#### DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

## RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA725)

## **Current Human Exposures Under Control**

Facility Name:

Fort Drum Military Reservation

Facility Address:

85 First Street West Fort Drum, New York 13602

Facility EPA ID #:

NY0214020281

1.	Has <b>all</b> available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Wast Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been <b>considered</b> in this EI determination?						
	_X_	If yes - check here and continue with #2 below.					
		If no - re-evaluate existing data, or					
		if data are not available skip to #6 and enter"IN" (more information needed) status code.					

#### BACKGROUND

Fort Drum is located in the northern portion of New York State approximately 16 kilometers (km) northeast of Watertown (Figures 1 & 2). Fort Drum is roughly rectangular in shape measuring 10 km in width and 32 km in length or 107,265 acres. Ft. Drum is the largest Army installation in the Northeast.

Ft. Drum has been used as a military training site since 1908 and is home to the 10<sup>th</sup> Mountain Division. Annually almost 50,000 soldiers participate in training at the base.

The facility contains a variety of waste sites and areas of concern including: 9 landfills; 7 underground storage tank sites; 4 storage areas; 4 spill sites; and 3 explosive ordnance disposal areas. Beginning in 1980, Ft. Drum has conducted investigations and implemented interim corrective actions to evaluate and mitigate releases to the environment.

Past solid waste disposal practices have resulted in the contamination of surface water, sediment and groundwater with landfill leachate containing petroleum hydrocarbons, heavy metals, pesticides, solvents and paint components. Formerly leaking underground storage tanks resulted in free product floating on the water table, contaminating groundwater, surface water, soil and sediment. Explosive ordnance disposal activities have caused elevated levels of heavy metals and trace explosive and propellant compounds in soil and groundwater. Two building/sites were contaminated with pesticides.

Cleanup Approach and Progress: Additional investigations to define the magnitude, extent and rate of migration of contaminants are on-going. In an effort to expedite clean-up, several interim corrective measures have been implemented. The measures include: Removal of 22 underground storage tanks and contaminated soil along Gasoline alley (Figure 3); capping and debris removal at two landfills; installation and operation of six free product and groundwater recovery systems; installation and operation of two bioventing/air sparge systems; and demolition and soil removal at Building T-4002 to address pesticide and herbicide contamination. Through the end of 2001, approximately 11,000 tons of contaminated soils; 32,000 gallons of free product and 130 million gallons of groundwater have been removed, treated and disposed of as part of the interim measures.

Ft. Drum is currently conducting feasibility studies of the Gasoline Alley areas and other portions of the facility as part of the remedy selection process. Corrective action remedy selections are projected to occur between 2002 and 2005.

#### Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

#### Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

#### Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

## **Duration / Applicability of EI Determinations**

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Are groundwater, soil, surface water, sediments, or air media known or reasonably suspected to be "contaminated" above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

		Yes	<u>No</u>	?_	Rationale / Key Contaminants
Groundwater		Yes X	<u> </u>		Gasoline Alley/OSL/P2140: BTEX contamination
Air (indoors) <sup>2</sup>			X	22 (2)	
Surface Soil (e.s	g., <2 ft)	X	100 000	St. 10	Gasoline Alley/OSL/P2140: BTEX contamination
Surface Water		X			Gasoline Alley/OSL/P2140: BTEX contamination
Sediment		X	25	\$2	Gasoline Alley/OSL/P2140: BTEX contamination
Surface Water Sediment Subsurf. Soil (e.	g., >2 ft)	$\overline{\mathbf{x}}$	<del></del>	2.00	Gasoline Alley/OSL/P2140: BTEX contamination
Air (outdoors)	,	$\overline{\mathbf{x}}$			Gasoline Alley/OSL/P2140: BTEX contamination
			els," and		ing sufficient supporting documentation demonstrating ed.
<u>X</u>	"contam	ninated" in ation the	medium,	citing ap dium co	fter identifying key contaminants in each propriate "levels" (or provide an explanation for the ald pose an unacceptable risk), and referencing
	If unkno	own (for	any medi	a) - skip	to #6 and enter "IN" status code.

Rationale and Reference(s): Investigation of releases from all known solid waste management units (SWMUs) has been conducted at Ft. Drum. Investigation results indicate soil, groundwater, sediment and surface water contamination in excess of New York State standards. The contaminants of concern are primarily associated with past fuel storage along Gasoline Alley and Building P-2140 at the base (see table ). Other contaminants which have historically been detected at the base include Pesticides (Building 4002 and Old Sanitary Landfill), Metals (Ranges 17 & 35, Building P-44). Additional information on the nature of contamination can be found in "Final Comprehensive Contaminant Assessment Report Volume 1, EA Engineering, September 2000." and "Draft Risk Assessment, Ft. Drum, New York - EOD Burn Sites Ranges 17 and 35, Buildings T-91, T-1245, P-2140, T-4006, Airfield Landfill & POL spill near Range 17,Malcolm Pirnie, February 2001." Indoor air is not a concern at the facility due to the absence of occupied structures over or near the contamination plumes.

#### Footnotes:

<sup>1</sup> "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

<sup>2</sup>Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

#### Potential **Human Receptors** (Under Current Conditions)

"Contaminated" Media Groundwater	Residents NO	Workers NO	Day-Care NO	$\frac{\text{NO}}{\text{NO}}$	Trespassers	Recreation	Food <sup>3</sup> NO
Air (indoors) Soil (surface, e.g., <2 ft)	NO	YES	NO	<u>NO</u>	<u>YES</u>	<u>YES</u>	<u>NO</u> <u>NO</u>
Surface Water Sediment	<u>NO</u> <u>NO</u>	YES YES			YES YES	YES YES	NO NO
Soil (subsurface e.g., >2 ft) Air (outdoors)		YES	_	YES			<u>NO</u>

Instructions for Summary Exposure Pathway Evaluation Table:

- 1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated") as identified in #2 above.
- 2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("\_\_\_"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

	If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional <a href="Pathway Evaluation Work Sheet">Pathway Evaluation Work Sheet</a> to analyze major pathways).
_X_	If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.
	If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and Reference(s): A pathway evaluation was conducted as part of risk assessments for the facility (Draft Risk Assessment, Ft. Drum, New York - EOD Burn Sites Ranges 17 and 35, Buildings T-91, T-1245, P-2140, T-4006, Airfield Landfill & POL spill near Range 17, Malcolm Pirnie, February 2001 & Final Risk Assessment, Ft. Drum, New York - Gasoline Alley, WWII Landfill & Old Sanitary Landfill, Malcolm Pirnie, September 2000). The pathways determined to be complete are exposure to contaminated surface water and sediment along Gasoline Alley, Old Sanitary Landfill and Building P-2140.

<sup>&</sup>lt;sup>3</sup> Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

4	"significant" (i. greater in magnit "levels" (used to even though low)	es from any of the complete pathways identified in #3 be reasonably expected to be e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) ude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable identify the "contamination"); or 2) the combination of exposure magnitude (perhaps ) and contaminant concentrations (which may be substantially above the acceptable esult in greater than acceptable risks)?
	-	If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."
	_X_	If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."
		If unknown (for any complete pathway) - skip to #6 and enter "IN" status code
	Rationale and Re	eference(s): As part of risk assessments conducted for the facility (Draft Risk Assessment,
		York - EOD Burn Sites Ranges 17 and 35, Buildings T-91, T-1245, P-2140, T-4006,
		& POL spill near Range 17, Malcolm Pirnie, February 2001 & Final Risk Assessment, Ft.
		k - Gasoline Alley, WWII Landfill & Old Sanitary Landfill, Malcolm Pirnie, September
		inogenic and non-carcinogenic risks to human health were evaluated. The only potentially
		isk was a non-carcinogenic risk to a recreationalist at Area 1795. All other current
	scenarios for bot	h carcinogenic and non-carcinogenic risks were below or within the USEPA acceptable

level or risk range. The risk assessments have been reviewed and accepted by the NYSDEC and

NYSDOH.

<sup>&</sup>lt;sup>4</sup> If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

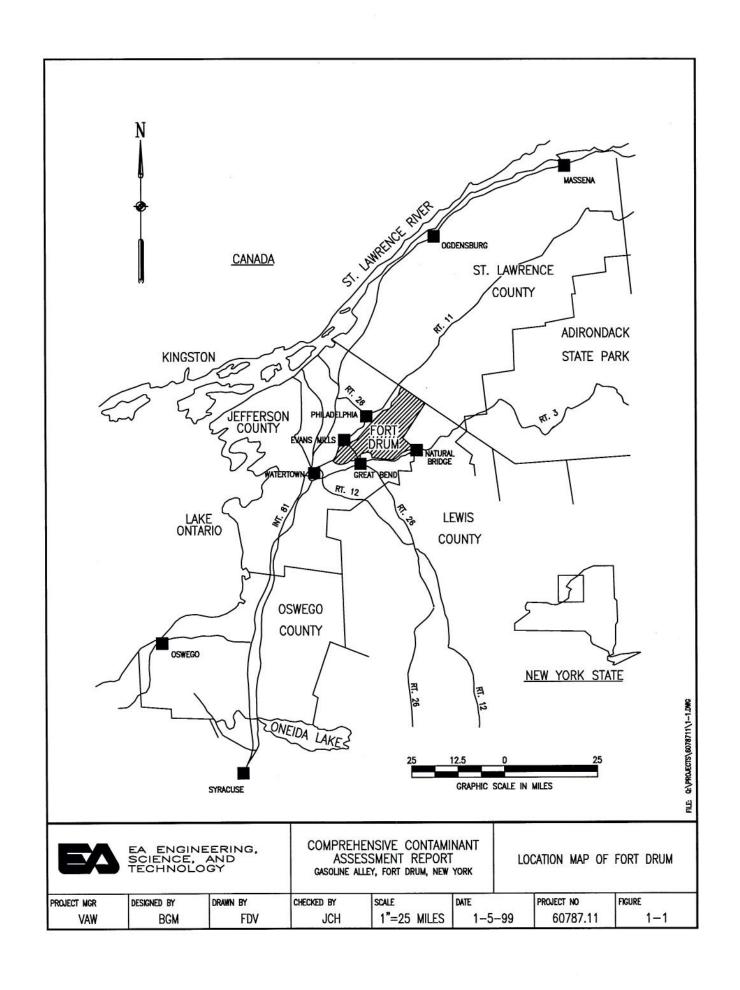
5	Can the "signific	ant" exposures (identified in #4) be shown to be within acceptable limits?
	X_	If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing <u>and</u> referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).
		If no (there are current exposures that can be reasonably expected to be "unacceptable") continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.
		If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

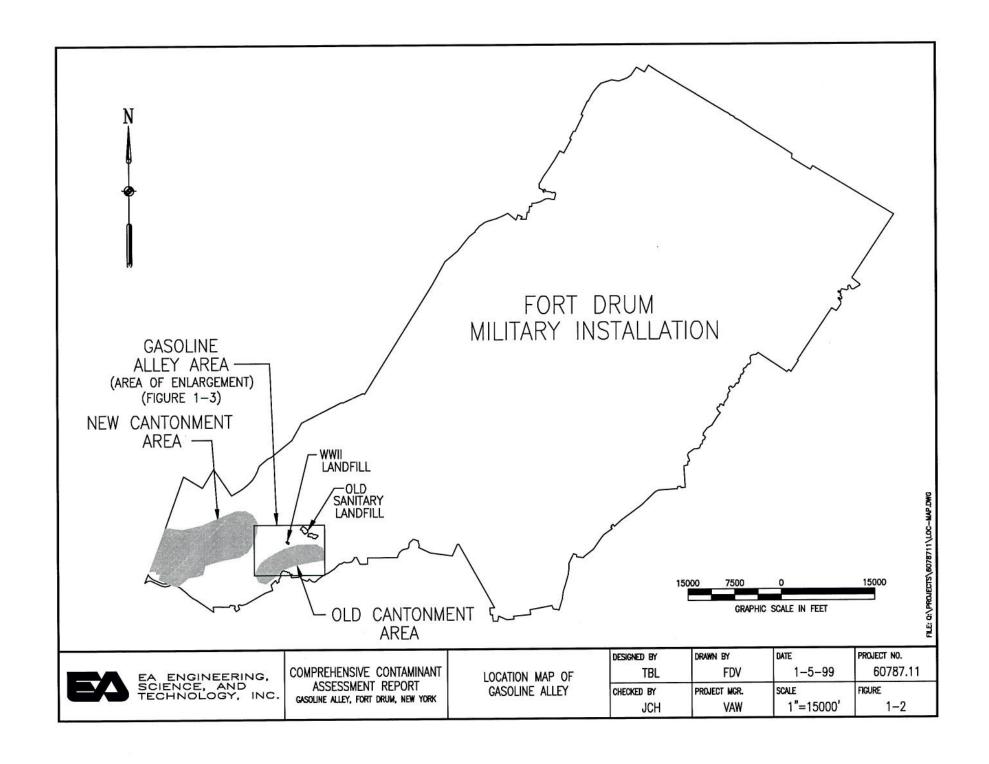
Rationale and Reference(s): The only "significant" exposure to contaminants determined as part of the risk assessment evaluations were non-carcinogenic risks to recreationalists via dermal exposure to surface water in the Area 1795 creek (Final Risk Assessment, Ft. Drum, New York - Gasoline Alley, WWII Landfill & Old Sanitary Landfill, Malcolm Pirnie, September 2000). The contaminated portion of the Area 1795 creek is located within a controlled area of an active military base and approximately two miles from the facility property line. Sampling of the creek downstream of the contaminated seeps do not indicate the presence of contamination. Measurements of the creek indicate a flow rate between 60 and 120 gallons per minute and there is currently no recreational use of the creek.

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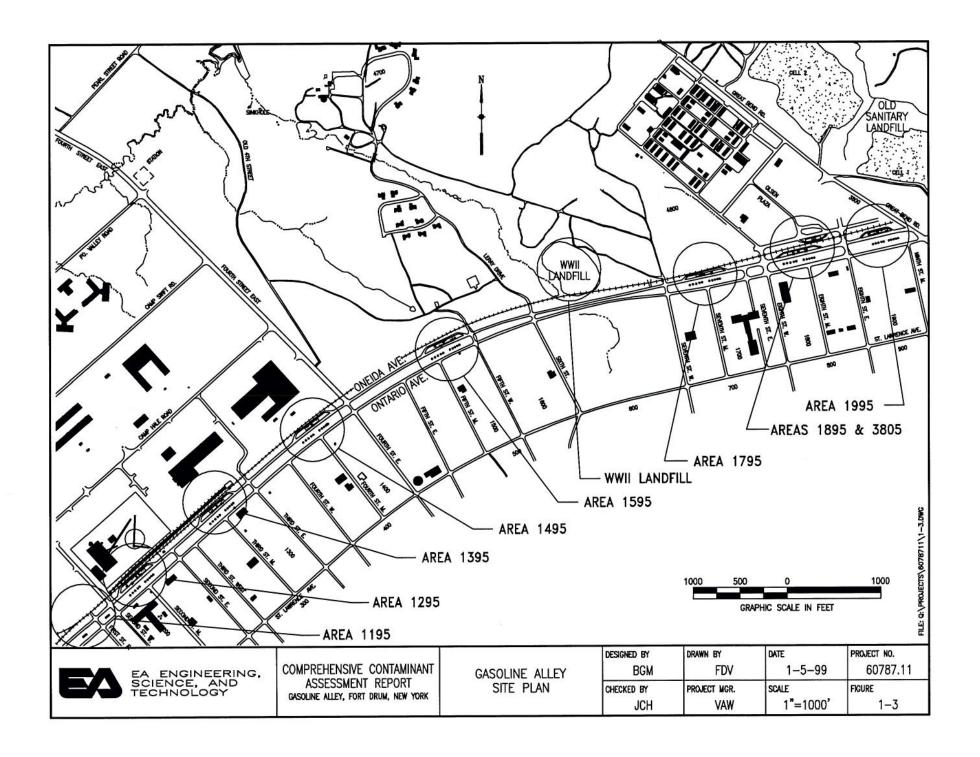
6.	(CA725), and ol	priate RCRIS status codes for the Current Human Exposures Under Control EI event code of tain Supervisor (or appropriate Manager) signature and date on the EI determination of the appropriate supporting documentation as well as a map of the facility):
	_ <u>X</u> _	YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the Fort Drum Military Reservation facility, EPA ID #NY0214020281, located at Fort Drum, New York under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.
		NO - "Current Human Exposures" are NOT "Under Control."
	<u> </u>	IN - More information is needed to make a determination.
	Completed by	(signature) Date June 19, 2002 (print) Kent D. Johnson (title) Engineering Geologist
	Supervisor	(signature) Date June 19, 2002 (print) Edwin Dassatti (title) Chief, Bureau of Solid Waste and Corrective Action (EPA Region or State) NYSDEC
	Locations where	References may be found:
		New York State Department of Environmental Conservation  Division of Solid & Hazardous Materials  625 Broadway, 8th Floor  Albany, New York 12233
	Contact telephor	ne and e-mail numbers
	(phone	Kent D. Johnson #) (518) 402-8594 ) kdjohnso@gw.dec.state.ny.us

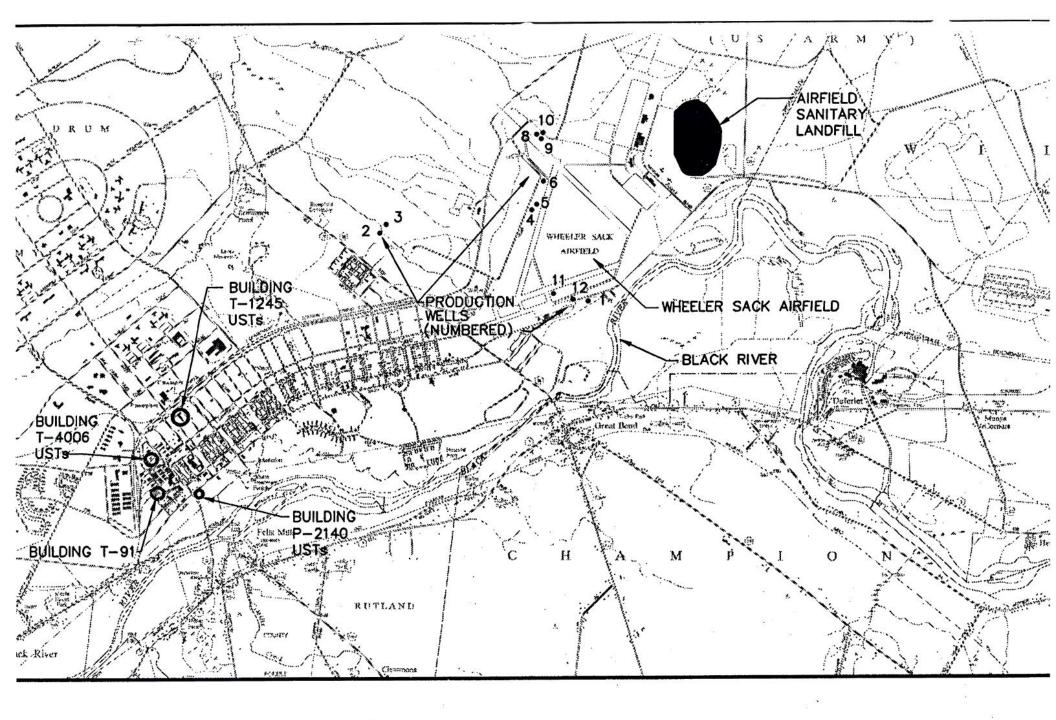
FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.











FORT DRUM SITE MAP

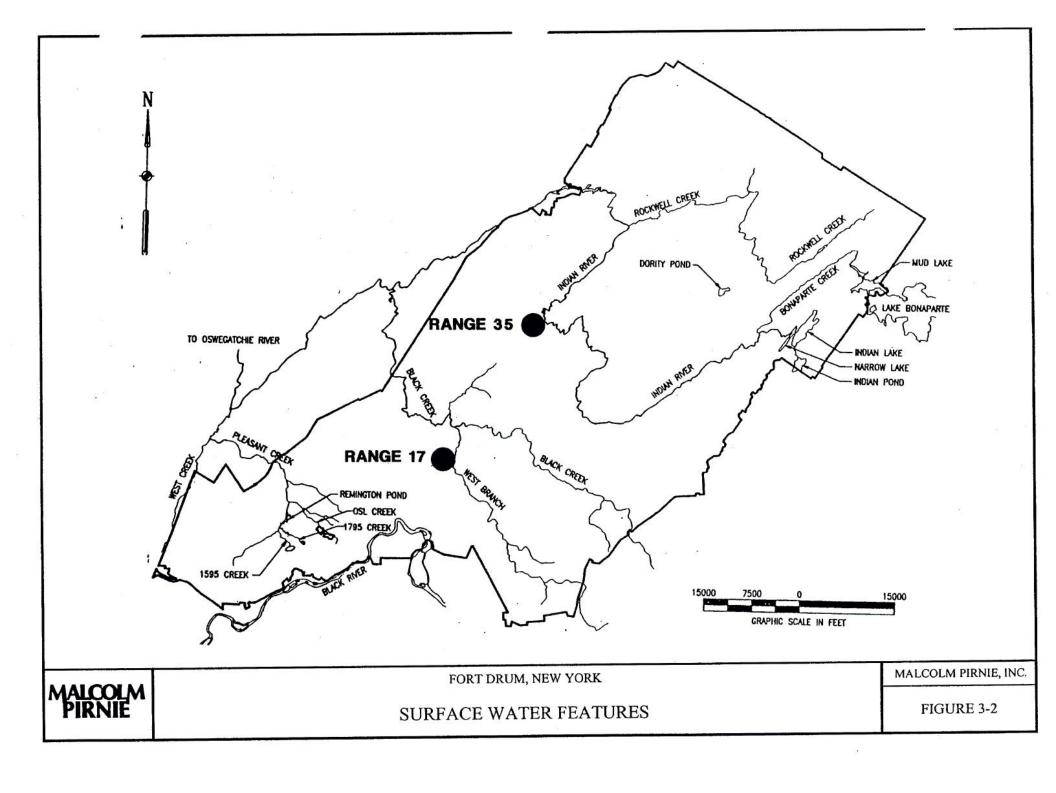


TABLE ES-1 SUMMARY OF CARCINOGENIC AND NON-CARCINOGENIC RISKS TO HUMAN HEALTH IN CURRENT AND FUTURE SCENARIOS

	Area 1195	Area 1295	Area 1395	Area 1495	Area 1595	Area 1795	Areas 1895/ 1995/3805	WWII Landfill	OSL
CURRENT SCENARIO							1550,000		332
Base Personnel, Non-Carcinogenic	NCEP	NCEP	NCEP	NCEP	<	<	NCEP	<	<
Base Personnel, Carcinogenic	NCEP	NCEP	NCEP	NCEP	<	<	NCEP	=	=
Recreationalist, Non-Carcinogenic	NCEP	NCEP	NCEP	NCEP	<	9 13 Z	NCEP	<	<
Recreationalist, Carcinogenic	NCEP	NCEP	NCEP	NCEP	-	=	NCEP	=	=
FUTURE SCENARIO									
Base Personnel, Non-Carcinogenic	NCEP	NCEP	<	<	<	<	NCEP	<	<
Base Personnel, Carcinogenic	NCEP	NCEP	<	<	<	-	NCEP	=	-
Construction/Utility Worker, Non-Carcinogenic	NCEP	<	<	<	<	<	<	<	<
Construction/Utility Worker, Carcinogenic	<	<	<	<	<	<	<		<
Recreationalist, Non-Carcinogenic	NCEP	NCEP	NCEP	NCEP	<	- 25	NCEP	<	<
Recreationalist, Carcinogenic	NCEP	NCEP	NCEP	NCEP	-	=	NCEP	=	-
HYPOTHETICAL FUTURE SCENARIO (WIT	H POTABL	E GROUND	WATER US	E)				*0	
Base Personnel, Non-Carcinogenic	<	<	<	<	<	<		<	*********
Base Personnel, Carcinogenic	<	-	-	=	766	18 A DU	=	-	44.0
Base Resident, Adult, Non-Carcinogenic	<			<	(2146a)				DE NOME
Base Resident, Adult, Carcinogenic	-	=	=	•	=				
Base Resident, Child, Non-Carcinogenic	<	<b>期间增加的</b>	1900000	<	TO THE PARTY.			GETTS FOR	
Base Resident, Child, Carcinogenic	-	THE PROPERTY OF THE PARTY OF TH	# . 2: THE COLUMN C	-	=	2		, <b>3</b> 22	

NCEP: No Complete Exposure Pathways.

<sup>&</sup>lt;: Risk is less than the USEPA acceptable level or risk range.

<sup>=:</sup> Carcinogenic risk is within the 10<sup>-4</sup> to 10<sup>-6</sup> risk range. >: Risk is greater than the USEPA acceptable level or risk range.

TABLE ES-1 SUMMARY OF CARCINOGENIC AND NON-CARCINOGENIC RISKS TO HUMAN HEALTH IN CURRENT AND FUTURE SCENARIOS

je di	EOD Disposal Site, Burn Pits (Range 17)	U.S. Air Force EOD Site (Range 35)	Building T-91	Building T-1245 USTs	Building P-2140 USTs	Building T-4006 USTs	Airfield Sanitary Landfill	Training Site POL Contamination Near Range 17
CURRENT SCENARIO								
Base Personnel, Non-Carcinogenic	<	<	<	<	<	NCEP	NCEP	<
Base Personnel, Carcinogenic	<	=,	<	<	-	NCEP	NCEP	<
Recreationalist, Non-Carcinogenic	NCEP .	NCEP	NCEP	NCEP	<	NCEP	NCEP	NCEP
Recreationalist, Carcinogenic	NCEP	NCEP	NCEP	NCEP	=	NCEP	NCEP	NCEP
FUTURE SCENARIO								
Base Personnel, Non-Carcinogenic	<	<	<	<	<	NCEP	NCEP	<
Base Personnel, Carcinogenic	<	=	<	<	=	NCEP	NCEP	<
Construction/Utility Worker, Non-Carcinogenic	NCEP	NCEP	<	<	755	NA	NCEP	NCEP
Construction/Utility Worker, Carcinogenic	NCEP	NCEP	<	<	=	NA	NCEP	NCEP
Recreationalist, Non-Carcinogenic	NCEP	NCEP	NCEP	NCEP	<	NCEP	NCEP	NCEP
Recreationalist, Carcinogenic	NCEP	NCEP	NCEP	NCEP	=	NCEP	NCEP	NCEP
HYPOTHETICAL FUTURE SCENARIO (WITH	H POTABLE GR	OUNDWATER U	SE)					
Base Personnel, Non-Carcinogenic	<		<	<		<	<	<
Base Personnel, Carcinogenic	<	<	=	=		NA	<	=
Base/Off-Site Resident, Adult, Non-Carcinogenic	<		<	<		<	<	<
Base/Off-Site Resident, Adult, Carcinogenic	=	=	=	=		NA	=	=
Base/Off-Site Resident, Child, Non-Carcinogenic	<		<			<	<	
Base/Off-Site Resident, Child, Carcinogenic	<	<	=	=		NA	<	=

NCEP: No Complete Exposure Pathways.

NA: Not Applicable.

<: Risk is less than the USEPA acceptable level or risk range.

<sup>=:</sup> Carcinogenic risk is within the 10<sup>-4</sup> to 10<sup>-6</sup> risk range. >: Risk is greater than the USEPA acceptable level or risk range.