Potential receptors include off-site farmer and child receptors and the expanded trespasser. This scenario assumes that a farm family lives immediately adjacent to the FEMP property boundary and is exposed through groundwater and surface soil pathways.

Future Land Use With Private Ownership

Under this land use scenario, there are neither access controls nor continued federal ownership. A farm family is assumed to reside on and farm the Operable Unit 1 property. A farm family is also assumed to be living and farming immediately adjacent to the FEMP property boundary. This scenario includes exposure routes that require development time such as establishing a home and farm operations on property.

Receptor exposure scenarios for the two land use scenarios are summarized in Figure D.3-1 and as follows:

- On-Property Resident Farmer Receptor - This scenario assumes that a farmer resides on the property and conducts agricultural activities. Typical activities may include food and feed production, livestock production, and general farm work. The receptor is assumed to not intrude into the disposal facility or the soils beneath the waste pits. It is assumed, however, that farming or other processes will bring non-pit area subsurface soils to the surface resulting in potential receptor exposure to surface soil pathways.
- On-Property Resident Child Receptor - This exposure is similar to the resident farmer with modifications of exposure parameter values to reflect values typical of a child. The exposure routes for this receptor include those listed for the resident farmer and assumed no intrusion into the disposal facility. Exposure to surface soil pathways is also assumed to occur.
- Off-Site Farmer and Child Receptors - This scenario assumes that a farm family lives immediately adjacent to the FEMP property boundary and is exposed through groundwater pathways. The off-site farmer and child exposures are the same for both land use scenarios.
- Expanded Trespasser - The expanded trespasser is an individual trespassing on the site as a youth and (later) as an adult. This exposure scenario assumes that subsurface soils are brought to the surface by some means such that surface soil exposure pathways are relevant. Groundwater and produce ingestion exposure pathways are not included in this exposure scenario.

Exposure routes identified for the on-property resident farmer and the on-property resident child are quantitatively evaluated for the private land use scenario. Groundwater exposure pathways include

identification, location, and concentrations. Characterization was controlled by the sampling and analysis plan, which identified sampling locations and analytical protocols.

The source of COC data for the FS risk evaluation was the Operable Unit 1 RI and baseline risk assessment. The RI Report for Operable Unit 1 was prepared according to CERCLA guidelines, and the data were validated. Whenever possible, COC identification was based on risk results in the RI baseline risk assessment from data collected according to a CERCLA sampling plan. However, uncertainty is inherently high in the Waste Pit data due to the heterogeneity of the waste forms. Uncertainty of soil data is inherently higher than groundwater data because soils are heterogeneous.

It is unlikely that major COC contributors to risk for Operable Unit 1 have been overlooked. Any shortcomings in the chemical data that have been gathered at the FEMP site are compensated for by a large database of contaminant type and concentration data. Evaluation of these data have identified a large number of contaminants which are present in Operable Unit 1 wastes and associated materials, and confirm general contamination patterns indicated by past site operations. There is a high degree of certainty that the major contaminants (uranium and other radionuclides, arsenic and other metals, and organics) which could credibly contribute to site risks have been identified.

D.8.2 EXPOSURE PATHWAYS AND PARAMETERS

The major source of uncertainty in predicting future exposures associated with Operable Unit 1 is the future disposition of the property itself. Because it is not possible to accurately predict future land use or condition of the site, the reasonable maximum exposure (RME) future conditions were evaluated, as stipulated by the National Oil and Hazardous Substance Pollution Contingency Plan (NCP). The two land uses proposed for this risk assessment span a continuum of land uses with the private farm use being the most conservative and the government reserve with access controls being much less conservative.

D.8.2.1 Uncertainties Associated with Remedial Action Risk Estimates

In general, estimates of remedial action risks in this assessment are conservative, i.e., the estimates tend to overestimate the risks likely to be experienced by potential receptors during remedial activities. Conservative analyses are necessary to compensate for uncertainties inherent in the assessment and to insure that potential risks are not missed. This section presents some of the uncertainties in the assessment, and has been subdivided by exposure mode.

controls, institutional controls, and the major applicable or relevant and appropriate requirements (ARARs) associated for each alternative. The No-Action Alternative is presented as a baseline for comparison purposes.

5.1 COMMON ELEMENTS

Except for the No-Action Alternative, all of the alternatives now being considered for Operable Unit 1 include a number of common components. Each alternative involves removal of 710,000 cubic yards of pit waste, soil, caps, liners, etc., some form of treatment (vitrification, drying, or cement stabilization), and disposal of Operable Unit 1 wastes. Table 5-1 summarizes waste volumes for each alternative, as well as approximate time for completion. Oversize structural-type debris is expected to be encountered during excavation of the waste pit contents. Such material not readily amenable to size reduction in the Operable Unit 1 remedial process will be forwarded to Operable Unit 3 for management in the same manner as debris and rubble generated from the demolition of the process area buildings. Surface soils, contaminated soils from beneath the excavated pits and some cover soils, as appropriate, will be forwarded to Operable Unit 5 for management. Operable Unit 5 has taken the site lead in identifying and evaluating remedial alternatives for this type of waste stream. The Operable Unit 5 Record of Decision will document the method of management for these soils. Proposed remediation levels are presented in Table 5-2 (for surface soils) and Table 5-3 (for subsurface soils beneath the pits). Note that the levels in Tables 5-2 and 5-3 are interim. Additional input from the Fernald Citizens Advisory Task Force and the public is essential before making final recommendations on land use from a site-wide perspective. The Operable Unit 1 proposed remediation levels will be re-examined by the Operable Unit 5 Feasibility Study Report and Record of Decision, based upon available Operable Unit 5 Feasibility Study conclusions, recommendations from the Fernald Citizens Advisory Task Force, and further public comment. Specifically, the risk assessment for the Operable Unit 5 Feasibility Study will include additional trespassing as well as recreational exposure scenarios, which are to be fully developed on a site-wide basis within the Operable Unit 5 Remedial Investigation/Feasibility Study. A full array of trespassing and recreational exposure scenarios from no trespassing through full recreational use of the site will be developed. If found to be necessary, the Operable Unit 5 Record of Decision will modify the Operable Unit 1

proposed remediation levels downward to ensure protectiveness of human health and the environment; the remediation levels will not be adjusted upward.

Each action alternative would meet the chemical-specific ARARs associated with potential releases to groundwater, air, and surface water. All action alternatives would comply with the pertinent location-

TABLE 2-6
(Continued)

	Incremental Above Background Concentrations				ARAR/ TBC	Background 95th Percentile
	HI=1 RfD based PRG	10^{-4} risk based PRG	10^{-5} risk based PRG	10^{-6} risk based PRG		
Molybdenum	4,500	N/A	N/A	N/A		2.6
Nickel	>10,000	>10,000	>10,000	>10,000		20.9
Silver	640	N/A	N/A	N/A		2.6
Thallium	140	N/A	N/A	N/A		0.58
Thorium[b]						ND
Uranium	380	N/A	N/A	N/A		ND
Vanadium	8,000	N/A	N/A	N/A		30.4
Zinc	>10,000	N/A	N/A	N/A		62.2
Dioxins/Furans (mg/kg)						
2,3,7,8-TetraCDD	NA	0.0012	0.00012	1.2E-05		ND
HeptaCDD	NA	0.12	0.012	0.0012		ND
HeptaCDF	NA	0.12	0.012	0.0012		ND
HexaCDD	NA	0.012	0.0012	0.00012		ND
HexaCDF	NA	0.012	0.0012	0.00012		ND
OctaCDD	NA	1.2	0.12	0.012		ND
PAHs (mg/kg)						
Benzo(a)anthracene	NA	2400	240	24		ND
Benzo(a)pyrene	NA	350	35	3.5		ND
Benzo(b)fluoranthene	NA	2900	290	29		ND
Benzo(k)fluoranthene	NA	6700	670	67		ND
Indeno(1,2,3-cd)pyrene	NA	1,300	130	13		ND
PCBs (mg/kg)						
Arochlor-1248	NA	3.5	0.35	0.035		ND
Arochlor-1254	NA	3.5	0.35	0.035		ND

TABLE 3
(Continued)

Constituent of Concern	Expanded Trespasser HI = 1 PRG	Expanded Trespasser 10^{-6} ILCR PRG	Background (95th percentile)	ARAR Target	Max. Detected Soil Concentration		**Proposed Remediation Levels**[a]	HI to Receptors from Proposed Remediation Levels		Risk to Receptors from Proposed Remediation Level	
					Surface	Sub surface		Expanded Trespasser	On-Property Farmer	Expanded Trespasser[b]	On-Property Farmer[c]
PAHs (mg/kg)											
Benzo(a)anthracene	NA	24	ND	None	NA	0.098	**NR**	N/A	N/A	$<1x10^{-6}$	$5.8x10^{-6}$
Benzo(a)pyrene	NA	3.5	ND	None	NA	0.042	**NR**	N/A	N/A	$<1x10^{-6}$	$2.3x10^{-5}$
Benzo(b)fluoranthene	NA	29	ND	None	NA	0.059	**NR**	N/A	N/A	$<1x10^{-6}$	$9.7x10^{-6}$
Benzo(k)fluoranthene	NA	67	ND	None	NA	0.046	**NR**	N/A	N/A	$<1x10^{-6}$	$6.6x10^{-6}$
Ideno(1,2,3-cd)pyrene	NA	13	ND	None	NA	0.088	**NR**	N/A	N/A	$<1x10^{-6}$	$1.6x10^{-7}$
PCBs (mg/kg)											
Arochlor-1254	N/A	0.035	ND	None	NA	1.4	**ND**	N/A	N/A	$1x10^{-6}$	$1.4x10^{-3}$

[a] This PRL column is formatted in bold print for ease of reference only.
[b] Includes the direct radiation, soil ingestion, and inhalation pathways.
[c] Includes all pathways including the indirect pathways due to food crops.
[d] 0.5 times the PRG to protect for multiple chemicals.
NA = Not Available.
N/A= Not Applicable.
ND = Not Detected.
NR = No Remediation Required.

5304

TABLE
(Continued)

Constituent of Concern	Expanded Trespasser HI = 1 PRG	Expanded Trespasser 10^{-6} ILCR PRG	Background (95th percentile)	ARAR Target	Max. Detected Soil Concentration		**Proposed Remediation Levels[a]**	HI to Receptors from Proposed Remediation Levels		Risk to Receptors from Proposed Remediation Level	
					Surface	Sub surface		Expanded Trespasser	On-Property Farmer	Expanded Trespasser[b]	On-Property Farmer[c]
PAHs (mg/kg)											
Benzo(a)anthracene	NA	24	ND	None	NA	0.098	**NR**	N/A	N/A	$<1x10^{-6}$	$5.8x10^{-6}$
Benzo(a)pyrene	NA	3.5	ND	None	NA	0.042	**NR**	N/A	N/A	$<1x10^{-6}$	$2.3x10^{-5}$
Benzo(b)fluoranthene	NA	29	ND	None	NA	0.059	**NR**	N/A	N/A	$<1x10^{-6}$	$9.7x10^{-6}$
Benzo(k)fluoranthene	NA	67	ND	None	NA	0.046	**NR**	N/A	N/A	$<1x10^{-6}$	$6.6x10^{-6}$
Ideno(1,2,3-cd)pyprene	NA	13	ND	None	NA	0.088	**NR**	N/A	N/A	$<1x10^{-6}$	$1.6x10^{-7}$
PCBs (mg/kg)											
Arochlor-1254	N/A	0.035	ND	None	NA	1.4	**ND**	N/A	N/A	$1x10^{-6}$	$1.4x10^{-3}$

[a] This PRL column is formatted in bold print for ease of reference only.
[b] Includes the direct radiation, soil ingestion, and inhalation pathways.
[c] Includes all pathways including the indirect pathways due to food crops.
[d] 0.5 times the PRG to protect for multiple chemicals.

NA = Not Available.
N/A = Not Applicable.
ND = Not Detected.
NR = No Remediation Required.

TABLE E.IV-19
ILCRs FOR RME ON-PROPERTY FARMER
FUTURE LAND USE, FUTURE SOURCE TERM

Transfer Media:	Air				Soil			Exposed Waste Pit Material			Surface Water		Groundwater						Buried Pit Material
Exposure Pathways: / Contaminants of Concern	Inhalation	Ingestion of Vegetables and Fruits	Ingestion of Meat	Ingestion of Milk Products	Ingestion of Vegetables and Fruits	Ingestion of Meat	Ingestion of Milk Products	Incidental Ingestion	Dermal Contact[b]	External Exposure	Ingestion of Meat	Ingestion of Milk Products	Ingestion of Drinking Water	Ingestion of Vegetables and Fruits	Ingestion of Meat	Ingestion of Milk Products	Inhalation of VOC's	Dermal Contact while Bathing	External Exposure[a]
Radionuclides																			
Cs_{137+1d}	6.8E-09	1.6E-07	2.9E-07	4.0E-07	8.6E-07	3.7E-06	5.2E-06	8.4E-07	NA	5.7E-04	3.3E-05	4.6E-05	NA	NA	NA	NA	NA	NA	
Np_{237+1d}	8.1E-06	8.3E-07	4.7E-09	1.7E-09	1.4E-06	6.1E-08	2.2E-08	4.7E-06	NA	8.7E-05	NA	NA	1.3E-09	4.1E-10	1.4E-12	5.2E-13	NA	NA	
Pu_{238}	6.3E-07	4.5E-08	1.6E-12	1.3E-12	1.3E-09	1.1E-11	8.4E-12	8.9E-07	NA	1.1E-09	NA	NA	1.4E-06	4.3E-07	7.9E-12	6.5E-12	NA	NA	
Pu_{239240}	2.7E-06	2.1E-07	1.6E-11	1.3E-11	2.6E-09	2.2E-11	1.8E-11	2.0E-06	NA	2.3E-09	NA	NA	NA	NA	NA	NA	NA	NA	
Ra_{226+8d}	1.5E-05	2.4E-05	9.9E-07	7.1E-06	NA	NA	NA	1.0E-04	NA	7.3E-03	6.3E-08	4.6E-07	6.8E-05	2.3E-05	4.3E-07	3.2E-06	NA	NA	
Ru_{106}	9.2E-09	2.5E-09	2.5E-10	3.1E-13	NA	NA	NA	1.2E-08	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	
Sr_{90+1d}	6.5E-09	6.1E-08	3.7E-09	7.3E-08	1.7E-05	3.7E-06	7.4E-05	4.6E-07	NA	ND	6.7E-07	1.4E-05	8.3E-09	3.3E-09	1.2E-10	2.4E-09	NA	NA	
Tc_{99}	8.6E-08	1.8E-07	1.1E-07	5.0E-07	NA	NA	NA	1.2E-06	NA	5.2E-09	1.3E-05	6.1E-05	1.1E-06	3.3E-07	1.3E-07	6.3E-07	NA	NA	
Th_{230}	1.6E-03	9.5E-06	1.1E-08	3.8E-08	2.1E-07	1.1E-08	3.8E-08	6.7E-05	NA	2.6E-06	1.0E-11	3.4E-11	6.6E-07	2.0E-07	5.2E-11	1.8E-10	NA	NA	
$Th_{232+10d}$	2.0E-04	4.0E-06	4.8E-09	1.6E-08	NA	NA	NA	2.3E-05	NA	1.1E-02	2.6E-09	9.0E-09	NA	NA	NA	NA	NA	NA	
U_{234}	3.3E-04	2.6E-06	2.9E-08	3.5E-07	9.6E-06	6.4E-07	7.7E-06	1.7E-05	NA	2.9E-07	1.3E-06	1.6E-05	1.8E-03	5.4E-04	4.0E-06	4.9E-05	NA	NA	
U_{235+1D}	8.7E-05	7.1E-07	7.9E-09	9.4E-08	1.5E-06	1.0E-07	1.2E-06	3.4E-06	NA	4.9E-04	7.2E-08	8.9E-07	4.1E-04	1.2E-04	9.1E-07	1.1E-05	NA	NA	
U_{238+2d}	2.4E-03	1.6E-05	1.8E-07	2.2E-06	1.1E-04	7.5E-06	9.0E-05	1.3E-04	NA	1.6E-03	5.4E-06	6.6E-05	1.5E-02	4.5E-03	3.3E-05	4.1E-04	NA	NA	
Rn_{222+4d}	3.3E-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Total Radionuclides	4.7E-03	5.9E-05	1.6E-06	1.1E-05	1.4E-04	1.6E-05	1.8E-04	3.5E-04		2.1E-02	5.3E-05	2.0E-04	1.7E-02	5.1E-03	3.8E-05	4.7E-04			1.2E-03
Chemicals																			
arsenic	1.5E-03	2.5E-03	6.3E-04	7.5E-05	NA	NA	NA	8.1E-03	2.7E-04	NA	5.5E-06	6.6E-07	2.8E-02	9.9E-03	1.4E-03	1.7E-04	ND	8.4E-05	NA
beryllium	5.4E-07	4.2E-06	8.1E-07	2.9E-09	3.6E-06	3.4E-06	1.2E-08	3.0E-05	9.5E-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cadmium	6.9E-07	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
chromium vi	2.7E-05	ND	ND	ND	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
lead	ND	ND	ND	ND	NA	NA	NA	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA
nickel	1.1E-06	ND	ND	ND	NA	NA	NA	ND	ND	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA
pcbs	ND	8.4E-06	2.4E-05	3.1E-05	9.8E-05	3.4E-04	4.3E-04	3.2E-05	4.1E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
benzo(a)anthracene	9.2E-10	1.5E-08	8.2E-09	1.0E-08	1.7E-06	1.7E-06	2.2E-06	2.7E-07	2.7E-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
benzo(a)pyrene	4.7E-09	7.4E-08	9.8E-08	1.2E-07	3.0E-06	8.8E-06	1.1E-05	9.1E-07	9.1E-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
benzo(b)fluoranthene	1.2E-09	1.8E-08	9.1E-08	1.2E-07	2.3E-07	4.1E-06	5.2E-06	1.7E-07	1.7E-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
benzo(k)fluoranthene	2.1E-11	3.2E-10	3.3E-09	4.2E-09	5.4E-08	2.2E-06	2.8E-06	3.9E-08	3.9E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
chrysene	ND	4.2E-10	2.4E-10	3.1E-10	4.5E-08	4.7E-08	5.9E-08	7.6E-09	7.6E-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
indeno(1,2,3-cd)pyrene	ND	8.8E-09	5.6E-07	7.1E-07	NA	NA	NA	3.0E-08	3.0E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-nitrosodipropylamine	ND	1.3E-07	3.9E-12	4.9E-12	NA	NA	NA	3.7E-07	3.9E-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
pentachlorophenol	ND	5.5E-09	7.7E-10	9.8E-10	NA	NA	NA	1.8E-08	1.9E-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
vinyl chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
tetrachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
tetrachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
pentachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
hexachlorodibenzo-p-dioxin	1.9E-09	2.3E-08	2.3E-07	3.3E-07	NA	NA	NA	8.2E-08	1.6E-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
hexachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
heptachlorodibenzo-p-dioxin	6.7E-09	7.9E-08	8.0E-07	1.1E-06	NA	NA	NA	2.9E-07	5.6E-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
heptachlorodibenzofuran	8.4E-10	9.9E-09	6.3E-09	9.0E-09	NA	NA	NA	3.6E-08	6.9E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
octachlorodibenzo-p-dioxin	7.7E-09	9.1E-08	9.2E-07	1.3E-06	NA	NA	NA	3.3E-07	6.4E-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
octachlorodibenzofuran	4.4E-10	5.2E-09	3.3E-09	4.7E-09	NA	NA	NA	1.9E-08	3.6E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
chloroform	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.6E-12	2.2E-12	NA	NA	NA	NA	NA	NA	NA
tetrachloroethene	6.1E-11	3.4E-08	1.7E-11	2.2E-11	NA	NA	NA	3.9E-08	5.5E-07	NA	7.1E-11	9.2E-11	9.0E-13	5.0E-13	1.5E-16	1.9E-16	1.3E-13	7.2E-13	NA
benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-10	4.0E-10	NA	NA	NA	NA	NA	NA	NA
methylene chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.2E-13	5.0E-13	NA	NA	NA	NA	NA	NA	NA
Sum Chem (TEF for PAHs):	1.5E-03	2.5E-03	6.6E-04	1.1E-04	1.1E-04	3.6E-04	4.5E-04	8.1E-03	1.3E-03		5.5E-06	6.6E-07	2.8E-02	9.9E-03	1.4E-03	1.7E-04	1.3E-13	8.4E-05	
Sum Chem (BaP for PAHs):	1.5E-03	2.5E-03	6.6E-04	1.1E-04	1.3E-04	4.5E-04	5.6E-04	8.1E-03	1.3E-03		5.5E-06	6.6E-07	2.8E-02	9.9E-03	1.4E-03	1.7E-04	1.3E-13	8.4E-05	
TOTAL ALL (TEF Approach):	6.2E-03	2.6E-03	6.6E-04	1.2E-04	2.5E-04	3.7E-04	6.3E-04	8.5E-03	1.3E-03	2.1E-02	5.8E-05	2.1E-04	4.5E-02	1.5E-02	1.4E-03	6.4E-04	1.3E-13	8.4E-05	1.2E-03
TOTAL ALL (BaP Approach):	6.2E-03	2.6E-03	6.6E-04	1.2E-04	2.7E-04	4.6E-04	7.4E-04	8.5E-03	1.3E-03	2.1E-02	5.8E-05	2.1E-04	4.5E-02	1.5E-02	1.4E-03	6.4E-04	1.3E-13	8.4E-05	1.2E-03

Notes:

NA -- Not applicable. Chemical not a chemical of interest for media or exposure pathway not applicable.

ND -- No data for toxicity assessment for exposure pathway.

[a] Risk from external radiation exposure is calculated from total exposure to all gamma radiation sources.

[b] Risk from dermal contact to PAH's is assumed to equal risk from oral ingestion of PAH's.

TABLE E.IV-21
ILCRs FOR RME ON-PROPERTY CHILD
FUTURE LAND USE, FUTURE SOURCE TERM

Transfer Media:	Air				Soil			Exposed Waste Pit Material			Surface Water		Groundwater						Buried Pit Material
Exposure Pathways: / Contaminants of Concern	Inhalation	Ingestion of Vegetables and Fruits	Ingestion of Meat	Ingestion of Milk Products	Ingestion of Vegetables and Fruits	Ingestion of Meat	Ingestion of Milk Products	Incidental Ingestion	Dermal Contact[b]	External Exposure	Ingestion of Meat	Ingestion of Milk Products	Ingestion of Drinking Water	Ingestion of Vegetables and Fruits	Ingestion of Meat	Ingestion of Milk Products	Inhalation of VOC's	Dermal Contact while Bathing	External Exposure[a]
Radionuclides																			
Cs_{137+1d}	1.2E-10	1.2E-08	9.5E-09	7.8E-08	6.4E-08	1.2E-07	1.0E-06	8.0E-08	NA	4.3E-05	1.1E-06	9.0E-06	NA	NA	NA	NA	NA	NA	
Np_{237+1d}	1.5E-07	6.2E-08	1.5E-10	3.3E-10	1.0E-07	2.0E-09	4.3E-09	4.5E-07	NA	6.5E-06	NA	NA	5.4E-11	3.0E-11	4.7E-14	1.0E-13	NA	NA	
Pu_{238}	1.1E-08	3.4E-09	5.4E-14	2.5E-13	9.4E-11	3.5E-13	1.6E-12	8.4E-08	NA	8.0E-11	NA	NA	6.1E-08	3.2E-08	2.6E-13	1.3E-12	NA	NA	
$Pu_{239/240}$	4.9E-08	1.6E-08	5.4E-13	2.5E-12	2.0E-10	7.3E-13	3.4E-12	1.9E-07	NA	1.7E-10	NA	NA	NA	NA	NA	NA	NA	NA	
Ra_{226+8d}	2.8E-07	1.8E-06	3.3E-08	1.4E-06	NA	NA	NA	9.6E-06	NA	5.5E-04	2.1E-09	9.0E-08	2.9E-06	1.7E-06	1.4E-08	6.1E-07	NA	NA	
Ru_{106}	1.7E-10	1.8E-10	8.1E-12	5.9E-14	NA	NA	NA	1.1E-09	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	
Sr_{90+1d}	1.2E-10	4.5E-09	1.2E-10	1.4E-08	1.3E-06	1.2E-07	1.4E-05	4.4E-08	NA	ND	2.2E-08	2.6E-06	3.5E-10	2.5E-10	4.0E-12	4.7E-10	NA	NA	
Tc_{99}	1.6E-09	1.3E-08	3.5E-09	9.8E-08	NA	NA	NA	1.1E-07	NA	3.9E-10	4.2E-07	1.2E-05	4.5E-08	2.5E-08	4.4E-09	1.2E-07	NA	NA	
Th_{230}	3.0E-05	7.1E-07	3.7E-10	7.3E-09	1.5E-08	3.8E-10	7.4E-09	6.4E-06	NA	2.0E-07	3.3E-13	6.7E-12	2.8E-08	1.5E-08	1.7E-12	3.5E-11	NA	NA	
$Th_{232+10d}$	3.7E-06	3.0E-07	1.6E-10	3.1E-09	NA	NA	NA	2.2E-06	NA	8.1E-04	8.7E-11	1.8E-09	NA	NA	NA	NA	NA	NA	
U_{234}	6.0E-06	1.9E-07	9.5E-10	6.7E-08	7.2E-07	2.1E-08	1.5E-06	1.6E-06	NA	2.2E-08	4.2E-08	3.0E-06	7.7E-05	4.0E-05	1.3E-07	9.6E-06	NA	NA	
U_{235+1D}	1.6E-06	5.3E-08	2.6E-10	1.8E-08	1.1E-07	3.4E-09	2.4E-07	3.3E-07	NA	3.6E-05	2.4E-09	1.7E-07	1.8E-05	9.2E-06	3.0E-08	2.2E-06	NA	NA	
U_{238+2d}	4.4E-05	1.2E-06	6.1E-09	4.3E-07	8.4E-06	2.5E-07	1.7E-05	1.2E-05	NA	1.2E-04	1.8E-07	1.3E-05	6.4E-04	3.3E-04	1.1E-06	7.9E-05	NA	NA	
Rn_{222+4d}	6.0E-11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Total Radionuclides	8.5E-05	4.4E-06	5.4E-08	2.1E-06	1.1E-05	5.2E-07	3.5E-05	3.3E-05		1.6E-03	1.7E-06	4.0E-05	7.3E-04	3.8E-04	1.3E-06	9.2E-05			2.5E-07
Chemicals																			
arsenic	1.2E-04	8.6E-04	9.7E-05	6.8E-05	NA	NA	NA	3.6E-03	3.8E-05	NA	8.4E-07	6.0E-07	5.6E-03	3.5E-03	2.1E-04	1.5E-04	ND	8.0E-06	NA
beryllium	4.6E-08	1.4E-06	1.3E-07	2.6E-09	1.2E-06	5.3E-07	1.1E-08	1.3E-05	1.3E-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cadmium	5.9E-08	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
chromium vi	2.3E-06	ND	ND	ND	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
lead	ND	ND	ND	ND	NA	NA	NA	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA
nickel	9.7E-08	ND	ND	ND	NA	NA	NA	ND	ND	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA
pcbs	ND	2.9E-06	3.8E-06	2.8E-05	3.4E-05	5.2E-05	3.9E-04	1.4E-05	5.7E-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
benzo(a)anthracene	7.8E-11	5.1E-09	1.3E-09	9.4E-09	5.8E-07	2.6E-07	2.0E-06	1.2E-07	1.2E-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
benzo(a)pyrene	4.0E-10	2.6E-08	1.5E-08	1.1E-07	1.0E-06	1.4E-06	1.0E-05	4.0E-07	4.0E-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
benzo(b)fluoranthene	9.9E-11	6.2E-09	1.4E-08	1.0E-07	8.1E-08	6.3E-07	4.7E-06	7.7E-08	7.7E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
benzo(k)fluoranthene	1.8E-12	1.1E-10	5.2E-10	3.8E-09	1.9E-08	3.5E-07	2.6E-06	1.7E-08	1.7E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
chrysene	ND	1.5E-10	3.8E-11	2.8E-10	1.6E-08	7.2E-09	5.4E-08	3.4E-09	3.4E-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
indeno(1,2,3-cd)pyrene	ND	3.1E-09	8.6E-08	6.4E-07	NA	NA	NA	1.3E-08	1.3E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-nitrosodipropylamine	ND	4.6E-08	6.0E-13	4.4E-12	NA	NA	NA	1.6E-07	5.5E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
pentachlorophenol	ND	1.9E-09	1.2E-10	8.9E-10	NA	NA	NA	7.9E-09	2.6E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
vinyl chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
tetrachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
tetrachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
pentachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
hexachlorodibenzo-p-dioxin	1.6E-10	8.0E-09	3.6E-08	3.0E-07	NA	NA	NA	3.7E-08	2.2E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
hexachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
heptachlorodibenzo-p-dioxin	5.7E-10	2.8E-08	1.2E-07	1.0E-06	NA	NA	NA	1.3E-07	7.8E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
heptachlorodibenzofuran	7.1E-11	3.4E-09	9.8E-10	8.2E-09	NA	NA	NA	1.6E-08	9.6E-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
octachlorodibenzo-p-dioxin	6.5E-10	3.2E-08	1.4E-07	1.2E-06	NA	NA	NA	1.5E-07	8.9E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
octachlorodibenzofuran	3.7E-11	1.8E-09	5.1E-10	4.3E-09	NA	NA	NA	8.4E-09	5.0E-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
chloroform	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.4E-13	2.0E-12	NA	NA	NA	NA	NA	NA	NA
tetrachloroethene	5.2E-12	1.2E-08	2.7E-12	2.0E-11	NA	NA	NA	1.7E-08	7.6E-08	NA	1.1E-11	8.4E-11	1.8E-13	1.7E-13	2.3E-17	1.8E-16	5.2E-14	8.3E-14	NA
benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.7E-11	3.6E-10	NA	NA	NA	NA	NA	NA	NA
methylene chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.4E-14	4.5E-13	NA	NA	NA	NA	NA	NA	NA
Sum Chem (TEF for PAHs):	1.3E-04	8.7E-04	1.0E-04	1.0E-04	3.7E-05	5.5E-05	4.1E-04	3.6E-03	1.8E-04		8.4E-07	6.0E-07	5.6E-03	3.5E-03	2.1E-04	1.5E-04	5.2E-14	8.0E-06	
Sum Chem (BaP for PAHs):	1.3E-04	8.7E-04	1.0E-04	1.0E-04	4.5E-05	6.9E-05	5.1E-04	3.6E-03	1.8E-04		8.4E-07	6.0E-07	5.6E-03	3.5E-03	2.1E-04	1.5E-04	5.2E-14	8.0E-06	
TOTAL ALL (TEF Approach):	2.1E-04	8.7E-04	1.0E-04	1.0E-04	4.8E-05	5.6E-05	4.4E-04	3.7E-03	1.8E-04	1.6E-03	2.6E-06	4.0E-05	6.3E-03	3.8E-03	2.1E-04	2.4E-04	5.2E-14	8.0E-06	2.5E-07
TOTAL ALL (BaP Approach):	2.1E-04	8.7E-04	1.0E-04	1.0E-04	5.6E-05	7.0E-05	5.5E-04	3.7E-03	1.8E-04	1.6E-03	2.6E-06	4.0E-05	6.3E-03	3.8E-03	2.1E-04	2.4E-04	5.2E-14	8.0E-06	2.5E-07

NA - Not applicable. Chemical not a chemical of interest for media or exposure pathway not applicable.
ND - No data for toxicity assessment for exposure pathway.
[a] Risk from external radiation exposure is calculated from total exposure to all gamma radiation sources.
[b] Risk from dermal contact to PAH's is assumed to equal risk from oral ingestion of PAH's.

TABLE E.IV-23
ILCRs FOR CT ON-PROPERTY FARMER
FUTURE LAND USE, FUTURE SOURCE TERM

Transfer Media:	Air				Soil			Exposed Waste Pit Material			Surface Water		Groundwater						Buried Pit Material
Exposure Pathways: / Contaminants of Concern	Inhalation	Ingestion of Vegetables and Fruits	Ingestion of Meat	Ingestion of Milk Products	Ingestion of Vegetables and Fruits	Ingestion of Meat	Ingestion of Milk Products	Incidental Ingestion	Dermal Contact[b]	External Exposure	Ingestion of Meat	Ingestion of Milk Products	Ingestion of Drinking Water	Ingestion of Vegetables and Fruits	Ingestion of Meat	Ingestion of Milk Products	Inhalation of VOC's	Dermal Contact while Bathing	External Exposure[a]
Radionuclides																			
Cs_{137+1d}	5.1E-10	1.0E-08	1.9E-08	2.2E-08	5.5E-08	2.5E-07	2.8E-07	5.8E-08	NA	5.4E-05	2.2E-06	2.5E-06	NA	NA	NA	NA	NA	NA	
Np_{237+1d}	6.0E-07	5.3E-08	3.1E-10	9.1E-11	9.1E-08	4.1E-09	1.2E-09	3.2E-07	NA	8.4E-06	NA	NA	8.8E-11	2.6E-11	9.5E-14	2.8E-14	NA	NA	
Pu_{238}	4.7E-08	2.9E-09	1.1E-13	7.0E-14	8.2E-11	7.1E-13	4.6E-13	6.1E-08	NA	1.0E-10	NA	NA	1.0E-07	2.8E-08	5.3E-13	3.5E-13	NA	NA	
$Pu_{239/240}$	2.0E-07	1.4E-08	1.1E-12	7.1E-13	1.7E-10	1.5E-12	9.5E-13	1.4E-07	NA	2.2E-10	NA	NA	NA	NA	NA	NA	NA	NA	
Ra_{226+1d}	1.1E-06	1.6E-06	6.7E-08	3.9E-07	NA	NA	NA	6.9E-06	NA	7.0E-04	4.2E-09	2.5E-08	4.8E-06	1.5E-06	2.9E-08	1.7E-07	NA	NA	
Ru_{106}	6.8E-10	1.6E-10	1.7E-11	1.6E-14	NA	NA	NA	8.0E-10	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	
Sr_{90+1d}	4.8E-10	3.9E-09	2.5E-10	4.0E-09	1.1E-06	2.5E-07	4.0E-06	3.2E-08	NA	ND	4.5E-08	7.3E-07	5.9E-10	2.2E-10	8.1E-12	1.3E-10	NA	NA	
Tc_{99}	6.4E-09	1.1E-08	7.2E-09	2.7E-08	NA	NA	NA	8.2E-08	NA	5.0E-10	8.5E-07	3.3E-06	7.4E-08	2.1E-08	8.8E-09	3.4E-08	NA	NA	
Th_{230}	1.2E-04	6.1E-07	7.6E-10	2.0E-09	1.3E-08	7.6E-10	2.0E-09	4.6E-06	NA	2.5E-07	6.7E-13	1.8E-12	4.7E-08	1.3E-08	3.5E-12	9.6E-12	NA	NA	
$Th_{232+10d}$	1.5E-05	2.6E-07	3.3E-10	8.7E-10	NA	NA	NA	1.6E-06	NA	1.0E-03	1.8E-10	4.9E-10	NA	NA	NA	NA	NA	NA	
U_{234}	2.5E-05	1.7E-07	1.9E-09	1.9E-08	6.2E-07	4.3E-08	4.1E-07	1.1E-06	NA	2.8E-08	8.4E-08	8.4E-07	1.3E-04	3.5E-05	2.7E-07	2.7E-06	NA	NA	
U_{235+1D}	6.5E-06	4.6E-08	5.3E-10	5.1E-09	9.9E-08	6.8E-09	6.6E-08	2.4E-07	NA	4.7E-05	4.8E-09	4.8E-08	2.9E-05	8.0E-06	6.1E-08	6.1E-07	NA	NA	
U_{238+2d}	1.8E-04	1.1E-06	1.2E-08	1.2E-07	7.3E-06	5.1E-07	4.8E-06	8.9E-06	NA	1.5E-04	3.6E-07	3.6E-06	1.0E-03	2.9E-04	2.2E-06	2.2E-05	NA	NA	
Rn_{222+4d}	2.5E-10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Total Radionuclides	3.5E-04	3.8E-06	1.1E-07	5.8E-07	9.3E-06	1.1E-06	9.6E-06	2.4E-05		2.0E-03	3.5E-06	1.1E-05	1.2E-03	3.3E-04	2.6E-06	2.5E-05			1.6E-04
Chemicals																			
arsenic	1.1E-04	1.6E-04	4.2E-05	4.1E-06	NA	NA	NA	5.5E-04	4.8E-06	NA	3.7E-07	3.6E-08	2.0E-03	6.4E-04	9.3E-05	9.1E-06	ND	5.0E-06	NA
beryllium	4.1E-08	2.7E-07	5.4E-08	1.6E-10	2.3E-07	2.3E-07	6.6E-10	2.0E-06	1.7E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cadmium	5.2E-08	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
chromium vi	2.0E-06	ND	ND	ND	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
lead	ND	ND	ND	ND	NA	NA	NA	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA
nickel	8.5E-08	ND	ND	ND	NA	NA	NA	ND	ND	NA	ND	ND	NA	NA	NA	NA	NA	NA	NA
pcbs	ND	5.4E-07	1.6E-06	1.7E-06	6.3E-06	2.3E-05	2.3E-05	2.2E-06	7.2E-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
benzo(a)anthracene	6.9E-11	9.4E-10	5.5E-10	5.6E-10	1.1E-07	1.2E-07	1.2E-07	1.9E-08	1.9E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
benzo(a)pyrene	3.5E-10	4.8E-09	6.6E-09	6.7E-09	1.9E-07	5.9E-07	6.0E-07	6.2E-08	6.2E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
benzo(b)fluoranthene	8.7E-11	1.1E-09	6.1E-09	6.2E-09	1.5E-08	2.7E-07	2.8E-07	1.2E-08	1.2E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
benzo(k)fluoranthene	1.5E-12	2.1E-11	2.2E-10	2.3E-10	3.5E-09	1.5E-07	1.5E-07	2.6E-09	2.6E-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
chrysene	ND	2.7E-11	1.6E-11	1.7E-11	2.9E-09	3.2E-09	3.2E-09	5.2E-10	5.2E-10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
indeno(1,2,3-cd)pyrene	ND	5.7E-10	3.7E-08	3.8E-08	NA	NA	NA	2.1E-09	2.1E-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-nitrosodipropylamine	ND	8.5E-09	2.6E-13	2.6E-13	NA	NA	NA	2.5E-08	6.9E-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
pentachlorophenol	ND	3.6E-10	5.2E-11	5.3E-11	NA	NA	NA	1.2E-09	3.3E-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
vinyl chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
tetrachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
tetrachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
pentachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
hexachlorodibenzo-p-dioxin	1.4E-10	1.5E-09	1.6E-08	1.8E-08	NA	NA	NA	5.6E-09	2.8E-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
hexachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
heptachlorodibenzo-p-dioxin	5.0E-10	5.1E-09	5.4E-08	6.2E-08	NA	NA	NA	2.0E-08	9.8E-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
heptachlorodibenzofuran	6.2E-11	6.4E-10	4.3E-10	4.9E-10	NA	NA	NA	2.5E-09	1.2E-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
octachlorodibenzo-p-dioxin	5.7E-10	5.9E-09	6.2E-08	7.1E-08	NA	NA	NA	2.3E-08	1.1E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
octachlorodibenzofuran	3.3E-11	3.3E-10	2.2E-10	2.5E-10	NA	NA	NA	1.3E-09	6.4E-10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
chloroform	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.1E-13	1.2E-13	NA	NA	NA	NA	NA	NA	NA
tetrachloroethene	4.5E-12	2.2E-09	1.2E-12	1.2E-12	NA	NA	NA	2.6E-09	9.6E-09	NA	4.8E-12	5.0E-12	6.4E-14	3.2E-14	1.0E-17	1.0E-17	1.3E-14	5.2E-14	NA
benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.0E-11	2.2E-11	NA	NA	NA	NA	NA	NA	NA
methylene chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.5E-14	2.7E-14	NA	NA	NA	NA	NA	NA	NA
Sum Chem (TEF for PAHs):	1.1E-04	1.6E-04	4.4E-05	5.9E-06	6.9E-06	2.4E-05	2.4E-05	5.6E-04	2.2E-05		3.7E-07	3.6E-08	2.0E-03	6.4E-04	9.3E-05	9.1E-06	1.3E-14	5.0E-06	
Sum Chem (BaP for PAHs):	1.1E-04	1.6E-04	4.4E-05	6.1E-06	8.3E-06	3.0E-05	3.0E-05	5.6E-04	2.3E-05		3.7E-07	3.6E-08	2.0E-03	6.4E-04	9.3E-05	9.1E-06	1.3E-14	5.0E-06	
TOTAL ALL (TEF Approach):	4.6E-04	1.6E-04	4.4E-05	6.5E-06	1.6E-05	2.5E-05	3.4E-05	5.8E-04	2.2E-05	2.0E-03	3.9E-06	1.1E-05	3.2E-03	9.7E-04	9.5E-05	3.4E-05	1.3E-14	5.0E-06	1.6E-04
TOTAL ALL (BaP Approach):	4.6E-04	1.6E-04	4.4E-05	6.7E-06	1.8E-05	3.1E-05	4.0E-05	5.8E-04	2.3E-05	2.0E-03	3.9E-06	1.1E-05	3.2E-03	9.7E-04	9.5E-05	3.4E-05	1.3E-14	5.0E-06	1.6E-04

NA – Not applicable. Chemical not a chemical of interest for media or exposure pathway not applicable.
ND – No data for toxicity assessment for exposure pathway.
* Risk from external radiation exposure is calculated from total exposure to all gamma radiation sources.
[b] Risk from dermal contact to PAH's is assumed to equal risk from oral ingestion of PAH's.

TABLE E.IV-25
ILCRs FOR RME ON-PROPERTY FARMER, USE OF PERCHED GROUNDWATER[a]
FUTURE LAND USE, FUTURE SOURCE TERM

Transfer Media:	Air				Soil			Exposed Waste Pit Material			Surface Water		Perched Groundwater[a]			Great Miami Aquifer			Buried Pit Material
Exposure Pathways: / Contaminants of Concern	Inhalation	Ingestion of Vegetables and Fruits	Ingestion of Meat	Ingestion of Milk	Ingestion of Vegetables and Fruits	Ingestion of Meat	Ingestion of Milk	Incidental Ingestion	Dermal Contact[b]	External Exposure	Ingestion of Meat	Ingestion of Milk	Ingestion of Drinking Water	Inhalation of VOC's	Dermal Contact while Bathing[b]	Ingestion of Vegetables and Fruits	Ingestion of Meat	Ingestion of Milk	External Exposure[b]
Radionuclides																			
Cs_{137+1d}	6.8E-09	1.6E-07	2.9E-07	4.0E-07	8.6E-07	3.7E-06	5.2E-06	8.4E-07	NA	5.7E-04	3.3E-05	4.6E-05	1.2E-06	NA	NA	NA	NA	NA	
Np_{237+1d}	8.1E-06	8.3E-07	4.7E-09	1.7E-09	1.4E-06	6.1E-08	2.2E-08	4.7E-06	NA	8.7E-05	NA	NA	8.1E-05	NA	NA	4.1E-10	1.4E-12	5.2E-13	
Pu_{238}	6.3E-07	4.5E-08	1.6E-12	1.3E-12	1.3E-09	1.1E-11	8.4E-12	8.9E-07	NA	1.1E-09	NA	NA	5.3E-06	NA	NA	4.3E-07	7.9E-12	6.5E-12	
$Pu_{239/240}$	2.7E-06	2.1E-07	1.6E-11	1.3E-11	2.6E-09	2.2E-11	1.8E-11	2.0E-06	NA	2.3E-09	NA	NA	5.6E-07	NA	NA	NA	NA	NA	
Ra_{226+8d}	1.5E-05	2.4E-05	9.9E-07	7.1E-06	NA	NA	NA	1.0E-04	NA	7.3E-03	6.3E-08	4.6E-07	2.8E-03	NA	NA	2.3E-05	4.3E-07	3.2E-06	
Ru_{106}	9.2E-09	2.5E-09	2.5E-10	3.1E-13	NA	NA	NA	1.2E-08	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	
Sr_{90+1d}	6.5E-09	6.1E-08	3.7E-09	7.3E-08	1.7E-05	3.7E-06	7.4E-05	4.6E-07	NA	ND	6.7E-07	1.4E-05	7.1E-05	NA	NA	3.3E-09	1.2E-10	2.4E-09	
Tc_{99}	8.6E-08	1.8E-07	1.1E-07	5.0E-07	NA	NA	NA	1.2E-06	NA	5.2E-09	1.3E-05	6.1E-05	1.7E-04	NA	NA	3.3E-07	1.3E-07	6.3E-07	
Th_{230}	1.6E-03	9.5E-06	1.1E-08	3.8E-08	2.1E-07	1.1E-08	3.8E-08	6.7E-05	NA	2.6E-06	1.0E-11	3.4E-11	1.9E-07	NA	NA	2.0E-07	5.2E-11	1.8E-10	
$Th_{232+10d}$	2.0E-04	4.0E-06	4.8E-09	1.6E-08	NA	NA	NA	2.3E-05	NA	1.1E-02	2.6E-09	9.0E-09	4.2E-07	NA	NA	NA	NA	NA	
U_{234}	3.3E-04	2.6E-06	2.9E-08	3.5E-07	9.6E-06	6.4E-07	7.7E-06	1.7E-05	NA	2.9E-07	1.3E-06	1.6E-05	1.1E-01	NA	NA	5.4E-04	4.0E-06	4.9E-05	
U_{235+1D}	8.7E-05	7.1E-07	7.9E-09	9.4E-08	1.5E-06	1.0E-07	1.2E-06	3.4E-06	NA	4.9E-04	7.2E-08	8.9E-07	2.1E-02	NA	NA	1.2E-04	9.1E-07	1.1E-05	
U_{238+2d}	2.4E-03	1.6E-05	1.8E-07	2.2E-06	1.1E-04	7.5E-06	9.0E-05	1.3E-04	NA	1.6E-03	5.4E-06	6.6E-05	4.4E-01	NA	NA	4.4E-03	3.3E-05	4.1E-04	
Rn_{222+4d}	3.3E-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Total Radionuclides	4.7E-03	5.9E-05	1.6E-06	1.1E-05	1.4E-04	1.6E-05	1.8E-04	3.5E-04		2.1E-02	5.3E-05	2.0E-04	5.8E-01			5.1E-03	3.8E-05	4.7E-04	1.2E-03
Chemicals																			
arsenic	1.5E-03	2.5E-03	6.3E-04	7.5E-05	NA	NA	NA	8.0E-03	2.7E-04	NA	5.5E-06	6.6E-07	3.0E-02	ND	9.2E-05	9.9E-03	1.4E-03	1.7E-04	NA
beryllium	5.4E-07	4.2E-06	8.1E-07	2.9E-09	3.6E-06	3.4E-06	1.2E-08	3.0E-05	9.5E-04	NA	NA	NA	2.4E-03	ND	6.9E-04	NA	NA	NA	NA
cadmium	6.9E-07	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
chromium vi	2.7E-05	ND	ND	ND	NA	NA	NA	ND	ND	NA	NA	NA	ND	ND	ND	NA	NA	NA	NA
lead	ND	ND	ND	ND	NA	NA	NA	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA
nickel	1.1E-06	ND	ND	ND	NA	NA	NA	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA
pcbs	ND	8.4E-06	2.4E-05	3.1E-05	9.8E-05	3.4E-04	4.3E-04	3.2E-05	4.1E-05	NA	NA	NA	3.1E-02	ND	8.3E-01	NA	NA	NA	NA
benzo(a)anthracene	9.2E-10	1.5E-08	8.2E-09	1.0E-08	1.7E-06	1.7E-06	2.2E-06	2.7E-07	2.7E-07	NA	NA	NA	1.2E-03	ND	1.2E-03	NA	NA	NA	NA
benzo(a)pyrene	4.7E-09	7.4E-08	9.8E-08	1.2E-07	3.0E-06	8.8E-06	1.1E-05	9.1E-07	9.1E-07	NA	NA	NA	8.0E-03	ND	8.0E-03	NA	NA	NA	NA
benzo(b)fluoranthene	1.2E-09	1.8E-08	9.1E-08	1.2E-07	2.3E-07	4.1E-06	5.2E-06	1.7E-07	1.7E-07	NA	NA	NA	9.8E-04	ND	9.8E-04	NA	NA	NA	NA
benzo(k)fluoranthene	2.1E-11	3.2E-10	3.3E-09	4.2E-09	5.4E-08	2.2E-06	2.8E-06	3.9E-08	3.9E-08	NA	NA	NA	4.2E-04	ND	4.2E-04	NA	NA	NA	NA
chrysene	ND	4.2E-10	2.4E-10	3.1E-10	4.5E-08	4.7E-08	5.9E-08	7.6E-09	7.6E-09	NA	NA	NA	3.5E-05	ND	3.5E-05	NA	NA	NA	NA
dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.2E-03	ND	2.2E-03	NA	NA	NA	NA
indeno(1,2,3-cd)pyrene	ND	8.8E-09	5.6E-07	7.1E-07	NA	NA	NA	3.0E-08	3.0E-08	NA	NA	NA	2.2E-03	ND	2.2E-03	NA	NA	NA	NA
n-nitrosodipropylamine	ND	1.3E-07	3.9E-12	4.9E-12	NA	NA	NA	3.7E-07	3.9E-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
pentachlorophenol	ND	5.5E-09	7.7E-10	9.8E-10	NA	NA	NA	1.8E-08	1.9E-07	NA	NA	NA	6.6E-04	ND	1.4E-02	NA	NA	NA	NA
vinyl chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.1E-02	3.0E-02	3.1E-03	NA	NA	NA	NA
tetrachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
tetrachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.2E-03	ND	2.4E-01	NA	NA	NA	NA
pentachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.3E-04	ND	5.3E-02	NA	NA	NA	NA
hexachlorodibenzo-p-dioxin	1.9E-09	2.3E-08	2.3E-07	3.3E-07	NA	NA	NA	8.2E-08	1.6E-07	NA	NA	NA	3.1E-04	ND	3.8E-02	NA	NA	NA	NA
hexachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.9E-04	ND	6.1E-02	NA	NA	NA	NA
heptachlorodibenzo-p-dioxin	6.7E-09	7.9E-08	8.0E-07	1.1E-06	NA	NA	NA	2.9E-07	5.6E-07	NA	NA	NA	3.9E-05	ND	4.9E-03	NA	NA	NA	NA
heptachlorodibenzofuran	8.4E-10	9.9E-09	6.3E-09	9.0E-09	NA	NA	NA	3.6E-08	6.9E-08	NA	NA	NA	8.2E-05	ND	1.0E-02	NA	NA	NA	NA
octachlorodibenzo-p-dioxin	7.7E-09	9.1E-08	9.2E-07	1.3E-06	NA	NA	NA	3.3E-07	6.4E-07	NA	NA	NA	7.4E-06	ND	9.4E-04	NA	NA	NA	NA
octachlorodibenzofuran	4.4E-10	5.2E-09	3.3E-09	4.7E-09	NA	NA	NA	1.9E-08	3.6E-08	NA	NA	NA	4.5E-06	ND	5.7E-04	NA	NA	NA	NA
chloroform	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.6E-12	2.2E-12	NA	NA	NA	NA	NA	NA	NA
tetrachloroethene	6.1E-11	3.4E-08	1.7E-11	2.2E-11	NA	NA	NA	3.9E-08	5.5E-07	NA	7.1E-11	9.2E-11	2.0E-04	2.9E-05	1.6E-04	5.0E-13	1.5E-16	1.9E-16	NA
benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-10	4.0E-10	NA	NA	NA	NA	NA	NA	NA
methylene chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.2E-13	5.0E-13	NA	NA	NA	NA	NA	NA	NA
Sum Chem (THF for PAHs):	1.5E-03	2.5E-03	6.6E-04	1.1E-04	1.1E-04	3.6E-04	4.5E-04	8.1E-03	1.3E-03		5.5E-06	6.6E-07	1.3E-01	3.0E-02	8.9E-01	9.9E-03	1.4E-03	1.7E-04	
Sum Chem (BaP for PAHs):	1.5E-03	2.5E-03	6.6E-04	1.1E-04	1.3E-04	4.5E-04	5.6E-04	8.1E-03	1.3E-03		5.5E-06	6.6E-07	1.7E-01	3.0E-02	8.9E-01	9.9E-03	1.4E-03	1.7E-04	
TOTAL ALL (THF Approach):	6.2E-03	2.5E-03	6.6E-04	1.2E-04	2.5E-04	3.7E-04	6.3E-04	8.5E-03	1.3E-03	2.1E-02	5.8E-05	2.1E-04	7.1E-01	3.0E-02	8.9E-01	1.5E-02	1.4E-03	6.4E-04	1.2E-03
TOTAL ALL (BaP Approach):	6.2E-03	2.5E-03	6.6E-04	1.2E-04	2.7E-04	4.6E-04	7.4E-04	8.5E-03	1.3E-03	2.1E-02	5.8E-05	2.1E-04	7.5E-01	3.0E-02	8.9E-01	1.5E-02	1.4E-03	6.4E-04	1.2E-03

NA – Not applicable. Chemical not a chemical of interest for media or exposure pathway not applicable.. ND – No data for toxicity assessment for exposure pathway.

[a] Risk calculated using 1-hit equation for calculating risks from higher dose (EPA, 1989a).

[b] Risk from external radiation exposure is calculated from total exposure to all gamma radiation sources.

[c] Risk from dermal contact to PAH's is assumed to equal risk from oral ingestion of PAH's.