US Army Corps
of Engineers®
Buffalo District

Proposed Plan
Vicinity Property H Prime
Niagara Falls Storage Site

Authorized under the
Formerly Utilized Sites Remedial Action Program

Niagara Falls Storage Site
Lewiston, New York

Prepared by:
U.S. Army Corps of Engineers - Buffalo District
478 Main Street
Buffalo, New York 14202-3278

September 2025

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UNITED STATES ARMY CORPS OF ENGINEERS
PROPOSED PLAN
VICINITY PROPERTY H PRIME
NIAGARA FALLS STORAGE SITE
LEWISTON, NEW YORK

U.S. ARMY CORPS OF ENGINEERS ANNOUNCES PROPOSED PLAN

This *Proposed Plan for Niagara Falls Storage Site (NFSS) Vicinity Property H Prime (VP H')* recommends no remedial action for VP H' located in the Town of Porter, Niagara County, New York. The U.S. Army Corps of Engineers (USACE) prepared this document under the Formerly Utilized Sites Remedial Action Program (FUSRAP), initiated in 1974 to identify, investigate, and if necessary, clean up or control sites that were contaminated from activities associated with the Nation's early atomic energy program. USACE executes FUSRAP in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). USACE completed a remedial investigation and determined that the levels of radionuclides detected at VP H' do not pose unacceptable risk for current and reasonably anticipated future industrial use of the site. In accordance with CERCLA, this proposed plan recommends no action at VP H'.

The proposed plan summarizes information presented in greater detail in the VP H' remedial investigation report issued concurrently with this proposed plan. It provides information about the site, its history, and its current condition; presents the proposed plan for the site; and solicits input from the public. The remedial investigation and proposed plan for VP H', a vicinity property of the Niagara Falls Storage Site (NFSS), are available on the project website at: https://www.lrd.usace.army.mil/Missions/Projects/Article/3612360/niagara-falls-storage-site/.

The public is invited to review and comment on this proposed plan that presents USACE's rationale for this decision of no action.

Public Comment Period
15 September 2025 – 13 November 2025

USACE will accept written comments on the proposed plan during the public comment period.

Written comments may be emailed to fusrap@usace.army.mil or mailed to:

U.S. Army Corps of Engineers Buffalo District
Environmental Project Management Section
478 Main Street
Buffalo, New York 14202-3278

Public Meeting
15 October 2025 at 6:30 P.M. at the Town of Lewiston Senior Center located at 4361 Lower River Road, Youngstown, NY 14174.

Administrative Record File
The administrative record file is publicly accessible electronically at the Lewiston Public Library located at 305 S 8th St, Lewiston, NY 14092; and the Youngstown Free Library located at 240 Lockport St, Youngstown, NY 14174.

Supporting documents can be found on the project website:

https://www.lrd.usace.army.mil/Missions/Projects/Article/3612360/niagara-falls-storage-site/

Members of the public who wish to comment on this proposed plan may submit their comments during the comment period between 15 September 2025 and 13 November 2025. Written comments may be sent to the following address:

U.S. Army Corps of Engineers, Buffalo District
Special Projects Branch, Environmental Project Management Section
478 Main Street
Buffalo, NY 14202-3278

Comments also may be submitted via email to fusrap@usace.army.mil. Please refer to this proposed plan, or VP H', in any comments you make and write "VP H' Proposed Plan Comments" in the subject line.

If there are any questions regarding the comment process or the proposed plan, please direct them to the address noted above or telephone 1-800-833-6390 (Option 4).

A public meeting is scheduled for Wednesday, 15 October, at 6:30 PM at the Town of Lewiston Senior Center located at 4361 Lower River Road, Youngstown, NY 14174.

The supporting documents which further describe the conditions at VP H' and form the basis for this proposed plan may be found in the administrative record file for the site, which is maintained at the USACE Buffalo District office. The administrative record file is publicly accessible electronically at the Lewiston Public Library located at 305 S 8th St, Lewiston, NY 14092; and the Youngstown Free Library located at 240 Lockport St, Youngstown, NY 14174. Both libraries are located approximately 6 miles from the VP H' site.

After the close of the public comment period, USACE will review, consider, and respond to all comments. After reviewing and considering all information provided during the comment period, USACE may modify the recommendation for no action or go forward with the no action decision. USACE will document responses to all comments in a Responsiveness Summary that will be part of the record of decision for VP H'.

SITE BACKGROUND

VP H' covers an area of approximately 1.6 hectares (4 acres) and is rectangular in shape, approximately 180 by 90 meters (600 by 300 feet). It is bounded on three sides by roads, including Wesson Road on the west, M Street on the south, and 5th Street on the east. The northern boundary is an out-of-service railroad track. VP H' is currently owned by CWM Chemical Services LLC (CWM) and access to the site is restricted.

VP H' is located within the original boundary of the former Lake Ontario Ordnance Works (LOOW), a 3,035-hectare (7,500-acre) Defense Environmental Restoration Program, Formerly Used Defense Site. The former LOOW was built for the purpose of manufacturing trinitrotoluene (TNT) during World War II. The TNT production and storage areas were constructed on approximately 1,012 hectares (2,500 acres), which included VP H'. The remaining 2,023 hectares (5,000 acres), located to the west of the production area, were left undeveloped. The TNT plant was decommissioned in July 1943 after only nine months of operation due to excess production at other TNT plants.

Beginning in 1944, the Manhattan Engineer District (MED) and its successor, the Atomic Energy Commission (AEC), used 607 hectares (1,500 acres) in the southern portion of LOOW, including NFSS, VP H’, and other surrounding vicinity properties, for temporary and permanent storage and incineration of radioactive wastes. These wastes were primarily residues from uranium ore processing operations; however, they also included contaminated rubble and scrap from decommissioning activities, biological and miscellaneous wastes from the University of Rochester, and low-level fission-product waste from contaminated-liquid evaporators at Knolls Atomic Power Laboratory. The LOOW discontinued receipt of radioactive waste in 1954, and after the Hooker Chemical Company conducted cleanup activities, 525 hectares (1,297 acres) of the 607 hectares (1,500 acres) became surplus. The General Services Administration eventually sold the vicinity properties to various private, commercial, and governmental agencies.

In 2000, USACE built a contaminated material storage area (CMSA) pad on VP H’ to temporarily store contaminated materials generated during the removal of TNT pipelines at LOOW under the Defense Environmental Restoration Program for Formerly Used Defense Sites. The CMSA pad consisted of a stone base, geotextile, high density polyethylene liner, a second geotextile, and additional stone covering an approximately 16-meter (175-foot) square area in the southeastern corner of VP H’.

In 2004, following completion of the TNT pipeline removal project, USACE determined that the CMSA pad was no longer needed. A contractor removed the barriers, stones, and geotextile; performed a visual survey of the pad area; and collected eight soil samples. One of these samples exhibited elevated concentrations of radium-226 and uranium-238. After the original CMSA pad materials were removed, the pad area was covered with a new geotextile liner and clean backfill and re-seeded.

Previous Investigations

Between 1970 and 1986, the U.S. Department of Energy (DOE) and its predecessor agency, the AEC, and their contractors performed radiation surveys and collected soil, water, and sediment samples at VP H’. Based on the results of these activities, a total of approximately 3,500 cubic meters (m^3) [4,600 cubic yards (yd^3)] of soil in the southeastern portion of the site was excavated. The source of the soil contamination found at VP H’ was likely spills and releases related to past waste storage, as well as waste incineration activities that reportedly took place on the concrete pad that remains at the site.

These previous investigations and associated remedial work provided the basis for the design of the remedial investigation of VP H’ that took place between October 2018 and January 2019 and included the collection of soil, groundwater, surface water (i.e., standing water in poorly drained, low-lying areas hereafter referred to as ponded water), and concrete samples. A gamma walkover survey of the site also was completed.

The strategy for the soil investigation included the collection of both biased and systematic samples. The biased soil samples were taken from the locations of elevated gamma readings recorded during the gamma walkover survey of all accessible areas of the site. The systematic sample locations were based on the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) to support the requirements of a future final status survey for site closure, if necessary.

The remedial investigation effort included the advancement of 89 borings to 1.5 meters (5 feet) below grade and collection of 267 soil samples; collection of three groundwater samples from existing wells (one on-site well and two downgradient wells located just outside the property boundary); collection of eight ponded water samples from three separate low-lying areas; and advancement of two concrete borings and collection of three concrete samples from the concrete pad. All samples were analyzed for isotopic radium, isotopic thorium, and isotopic uranium. Water samples were also analyzed for water quality parameters such as alkalinity, total dissolved solids, and anions (e.g., bromide, chloride, fluoride, nitrite, nitrate, orthophosphate, and sulfate).

SITE CHARACTERISTICS

Most of VP H' is overgrown with pasture grass and northern shrub; maple, ash, and oak trees dominate the wooded areas. There are several low-lying areas of the site that are poorly drained and allow for standing (ponded) water during periods of heavy precipitation. Cattail-marsh grass is dominant within these areas. The concrete pad is located in the southeast corner of the site.

In April 1972, the New York State Commissioner of Health imposed land-use restrictions on the property with the objective of protecting public health and safety and to "minimize danger to life

What is a radionuclide?

Atoms that are unstable due to an imbalance of forces in their nucleus are called radionuclides. An unstable nucleus will spontaneously undergo radioactive decay. During decay, radionuclides give off energy in the form of either particles or rays. This energy is called "radiation."

The most common forms of radiation observed at FUSRAP sites are alpha, beta, and gamma/X-ray.

- Alpha particles consist of two protons and two neutrons, easily interacting with matter due to their charges and combined mass, and at their usual velocities only penetrate a few centimeters of air. Alpha particles do not penetrate the outer layers of dead skin cells, causing no damage to live tissues below. However, alpha particles can be lethal when ingested or inhaled, causing severe damage to internal soft tissue.
- Beta radiation consists of an energetic electron, which is more penetrating than alpha, but less than gamma. Beta particles can be stopped by a layer of clothing or by a few millimeters of a substance such as aluminum. Beta particles are capable of penetrating the skin and causing radiation damage, such as skin burns. As with alpha emitters, beta emitters are most hazardous when they are inhaled or swallowed or absorbed into the blood stream through wounds.
- Gamma rays and X-rays are penetrating. Several feet of concrete or a few inches of lead are required to stop them. Gamma rays and X-rays are a radiation hazard for the entire body. While gamma rays and X-rays can easily pass completely through the human body, some fraction of the energy will always be absorbed by body tissue.

Atoms of a given element may exist as different isotopes. Isotopes are atoms that have the same number of protons, which determines what element they represent, but different numbers of neutrons. For example, uranium has 92 protons, but the number of neutrons can vary from 138 to 148. Uranium with 146 neutrons is written as U-238 (92 protons + 146 neutrons = 238). Only U-234, U-235 and U-238 are naturally occurring.

and property from radiation hazards." The restrictions indicate that the property cannot be used for residential purposes, schools, or hospitals, but it can be used for industrial or commercial activities. If the New York State Department of Health deemed it appropriate, these restrictions could be lifted.

The Town of Porter zoning indicates that VP H' is situated in the M-2 General Industrial zone, which allows for heavier manufacturing and processing facilities as well as offices, research, and service establishments. Prohibited uses include residences; those that may be injurious or noxious due to production or emission of dust, smoke, refuse matter, odor, gas, fumes, noise, vibration, or toxic substances or conditions; and processing, storage or disposal of hazardous or other wastes.

VP H' is underlain by two water-bearing zones within 30.5 meters (100 feet) of the ground surface; these are separated by an aquitard, or confining unit. The two water-bearing zones are known as the upper water-bearing zone and the lower water-bearing zone. The upper water-bearing zone is near the surface brown clay unit and the lower water-bearing zone is associated with the Queenston Formation and the unconsolidated materials immediately above the bedrock (red silt and sand and gravel units). The glaciolacustrine clay unit acts as an aquitard between the two water-bearing zones. Groundwater in the upper water-bearing zone occurs at approximately 1 to 3 meters (3.2 to 9.8 feet) below ground surface and exhibits a water-table surface that generally conforms to the local topography. On November 27, 2018, depth to water in the onsite groundwater monitoring well, C1-2-BP1, was measured at 1.1 meters (3.7 feet) below grade. Regional groundwater flow is primarily to the northwest toward the Niagara River, although creeks and drainage ditches influence localized groundwater flow patterns.

SUMMARY OF SITE RISKS

To determine the potential for effects of site-related constituents on human health and the environment, USACE conducted a baseline human health and ecological risk assessment following U.S. Environmental Protection Agency (USEPA) guidance for performing CERCLA risk assessments.

Human Health Risks

VP H' is currently zoned for industrial land use and is adjacent to existing industrial operations performed by the current site owner, who restricts access to the site. The site is largely vacant land with no structures except an abandoned railroad track and a concrete pad and is a combination of areas of natural vegetation and areas of industrial impact (e.g., storage and historical industrial debris).

What is "risk" and how is it calculated?

A baseline risk assessment provides an estimate of the likelihood of health problems occurring if no cleanup action were taken at a site. USACE follows the risk assessment process developed by the USEPA, which consists of four main steps:

Step 1: Analyze Contamination. Data collection and evaluation occurs during the remedial investigation phase. USACE collects samples from site soils, groundwater, sediments, surface water, and building materials, where appropriate. These samples are analyzed for hazardous substances that are likely present as a result of past activities. For example, if a site stored uranium compounds, the site would be tested for uranium and the radioactive decay products of uranium, such as thorium-230.

Step 2: Estimate Exposure. Exposure assessment occurs when the risk assessor considers different ways people might be exposed to the radionuclides and chemicals identified in Step 1 by developing a conceptual site model that identifies current and potential future land users and maps out the different ways in which each could be exposed to hazardous materials at the site. For example, someone who traverses the site occasionally could be exposed approximately two hours per day, up to seven days per week. They would likely not come in contact with groundwater or soils below a certain depth. By comparison, a construction worker might come in contact with deeper soils through excavation activities. The exposure assessment considers the concentrations that people might be exposed to in environmental media, and the potential frequency and duration of exposure. Using this information, the risk assessor estimates a reasonable maximum exposure to contamination for likely future receptors, which is the highest level of human exposure to site contaminants that could reasonably be expected to occur.

Step 3: Assess Potential Health Dangers. Toxicity assessment involves compiling information on the toxicity of each site-related chemical, as well as the radioactive energy of each radionuclide to assess potential health risks. The risk assessor considers two types of chemically-based health risks: cancer risk and non-cancer hazard. In addition, the health effects resulting from the dose from exposure to radioactive contaminants (e.g., cancer induction and genetic and teratogenic effects) are considered. The probability of cancer occurring as a result of exposures at remediation sites is generally expressed as an upper bound probability; for example, a one in 10,000 chance of cancer occurrence over a lifetime. In other words, for every 10,000 people that could be exposed at the reasonable maximum exposure level, at most, one extra cancer would be expected to occur over a lifetime. An extra cancer case means that one more person could get cancer than would normally be expected to from all other causes. For non-cancer health effects, the risk assessor calculates a hazard quotient, which is the ratio of the maximum reasonably expected chronic daily intake of a contaminant to a "safe dose" level identified by the USEPA. In addition to evaluating cancer risks and non-cancer health effects from exposures to chemicals, this step evaluates how much of a radiological dose someone exposed to the radioactive contamination may incur.

Step 4: Characterize Site Risk. Risk characterization is the final step and incorporates the results of the three previous steps into a risk summary. The results of the risk characterization may be compared to relevant benchmarks for acceptable risks recommended by the USEPA or other agencies, such as the U.S. Nuclear Regulatory Commission or the DOE.

Human receptors considered for current and future land use were industrial workers, maintenance workers, construction workers, and trespassing or recreational adults and adolescents. Exposure routes considered complete for surface and subsurface soil were incidental ingestion, inhalation of particulates (fugitive dust), and external gamma radiation. Dermal exposure was considered a complete but unquantifiable exposure route because no dermal slope factors have been developed for radionuclides, as the dermal exposure route produces negligible radiological risk compared to inhalation, ingestion, and external gamma radiation. Uranium also does not have a dermal absorption factor for evaluating chemical exposure, as insufficient information exists about the absorption efficiency of uranium through skin, precluding use of any default value. The only exposure route considered complete for groundwater and ponded water was incidental ingestion.

As part of the VP H' remedial investigation, eight radionuclides were evaluated as potential site contaminants that could pose a risk to human health, including:

- Uranium-234, uranium-235, and uranium-238 (collectively called isotopic uranium)
- Thorium-228, thorium-230, and thorium-232 (collectively called isotopic thorium)
- Radium-226 and radium-228 (collectively called isotopic radium)

To identify radionuclides of potential concern (ROPCs), the concentrations of these eight radionuclides in surface soil, subsurface soil, groundwater, and ponded water were compared to concentrations representative of background. As shown on Table 1 and summarized below, the results of this comparison identified:

- Five ROPCs in soil (both surface and subsurface soil) (radium-226, thorium-230, uranium-234, uranium-235, and uranium-238),
- Three ROPCs in groundwater (uranium-234, uranium-235, and uranium-238), and
- No ROPCs in ponded water.

The cancer risks and radiological doses resulting from exposure to these ROPCs were quantified for human receptors—industrial/maintenance/construction workers and trespassers (adult and adolescent)—potentially using VP H' under current and foreseeable future industrial land use.

The results of the human health risk assessment found that no receptor was estimated to be subject to unacceptable incremental lifetime cancer risk (1E-04, or 1 in 10,000), radiological dose (25 millirem/year), or chemical hazard (hazard quotient > 1) due to combined exposure to site environmental media (Table 2). These thresholds are based on USEPA guidance for risk assessments under CERCLA and Nuclear Regulatory Commission radiological dose standards for license termination with unrestricted release. Therefore, no ROPCs were identified as radionuclides of concern requiring further evaluation or action to prevent unacceptable impacts to human health.

Ecological Risks

The purpose of the ecological risk assessment (ERA) was to determine the potential for adverse ecological impacts resulting from exposure to chemicals and radionuclides related to past activities at the site. The ERA provides information to determine whether ecological risks at the site are negligible, if further information and evaluation are necessary to better define potential ecological risks at the site, or if mitigation should be done without further evaluation. Ecological screening values published by the DOE were used to evaluate whether populations of terrestrial or aquatic organisms potentially utilizing the natural features of the site would likely be negatively impacted by the ROPCs on site. Potential ecological receptors were not predicted to have combined exposure to ROPCs such that individual organisms would experience chemical toxicity or receive radiological dose rates likely to result in adverse impacts to the population. In addition, no sensitive habitats or species have been identified on site. The ERA therefore concluded that no further evaluation of ecological risks was required.

Conclusions

The remedial investigation and corresponding human health risk assessment found no unacceptable risk to receptors from site-related constituents under current or reasonably anticipated future land uses. The ERA found that potential exposures of ecological receptors were unlikely to result in adverse impacts and no further evaluation of ecological risks was required. Therefore, USACE recommends no action at VP H'.

Table 1
Results of Screening Site Radionuclide Distributions Against Background Radionuclide Distributions

Radionuclide	Background Mean	Site Mean	Central tendency test result [1]	Background Threhold Value (BTV)	Site Upper Tolerance Limit (UTL)	Distribution Comparison Result	Radionuclide exceeds background? [2]
Surface Soil (0 to 0.5 ft bgs) Screening (pCi/g)							
Radium-226	0.74	1.70	Site > Background	0.92	8.75	Site > Background	Yes
Radium-228	0.90	0.82	Site ≈ Background	1.26	1.40	Site > Background	No (a)
Thorium-228	1.09	0.79	Site ≈ Background	1.64	1.32	Site ≤ Background	No
Thorium-230	0.93	1.33	Site ≈ Background	1.60	4.10	Site > Background	Yes
Thorium-232	0.88	0.73	Site ≈ Background	1.24	1.24	Site ≤ Background	No
Uranium-234	0.91	0.81	Site ≈ Background	1.68	1.76	Site > Background	Yes
Uranium-235	0.05	0.03	Site ≈ Background	0.10	0.09	Site ≤ Background	Yes (b)
Uranium-238	0.86	0.83	Site ≈ Background	1.36	1.70	Site > Background	Yes
Subsurface Soil (> 0.5 ft bgs) Screening (pCi/g)							
Radionuclide	**Background Mean**	**Site Mean**	**Central tendency test result [1]**	**Background Threhold Value (BTV)**	**Site Upper Tolerance Limit (UTL)**	**Distribution Comparison Result**	**Radionuclide exceeds background? [2]**
Radium-226	0.87	2.83	Site > Background	1.30	6.09	Site > Background	Yes
Radium-228	0.97	0.87	Site ≈ Background	1.24	1.48	Site > Background	No (a)
Thorium-228	1.13	0.81	Site ≈ Background	1.55	1.16	Site ≤ Background	No
Thorium-230	0.85	2.34	Site ≈ Background	1.17	2.10	Site > Background	Yes
Thorium-232	0.94	0.78	Site ≈ Background	1.24	1.22	Site ≤ Background	No
Uranium-234	0.68	1.13	Site > Background	1.05	2.37	Site > Background	Yes
Uranium-235	0.04	0.04	Site ≈ Background	0.06	0.10	Site > Background	Yes
Uranium-238	0.73	1.12	Site > Background	1.05	2.13	Site > Background	Yes
Groundwater Screening (pCi/L)							
Radionuclide	**Background Mean**	**Site Mean**	**Central tendency test result [1]**	**Background Threhold Value (BTV)**	**Site Upper Tolerance Limit (UTL)**	**Distribution Comparison Result**	**Radionuclide exceeds background? [2]**
Radium-226	0.55	0.14	Site ≈ Background	1.48	0.19	Site ≤ Background	No
Radium-228	0.76	0.72	Site ≈ Background	1.48	1.05	Site ≤ Background	No
Thorium-228	0.12	0.04	Site ≈ Background	0.32	0.09	Site ≤ Background	No
Thorium-230	0.53	-0.01	Site ≈ Background	0.88	-0.01	Site ≤ Background	No
Thorium-232	0.08	-0.01	Site ≈ Background	0.26	0.01	Site ≤ Background	No
Uranium-234	2.55	5.71	Site ≈ Background	8.73	10.28	Site > Background	Yes
Uranium-235	0.17	0.11	Site ≈ Background	0.72	0.16	Site ≤ Background	Yes (c)
Uranium-238	1.64	4.48	Site > Background	5.79	7.49	Site > Background	Yes

Table 1
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Surface Water Screening (pCi/L)							
Radionuclide	**Background Mean**	**Site Mean**	**Central tendency test result** [1]	**Background Threhold Value (BTV)**	**Site Upper Tolerance Limit (UTL)**	**Distribution Comparison Result**	**Radionuclide exceeds background?** [2]
Radium-226	0.27	0.08	Site ≈ Background	0.49	0.11	Site ≤ Background	No
Radium-228	0.79	0.17	Site ≈ Background	1.43	0.50	Site ≤ Background	No
Thorium-228	0.12	0.30	Site ≈ Background	0.26	1.09	Site > Background	No [(d)]
Thorium-230	0.28	0.01	Site ≈ Background	0.61	0.08	Site ≤ Background	No
Thorium-232	0.02	-0.02	Site ≈ Background	0.07	0.03	Site ≤ Background	No
Uranium-234	1.66	1.68	Site ≈ Background	5.78	3.21	Site ≤ Background	No
Uranium-235	0.17	0.06	Site ≈ Background	0.53	0.18	Site ≤ Background	No
Uranium-238	1.47	1.71	Site ≈ Background	4.81	3.00	Site ≤ Background	No

[1] The Mann-Whitney U test (alternatively known as the Wilcoxon rank sum test) was used to compare the central tendencies of site and background distributions. The test statistic (U) is used to determine the probability (P-value) that—under the null hypothesis that the site distribution is not stochastically greater than the background distribution—the difference between mean ranks would be at least as large as that observed. One-sided tests were conducted with $\alpha = 0.05$.

[2] A radionuclide was considered to exceed background for a given environmental medium if either the central tendency or upper distribution of site concentrations exceeded that of background.

[(a)] Radium-228 was not considered an ROPC for either surface or subsurface soil—despite site UTLs exceeding BTVs in both soil horizons—because site-related radium-228 contamination would be contingent on coincident contamination from the thorium-232 decay chain. Radium-228 is generated by the radioactive decay of thorium-232 and subsequently decays to thorium-228, and neither thorium radionuclide on site was identified as exceeding background in soil. Radium-228 is not expected to exist as its own source term without thorium-232 based on site history, and its short half-life (5.75 years) would couple it to the presence of thorium-228 (half-life of 1.9 years) if still present from MED/AEC activities. As such, the exceedance of the radium-228 BTV by the site radium-228 UTL was considered a sampling anomaly and not representative of site contamination and radium-228 was not considered an ROPC.

[(b)] Because uranium-235 was identified as an ROPC in subsurface soil and uranium isotopes are assumed to exist on site in natural ratios, uranium-235 was additionally considered an ROPC in surface soil.

[(c)] Uranium-235 was additionally considered a groundwater ROPC because of the assumed presence in natural ratios with the other two uranium isotopes identified as groundwater ROPCs.

[(d)] Thorium-228 was the only radionuclide with its site surface water distribution exceeding its background surface water distribution (based on a site UTL exceedance of the BTV). However, thorium-228 was not considered to be a surface water ROPC because site-related thorium-228 contamination would be contingent on coincident contamination from the thorium-232 decay chain in either surface water, surface soil, or both. Thorium-228 is generated by the radioactive decay of thorium-232 and then radium-228, and neither of those two parent radionuclides on site were identified as exceeding background in either medium. As such, the exceedance of the thorium-228 BTV by the site thorium-228 UTL was considered a sampling anomaly and not representative of site contamination and thorium-228 was not considered an ROPC.

Table 2
Summary of Estimated Incremental Lifetime Cancer Risk (ILCR) and Predicted Effective Radiological Dose Rates (mrem/yr) for All Receptors for Present (Year 0) and Modeled Future (Year 1,000) Conditions.

Gross Incremental Lifetme Cancer Risk and Annual Total Effective Dose Equivalent

	Year 0		Year 1,000	
Receptor [1]	**ILCR (unitless)**	**Dose Rate (mrem/yr)**	**ILCR (unitless)**	**Dose Rate (mrem/yr)**
Industrial Worker	6E-05	2.9	6E-05	3.2
Maintenance Worker	2E-05	0.9	2E-05	1.0
Construction Worker	1E-05	18.4	1E-05	18.5
Trespasser	1E-05	0.6	1E-05	0.7

Background Incremental Lifetme Cancer Risk and Annual Total Effective Dose Equivalent

	Year 0		Year 1,000	
Receptor [1]	**ILCR (unitless)**	**Dose Rate (mrem/yr)**	**ILCR (unitless)**	**Dose Rate (mrem/yr)**
Industrial Worker	1E-05	1	1E-05	1
Maintenance Worker	4E-06	0	4E-06	0
Construction Worker	2E-06	2	2E-06	2
Trespasser	2E-06	0	2E-06	0

Net Site Incremental Lifetme Cancer Risk and Annual Total Effective Dose Equivalent

	Year 0		Year 1,000	
Receptor [1]	**ILCR (unitless)**	**Dose Rate (mrem/yr)**	**ILCR (unitless)**	**Dose Rate (mrem/yr)**
Industrial Worker	4E-05	2	5E-05	3
Maintenance Worker	1E-05	1	2E-05	1
Construction Worker	1E-05	16	1E-05	16
Trespasser	8E-06	0	9E-06	1

[1] Risk and dose for construction workers are the sum of exposure to site soils (surface and subsurface), groundwater, and surface water; risk and dose for all other receptors is for exposure to soils only. Trespasser results are the total of adolescent and adult results for ILCR, and the maximum of individual adolescent or adult results for annual dose rate.