DOE/ORP-2000-18
Revision 0

Radioactive Air Emissions Notice of Construction for Construction of the Liquid Effluent Transfer System, Project W-519

Office of River Protection

P.O. Box 450
Richland, Washington 99352

RECORD COPY

DOE/ORP-2000-18
Revision 0

Radioactive Air Emissions Notice of Construction for Construction of the Liquid Effluent Transfer System, Project W-519

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RELEASE AUTHORIZATION

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This document, reviewed in accordance with DOE Order 241.1 Scientific and Technical Information Management," and DOE G 241.1-1, "Guide to the Management of Scientific and Technical Information," does not contain classified or sensitive unclassified information and is:

APPROVED FOR PUBLIC RELEASE

Christine Willingham 8/14/00

Christine Willingham
Lockheed Martin Services, Inc.
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APPROVAL SIGNATURES

R. H. Engelmann, Manager, FH
Project Environmental Documentation

5-12-00
Date

FOR J. B. PAYNE

J. B. Payne, Manager, CHG
Project W-519, Liquid Effluent Transfer System

5-15-00
Date

DJC 5/15/00

W. T. Dixon, Manager, CHG
River Protection Project Environmental Services

5/15/00
Date

5-15-00 for 5/17/00

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TERMS

ALARA	as low as reasonably achievable
ALARACT	As low as reasonably achievable control technology
CFR	Code of Federal Regulations
Ci	Curie
DOE/ORP	U.S. Department of Energy, Office of River Protection
DOE-RL	U.S. Department of Energy, Richland Operations Office
dpm	disintegrations per minute
EPA	U.S. Environmental Protection Agency
HPT	health physics technician
HNF	Hanford Nuclear Facility (document identifier)
LERF	Liquid Effluent Retention Facility
LWTS	liquid waste transfer system
MEI	Maximally exposed individual
mrem	Millirem
NOC	Notice of construction
PCM	periodic confirmatory measurements
PTE	Potential-to-emit
PVC	polyvinyl chloride
RPP	River Protection Project
RWP	radiological work permit
SEPA	State Environmental Policy Act of 1971
TEDE	Total effective dose equivalent
TEDF	Treatment Effluent Disposal Facility
TWRS	Tank Waste Remediation System
WAC	Washington Administrative Code
WDOH	Washington State Department of Health

METRIC CONVERSION CHART

Into metric units

If you know	Multiply by	To get
Length		
inches	25.40	millimeters
inches	2.54	centimeters
feet	0.3048	meters
yards	0.914	meters
miles	1.609	kilometers
Area		
square inches	6.4516	square centimeters
square feet	0.092	square meters
square yards	0.836	square meters
square miles	2.59	square kilometers
acres	0.404	hectares
Mass (weight)		
ounces	28.35	grams
pounds	0.453	kilograms
short ton	0.907	metric ton
Volume		
fluid ounces	29.57	milliliters
quarts	0.95	liters
gallons	3.79	liters
cubic feet	0.03	cubic meters
cubic yards	0.76456	cubic meters
Temperature		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius
Energy		
kilowatt hour	3,412	British thermal unit
kilowatt	0.948	British thermal unit per second
Force/Pressure		
pounds per square inch	6.895	kilopascals

Out of metric units

If you know	Multiply by	To get
Length		
millimeters	0.0393	inches
centimeters	0.393	inches
meters	3.2808	feet
meters	1.09	yards
kilometers	0.62	miles
Area		
square centimeters	0.155	square inches
square meters	10.7639	square feet
square meters	1.20	square yards
square kilometers	0.39	square miles
hectares	2.471	acres
Mass (weight)		
grams	0.0352	ounces
kilograms	2.2046	pounds
metric ton	1.10	short ton
Volume		
milliliters	0.03	fluid ounces
liters	1.057	quarts
liters	0.26	gallons
cubic meters	35.3147	cubic feet
cubic meters	1.308	cubic yards
Temperature		
Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Energy		
British thermal unit	0.000293	kilowatt hour
British thermal unit per second	1.055	kilowatt
Force/Pressure		
kilopascals	0.14504	pounds per square inch

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Second Ed., 1990, Professional Publications, Inc., Belmont, California.

RADIOACTIVE AIR EMISSIONS NOTICE OF CONSTRUCTION FOR CONSTRUCTION OF THE LIQUID EFFLUENT TRANSFER SYSTEM, PROJECT W-519

This document serves as a notice of construction (NOC) pursuant to the requirements of Washington Administrative Code (WAC) 246-247-060, and as a request for approval to construct pursuant to 40 Code of Federal Regulations (CFR) 61.07, for the construction of a Liquid Effluent Transfer System (LETS). The transfer system will provide waste transfer capabilities from the proposed treatment and immobilization facility (Vitrification Plant) to the existing Liquid Effluent Retention Facility (LERF) and to the existing 200 Area Treated Effluent Disposal Facility (TEDF).

Project W-519, is scoped to provide infrastructure support (pipelines, roads, electrical power, etc.) for the Vitrification Plant, including the installation of three underground pipelines with tie-ins to the LERF and a tie-in to a waste water feed line to the TEDF. Two lines will transport an aqueous waste stream containing trace amounts of radioactive dangerous waste to the LERF and one will transport non-radioactive/non-dangerous aqueous waste to the 200 Area TEDF.

This NOC is intended to cover the construction activities associated with installation of the pipelines. Use of the LETS is dependent on operation of the Vitrification Plant and will be addressed in the permitting documentation for that facility. There are no emission points along the transfer piping. Any emissions will be seen at the LERF.

Section 15.0 of this NOC discusses the estimated total effective dose equivalent (TEDE) to the offsite maximally exposed individual (MEI) resulting from the unabated emissions from these construction activities.

Using the currently approved unit dose conversion factors in HNF-3602, the estimated potential TEDE to the MEI resulting from the unabated, fugitive emissions from installation of the LETS is 6.37 E-02 millirem per year. This dose was arrived at by conservatively adding together the doses for conventional and Guzzler digging.

As requested by the EPA and the WDOH, a new MEI evaluation was also performed. Results of the new evaluation show that the nearest public on-site receptor (Energy Northwest) would receive approximately the same doses as those calculated from the HNF-3602 conversion factors. The additive dose from both conventional and Guzzler digging using the new MEI is 5.1 E-02 millirem per year.

1.0 LOCATION

The LETS is located along the eastern boundary outside of the 200 East Protected Area fence line within the 200 East Area Perimeter Fence on the Hanford Site. Figure 1 shows the location of the transfer system. The pipelines will be constructed between the proposed site for the new vitrification plant and the LERF Basins. The geodetic coordinates for the LERF are:

46° 33" 42' North Latitude
119° 30" 21' West Longitude

The address for the LETS

U.S. Department of Energy, Office of River Protection
Hanford Site
200 East Area Waste Immobilization Plant
Richland, Washington 99352

2.0 RESPONSIBLE MANAGER

Mr. R. T. French, Manager
U.S. Department of Energy, Office of River Protection
P.O. Box 550
Richland, Washington 99352
(509) 376-6677

3.0 PROPOSED ACTION

The proposed action is to install a new liquid effluent transfer system (three underground waste transfer pipelines). As such, a potential new source will be created as a result of the construction activities. The anticipated emissions associated with this activity are insignificant.

4.0 STATE ENVIRONMENTAL POLICY ACT

The proposed activities are categorically exempt from State Environmental Policy Act (SEPA) requirements in accordance with WAC 197-11-845.

5.0 PROCESS DESCRIPTION

Project W-519 will construct and install three underground waste transfer lines. Two lines, one primary and one backup, will transport an aqueous waste stream containing trace amounts of radioactive dangerous waste from the proposed Vitrification Plant to the existing LERF basin risers. Both the primary and backup lines that transport dangerous waste are fiberglass epoxy resin, double pipe containment systems. The primary pipeline consists of a 4-inch pipe within an 8-inch pipe and is approximately 8,100 feet in length. The back-up line consists of a 3-inch pipe within a 6-inch pipe and is approximately 4,000 feet in length.

The third transfer line will transport non-radioactive/non-dangerous aqueous waste from the proposed Vitrification Plant to a tie-in location on an existing waste line that transports non-dangerous/non-radioactive aqueous waste to the 200 Area TEDF. The non-radioactive/non-dangerous waste line consists of 6-inch PVC approximately 4,000 feet in length.

All three lines will be buried in a common trench. The trench depth ranges between 3 and 10 feet, however the average depth of most of the trench will be 3 to 5 feet. All three pipelines are low pressure, gravity drained to their destinations and do not contain any in-line vents.

5.1 TIE-IN CONNECTIONS

The head end, or up-gradient end, of the lines will be blank-flanged until such time the Vitrification Plant is constructed and the final connections made. The down-gradient end of the primary radioactive

dangerous waste line will be tied in at the existing LERF basin risers and manifold. There is no forced airflow in the operation of the basins. The risers are at ambient temperature and pressure.

There will be a total of 4 tie-ins made to existing blank flanges at the LERF risers. At each riser the blank flange will be removed and the area surveyed. If required by the Health Physics Organization, decontamination of the flange surface will take place prior to completing the connection of the new piping. Connection of the new piping will generally take place immediately after the blank flange is removed. If immediate connection is not possible, the opening will be temporarily sealed with a plug, tape, or equivalent device, until the connection can be completed. A fifth tie-in will be made to the existing manifold. This is also a flanged connection and the process that will be followed is the same as the process outlined above for each of the riser connections.

In addition to the five tie-in connections at the LERF basin, two concrete pads will be constructed where the primary line transitions from a double piped containment system to a single walled pipe as it leaves the berm. The purpose of the pads is to serve as a catchment for potential future leaks.

The down-gradient end of the backup line will tie into the existing PC5000 waste transfer line that transports waste from the 242-A Evaporator to the LERF basin. There are three basic steps to this tie-in. First, the pipe will be cut. Preliminary contamination surveys will be performed through a hole drilled in the pipe in the area to be cut to determine current contamination levels inside the pipe. The Health Physics Organization will then determine the appropriate control measures. The pipe will be cut using appropriate equipment such as a reciprocating saw, a circular saw, a hacksaw, a tri-tool or an abrasive wheel. Each exposed end cut will be temporarily capped. Second, a manway will be constructed. The manway will be designed to provide secondary containment because all connections to the existing PC5000 line will be made using single-wall pipe. Pre-made spool pieces will be used to make these connections and the pipes will be bonded to the inside of the manway. Third, the existing PC5000 line and newly constructed backup line encasements will be bonded to the outside of the manway to complete the connections. Once all the connections have been completed, the manway will be closed.

If needed or chosen for use during these activities, a Portable/Temporary Radioactive Air Emission Unit, or a HEPA Filtered Vacuum Radioactive Air Emission Unit may be used in accordance with the latest revisions of their NOCs (DOE/RL-96-75, and DOE/RL-97-50 respectively).

5.2 SOIL EXCAVATION

Approximately 30,000 cubic yards of soil will be excavated to install the pipelines. The area to be excavated is managed as a "clean" area and is currently free of surface contamination. There are no recorded spills or leaks. However, there are underground radioactive material areas and windblown contamination areas posted in the vicinity of the excavation. A field study (HNF-3210) was performed to collect and test soil samples in areas of known or suspected waste lines or waste sites that could impact placement of the pipe routing. All locations sampled showed no contamination. Therefore, encountering contamination is not expected during these soil excavation activities. Because of the possibility of encountering previously undetected subsurface contamination, or future contamination from windblown sources, all work will be performed in accordance with the Project Hanford Radiological Control Manual (PHRCM, HNF-5173) and the RPP As Low As Reasonably Achievable (ALARA) Program requirements. These requirements are carried out through the activity work packages and associated radiological work permit (RWP).

Conventional methods such as the use of backhoes, front-end loaders or manual digging with shovels or the "clean" guzzler will be used. If needed or chosen for use during these activities, the Radiologically

Controlled Guzzler may be used in accordance with the NOC (98-EAP-037), as amended. Backfill will be made using either the original soil removed or "clean" soil brought in.

Excavation activities will be stopped if the stop-work levels described in Section 6.0 are met. Work will not continue until the WDOH has been contacted and the encountered conditions have been mitigated. Excavation activities will not be stopped if hot specks or "specky" contamination are encountered. Hot specks are generally very small volumes of contamination, i.e., a pebble, animal dropping, pieces of tumbleweed, etc. The specks will be removed and containerized for disposal.

6.0 PROPOSED CONTROLS

Emission controls utilized during the construction activities are administrative, based in ALARA principles and consist of ALARA techniques. It is proposed that these controls be approved as low as reasonably achievable control technology (ALARACT) for the installation for the LETS.

6.1 TIE-IN CONNECTIONS

A recent radiological survey of the LERF basins shows removable contamination levels below 1000 dpm/cm^2 beta/gamma in the areas of the tie-ins, with the exception of one riser at 3,000 dpm/cm^2 beta/gamma.

Health physics technician (HPT) coverage will be provided during all of the tie-in connections. The connections made at the LERF risers will be bolt-on flanged connections, no cutting of pipe will take place. Work will take place in the open air. Prior to starting work on the connections any removable contamination in the flange area will be reduced to ALARA. The reduction goal will be equal to or less than 1,000 dpm/100 cm^2 beta gamma and 20 dpm/100 cm^2 alpha, but may not always be attainable. If removable contamination levels around the flange area after reduction efforts are greater than 10,000 dpm/100cm^2 beta gamma and 200 dpm/100 cm^2 alpha, the work will be performed in a glove bag.

The tie-in of the backup line to the existing PC5000 line will involve cutting the PC5000 line, bonding spool pieces into place inside the manway and bonding both the existing PC5000 and backup line encasements to the clean outer surface of the manway. The PC5000 pipe will be exposed and preliminary surveys will be performed to assess internal and external contamination levels. Any removable contamination in the cut and bonding areas will be reduced to ALARA. The goal will be equal to or less than 1,000 dpm/100 cm^2 beta gamma and 20 dpm/100 cm^2 alpha, but may not always be attainable. Work will be performed in open air unless the removable contamination levels around the cut or bonding areas after reduction efforts are greater than 10,000 dpm/100cm^2 beta gamma and 200 dpm/100 cm^2 alpha, then the work will be performed in a glove bag. Measures such as expandable foam or fixatives may also be applied on or around a pipe cut to help fix contamination.

Work in glove bags will not be performed if sustained wind speeds are greater than 30 miles per hour.

If a Portable/Temporary Radioactive Air Emission Unit or a HEPA Filtered Vacuum Radioactive Air Emission Unit is used during the tie-in activities, controls as described in the latest revision of their NOCs (DOE/RL-96-75, and DOE/RL-97-50) will be followed.

6.2 SOIL EXCAVATION

HPT coverage will be provided during the excavation activities. Soil surveys for radioactive contamination will be performed for beta/gamma. If beta/gamma contamination is detected, surveys for alpha contamination will also be performed.

Appropriate controls such as water, fixatives, covers, or windscreens will be applied, if needed, as determined by the Health Physics organization. Spoil piles containing contaminated soil will be segregated from the clean soil. Containerizing spoils for disposal may also be performed.

Excavation activities will be stopped if evenly distributed contamination with detection readings greater than 500,000 dpm/100 cm^2 beta-gamma or greater than 200 dpm/100 cm^2 above background alpha is encountered. Excavation will not continue until a review of the work and encountered conditions has been performed and it has been determined that no threat to worker safety or the environment exists, or until proper controls (i.e., removal and disposal, water, fixatives, covers, etc.) have been put in place to mitigate any further threat; and the WDOH has been contacted and briefed of the situation.

If the Radiologically Controlled Guzzler is used to excavate soil, administrative controls as described in its NOC for use in the A Tank Farm Complex (98-EAP-037) will be followed.

After backfilling, the area will be surveyed to verify that radiological contamination levels on the soil surface are less than 5,000 dpm/100 cm^2 beta-gamma and less than 100 dpm/100 cm^2 alpha. If contamination is present on the surface above these levels, it will be removed and containerized for disposal or covered or fixed to provide containment of the contamination.

7.0 DRAWINGS OF CONTROLS

Not applicable because the emission controls to be utilized during these activities are administratively defined, based on ALARA principles and consist of ALARA techniques.

8.0 RADIONUCLIDES OF CONCERN

The radionuclides of concern are primarily Sr-90 and Am-241. Refer to Table 1.

9.0 MONITORING

The potential unabated offsite dose associated with this activity is calculated to be less than 0.1 millirem per year. Therefore in accordance with 40 CFR 61, Subpart H, periodic confirmatory measurements (PCM) will be made to verify the low emissions.

The proposed PCM will consist of the radiological soil contamination surveys as described in Section 6. This method of PCM is not a direct measurement of effluent emissions. It is intended to demonstrate compliance by showing that being under the contamination levels by which work is controlled, the emissions which are based and calculated from these contamination levels, would inherently be below the estimated emissions. If the Radiologically Controlled Regulated Guzzler, a Portable Temporary Radioactive Air Emission Unit or a HEPA Filtered Vacuum Radioactive Air Emission Unit is used, PCM for emissions from those units will be performed as required by their respective NOCs.

10.0 ANNUAL POSSESSION QUANTITY

The annual possession quantity was determined by assuming 10% of the total volume of soil to be excavated was contaminated at the stop work levels stated in Section 6.0, as monitored by standard radiological field instrumentation. The beta-gamma contributing radionuclide was assumed to be Sr-90 and the alpha contributing radionuclide was assumed to be Am-241. Refer to Table 1. An additional list of radionuclides representing possible constituents from the PC5000 waste line tie-in is listed below. These radionuclides may also contribute to the gross alpha and gross beta-gamma measurements and are conservatively represented by the Sr-90 and Am-241 estimates.

H-3	I-129	U-234
C-14	Cs-134	Np-237
Co-60	Cs-137	Pu-238
Se-79	Ce-144	Pu-239
Sr-90	Eu-154	Pu-241
Nb-94	Eu-155	Am-241
Tc-99	Ra-226	Cm-244

11.0 PHYSICAL FORM

The physical form of each radionuclide in the inventory is particulate solid.

12.0 RELEASE FORM

The release form of each radionuclide in the inventory is particulate solid.

13.0 RELEASE RATES

Unabated release rates resulting from these construction activities are expected to be low. Unabated release rates were determined by assuming 10% of the total volume of soil to be excavated was contaminated at the same concentration and the 40 CFR 61 Appendix D release factor for particulates was applied to that volume (see Table 1). This estimate is intended to envelop both the soil excavation and tie-in activities.

13.1 CONVENTIONAL EXCAVATION

Encountering contamination is not expected during excavation, therefore, to determine a potential to emit if contamination is encountered, the administrative control points set in Section 6.0 for contamination, as monitored by standard radiological field instrumentation, will be used to envelope emissions. The 500,000 dpm/100 cm^2 beta/gamma control point correlates to 50,000 cpm as used in the calculations, and 200 dpm/100 cm^2 above background alpha correlates to 29 cpm. To determine the corresponding soil concentration in picocuries per grams of individual radionuclides, conversion factors, as developed in the study *Soil Contamination Standards for Protection of Personnel* (HNF-2418), were used. The average soil density was assumed to be 98 pounds per cubic feet. The beta-gamma contributing radionuclides were assumed to be represented by Sr-90 and the alpha contributing radionuclides were assumed to be represented by Am-241. The potential unabated emissions from the construction activities are shown in Table 1. An additional list of radionuclides, representing possible constituents from the PC5000 waste

water line, that may also contribute to the gross alpha and gross beta-gamma measurements are shown in Section 10.0.

13.2 RADIOLOGICALLY CONTROLLED REGULATED GUZZLER EXCAVATION

Unabated emissions for soil excavation with the Radiologically Controlled Guzzler are included by reference from 98-EAP-037. The releasable curie values in the referenced NOC were multiplied by 0.86, the ratio between the total volume of soil to be excavated in the Guzzler NOC and the volume of assumed contaminated soil in this NOC. It is not known at this time if, or how much, soil will be excavated by the Radiologically Controlled Guzzler, therefore, the entire volume assumed to be contaminated (3,000 cubic yards) was used to envelope the potential emissions. The potential unabated emissions from Radiologically Controlled Guzzler excavation activities are also shown in Table 1.

14.0 LOCATION OF MAXIMALLY EXPOSED INDIVIDUAL

The MEI for this application is located at the Hanford Site boundary, approximately 20.2 kilometers to the east/southeast of the proposed construction (HNF-3602).

As requested by the EPA and the WDOH, a new MEI evaluation was performed using the nearest public on-site receptor of Energy Northwest which is 15.99 kilometers east-southeast of the release location. The associated Hanford Map Distances (Version 1.8) run is provided in Appendix A.

15.0 TOTAL EFFECTIVE DOSE EQUIVALENT TO THE MAXIMALLY EXPOSED INDIVIDUAL

Using the currently approved unit dose conversion factors in HNF-3602, the estimated potential total effective dose equivalent to the maximally exposed individual resulting from the unabated, fugitive emissions resulting from installation of the LETS is 6.37 E-02 millirem per year (refer to Table 1). This dose was arrived at by conservatively adding together the doses for conventional and Guzzler digging.

As requested by the EPA and the WDOH, a new MEI evaluation was also performed. Results of the new evaluation show that the nearest public on-site receptor (Energy Northwest) would receive approximately the same doses as those calculated from the HNF-3602 conversion factors. The additive dose from both conventional and Guzzler digging using the new MEI is 5.1 E-02 millirem per year. The associated CAP88PC (Version 2.0) runs for conventional and Guzzler digging have been provided in Appendix B and C respectively.

The HNF-3602 conversion factors have been retained in this discussion because they result in essentially the same or a more conservative estimated TEDE to the MEI, and they provide an easy method of calculating a maximum dose envelope for the project.

The total effective dose equivalent from all 1998 Hanford Site air emissions (point sources, diffuse and fugitive sources, and Radon and Thoron) was 0.038 millirem (DOE/RL-99-41). The emissions resulting from the construction of the LETS, in conjunction with other operations at the Hanford Site, will not result in a violation of the National Emission Standard of 10 millirem per year.

16.0 COST FACTORS OF CONTROL TECHNOLOGY COMPONENTS

Not applicable because the emission controls utilized during the construction activities are administratively defined and consist of ALARA techniques.

17.0 DURATION OR LIFETIME

Construction activities to install the LETS are schedule to take place between June 2000 and December 2001.

18.0 STANDARDS

The activity of installing the LETS has an estimated potential to emit of less than 0.1 millirem/year TEDE to the MEI. None of the standards apply to the emission controls planned for the construction activities undertaken to install the system.

19.0 REFERENCES

98-EAP-037, J. E. Rasmussen, U. S. Department of Energy, Richland Field Office, to J. Leitch, U. S. Environmental Protection Agency, Region 10, *Short Form Radioactive Air Emissions Notice of Construction (NOC) for Guzzler Excavation and Backfilling Activities in Support of the 200 East Area A Farm Complex*, January 30, 1998.

DOE/RL-96-75 Rev. 2, *Radioactive Air Emissions Notice of Construction Portable/Temporary Radioactive Air Emissions Units,* September 1999, Department of Energy, Richland Washington.

DOE/RL-97-50 Rev.1, *Radioactive Air Emissions Notice of Construction for HEPA Filtered Vacuum Radioactive Air Emission Units,* September 1999, Department of Energy, Richland Washington.

DOE/RL-99-41, *Radionuclide Air Emissions Report for the Hanford Site, Calendar Year 1998,* June 1999, U.S. Department of Energy, Richland, Washington.

HNF-2418, *Soil Contamination Standards for Protection of Personnel,* March 1998, P.D. Rittmann, Fluor Daniel Northwest, Richland, Washington.

HNF-3210, *TWRS Phase I Infrastructure Project (W-519) Characterization*, September 1998, R.M. Mitchell, B.M. Markes, D.E. Skoglie, K.J. Young, T.H. Mitchell, Waste Management Federal Services, Inc., Northwest Operations, Richland, Washington.

HNF-3602, *Volume 1: Calculating Potential to Emit Releases and Doses for FEMPs and NOCs*, July, 1999, J.S. Hill, P.D. Rittman, Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-5173, *PHMC Radiologcical Control Manual,* April, 2000, Fluor Hanford, Inc. Richland, Washington.

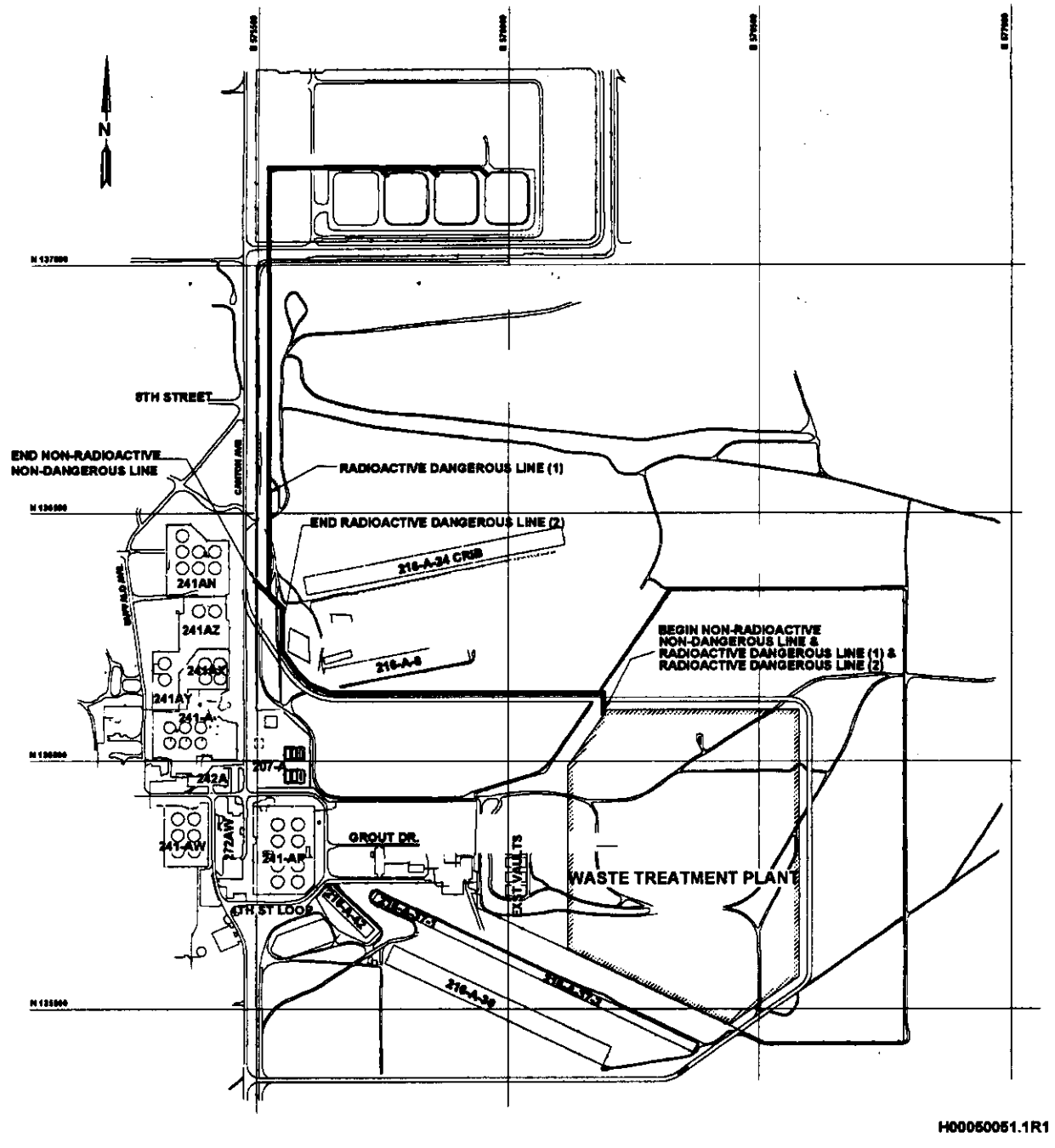

Figure 1. Location of the Liquid Effluent Transfer System.

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Table 1. Estimated Potential Unabated Emissions.

CONVENTIONAL EXCAVATION

MAXIMUM SOIL EXCAVATED	30,000	YARD^3				
CONTAMINATED SOIL EXCAVATED	81,000	FEET^3				
SOIL DENSITY	98	POUNDS/FEET^3				
TOTAL MASS OF SOIL	3.601E+09	GRAMS				
MAXIMUM ALPHA READING	29	CPM				
MAXIMUM BETA/GAMMA READING	50,000	CPM				
RELEASE FACTOR	1.00E-03					
ASSUMED ISOTOPE	**CONVERSION FACTOR (a)**	**TOTAL POSSESSION *QUANTITY (b)***	**UNABATED RELEASE**	**OFFSITE DOSE *FACTOR (c)***	**UNABATED DOSE**	**% UNABATED *OFFSITE* DOSE**
	(pCi/gram)/cpm	Ci	Ci	mrem/Ci	mrem	%
Sr-90	0.35	6.301E+01	6.30E-02	1.10E-01	6.93E-03	26.72%
Am-241	14.20	1.462E+00	1.46E-03	1.30E+01	1.90E-02	73.28%
TOTAL					**2.59E-02**	100.00%
Notes:						
(a) FROM TABLE 4 IN HNF-2416						
(b) WEIGHT OF SOIL X FIELD INSTRUMENT READING X CONVERSION FACTOR.						
(c) UNIT DOSE FACTOR FROM HNF-3602						

REGULATED GUZZLER EXCAVATION

Curie values are included by reference from 98-EAP-037. The values are multiplied by 0.86, the ratio between the total volume of soil to be excavated in the Guzzler NOC and the total volume of assumed contaminated soil to be excavated in this NOC (81,000 ft^3/94,500 ft^3 = 0.86).

(2.23 E-01 curies of Strontium-90) X (0.86) = 1.92 E-01 curies Sr-90
(1.49 E-03 curies of Americium-241) X (0.86) = 1.28 E-03 curies Am-241

Offsite Dose:
Sr-90 = (1.92 E-01 Ci)(1.10 E-01 mrem/ Ci) = 2.11 E-02 mrem/yr.
Am-241 = (1.28 E-03 Ci)(1.30 E+01 mrem/ Ci) = 1.67 E-02 mrem/yr.
Total = 3.78 E-02 mrem/yr.

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APPENDIX A

HANFORD MAP DISTANCE REPORT FILE

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Hanford Map Distances Version 1.8
by Paul D. Rittmann PhD CHP

Map Data File (HMD.DAT): Map Coordinate File PDR 5/13/98

Release Location: 46341W 40053N East of Grout Vaults 200-East Area

Boundary Definition:
Highway 240 + the Near Bank of the Columbia River

Table of Distances from the Release Location to the Boundary

Transport Direction	Sector	Distances, meters NRC 1.145	Transport Direction	Sector	Distances, meters NRC 1.145
1 S	9900	9140 m	9 N	16170	12490 m
2 SSW	9140	9140 m	10 NNE	12490	10360 m
3 SW	9140	9140 m	11 NE	10360	10190 m
4 WSW	9890	9140 m	12 ENE	10190	10190 m
5 W	13280	9890 m	13 E	12270	10190 m
6 WNW	17000	13260 m	14 ESE	18260	11750 m
7 NW	13260	13260 m	15 SE	11750	11750 m
8 NNW	13350	13260 m	16 SSE	13990	9900 m

Notes:
(1) NRC Regulatory Guide 1.145 (Rev 1, 1982) requires finding the smallest distance in a 45 degree sector centered on the direction of interest.
(2) The last digit is questionable, and is for information only.

Release Location: 46341W 40053N East of Grout Vaults 200-East Area

Special Point Information Number	Longitude	Latitude	Transport Direction	Distance	
1	24.456	27.301	15 SE	13.19 km	(LIGO)
2	20.054	28.317	14 ESE	15.99 km	(Energy Northwest)

Notes:
(1) NRC Regulatory Guide 1.145 (Rev 1, 1982) requires finding the smallest distance in a 45 degree sector centered on the direction of interest.
(2) The last digit is questionable, and is for information only.

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APPENDIX B

CAP88 PC REPORT FILES FOR CONVENTIONAL DIGGING

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Version 2.00

Clean Air Act Assessment Package - 1988

D O S E A N D R I S K E Q U I V A L E N T S U M M A R I E S

Non-Radon Individual Assessment
May 1, 2000 02:17 pmm

Facility: Project W-519 (East of Grout Vaults 200-East Area)
Address: Hanford Site
City: Richland
State: WA Zip: 99336

Source Category:
Source Type: Stack
Emission Year: 2000

Comments: Project W-519

Dataset Name: Project W-519
Dataset Date: May 1, 2000 02:16 pm
Wind File: C:\CAP88PC2\WNDFILES\HS200E10.WND

May 1, 2000 02:17 pmm SUMMARY
Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)
GONADS	5.99E-03
BREAST	7.28E-04
R MAR	5.15E-02
LUNGS	3.96E-03
THYROID	7.10E-04
ENDOST	4.88E-01
RMNDR	2.06E-02
EFFEC	2.91E-02

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	2.94E-03
INHALATION	2.62E-02
AIR IMMERSION	5.37E-10
GROUND SURFACE	2.11E-05
INTERNAL	2.91E-02
EXTERNAL	2.11E-05
TOTAL	2.91E-02

May 1, 2000 02:17 pmm

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem/y)
SR-90	2.90E-03
AM-241	2.62E-02
TOTAL	2.91E-02

May 1, 2000 02:17 pmm

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
LEUKEMIA	7.19E-08
BONE	2.46E-08
THYROID	1.25E-10
BREAST	1.02E-09
LUNG	1.15E-08
STOMACH	6.25E-10
BOWEL	1.35E-09
LIVER	7.04E-08
PANCREAS	5.60E-10
URINARY	2.95E-10
OTHER	6.85E-10
TOTAL	1.83E-07

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	4.36E-08
INHALATION	1.39E-07
AIR IMMERSION	1.12E-14
GROUND SURFACE	4.40E-10
INTERNAL	1.83E-07
EXTERNAL	4.40E-10
TOTAL	1.83E-07

May 1, 2000 02:17 pmm

SUMMARY
Page 4

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
SR-90	4.90E-08
AM-241	1.34E-07
TOTAL	1.83E-07

May 1, 2000 02:17 pmm SUMMARY
Page 5

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

	Distance (m)	
Direction	13190	15990
N	9.1E-03	7.8E-03
NNW	1.1E-02	9.4E-03
NW	1.1E-02	9.1E-03
WNW	8.8E-03	7.4E-03
W	7.6E-03	6.5E-03
WSW	6.4E-03	5.6E-03
SW	6.6E-03	5.7E-03
SSW	6.7E-03	5.8E-03
S	7.4E-03	6.4E-03
SSE	8.8E-03	7.5E-03
SE	1.7E-02	1.4E-02
ESE	2.9E-02	2.4E-02
E	2.0E-02	1.7E-02
ENE	1.3E-02	1.1E-02
NE	9.1E-03	7.7E-03
NNE	7.7E-03	6.6E-03

May 1, 2000 02:17 pmm

SUMMARY
Page 6

INDIVIDUAL LIFETIME RISK (deaths)
(All Radionuclides and Pathways)

	Distance (m)	
Direction	13190	15990
N	7.7E-08	6.9E-08
NNW	8.8E-08	7.8E-08
NW	8.6E-08	7.7E-08
WNW	7.5E-08	6.7E-08
W	6.9E-08	6.3E-08
WSW	6.2E-08	5.8E-08
SW	6.3E-08	5.8E-08
SSW	6.4E-08	5.9E-08
S	6.8E-08	6.2E-08
SSE	7.5E-08	6.8E-08
SE	1.2E-07	1.0E-07
ESE	1.8E-07	1.5E-07
E	1.4E-07	1.2E-07
ENE	9.5E-08	8.4E-08
NE	7.6E-08	6.9E-08
NNE	6.9E-08	6.3E-08

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S Y N O P S I S R E P O R T

Non-Radon Individual Assessment
May 1, 2000 02:17 pmm

Facility: Project W-519 (East of Grout Vaults 200-East Area)
Address: Hanford Site
City: Richland
State: WA Zip: 99336

Source Category:
Source Type: Stack
Emission Year: 2000

Comments: Project W-519

Effective Dose Equivalent (mrem/year)
2.91E-02

At This Location: 13190 Meters East Southeast
Dataset Name: Project W-519
Dataset Date: May 1, 2000 02:16 pm
Wind File: C:\CAP88PC2\WNDFILES\HS200E10.WND

May 1, 2000 02:17 pmm

SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 13190 Meters East Southeast
Lifetime Fatal Cancer Risk: 1.83E-07

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Dose Equivalent (mrem/y)
GONADS	5.99E-03
BREAST	7.28E-04
R MAR	5.15E-02
LUNGS	3.96E-03
THYROID	7.10E-04
ENDOST	4.88E-01
RMNDR	2.06E-02
EFFEC	2.91E-02

May 1, 2000 02:17 pmm SYNOPSIS
Page 2

RADIONUCLIDE EMISSIONS DURING THE YEAR 2000

Nuclide	Class	Size	Source #1 Ci/y	TOTAL Ci/y
SR-90	D	1.00	6.3E-02	6.3E-02
AM-241	W	1.00	1.5E-03	1.5E-03

SITE INFORMATION

Temperature:	12 degrees C
Precipitation:	16 cm/y
Mixing Height:	1000 m

May 1, 2000 02:17 pmm

SYNOPSIS
Page 3

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 1.
Diameter (m): 0.

Plume Rise Pasquill Cat:	A	B	C	D	E	F	G
Fixed (m): (Fixed Rise)	0.	0.	0.	0.	0.	0.	0.

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.000	0.000	0.000
Fraction From Assessment Area:	1.000	1.000	1.000
Fraction Imported:	0.000	0.000	0.000

Food Arrays were not generated for this run.
Default Values used.

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

13190 15990

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                                Version 2.00


                        Clean Air Act Assessment Package - 1988


                                G E N E R A L   D A T A

                            Non-Radon Individual Assessment
                                 May  1, 2000  02:17 pmm


        Facility:  Project W-519 (East of Grout Vaults 200-East Area)
         Address:  Hanford Site
            City:  Richland
           State:  WA                      Zip:  99336


      Source Category:
          Source Type:  Stack
        Emission Year:  2000


      Comments:  Project W-519


           Dataset Name:  Project W-519
           Dataset Date:  May  1, 2000  02:16 pm
              Wind File:  C:\CAP88PC2\WNDFILES\HS200E10.WND
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May 1, 2000 02:17 pmm GENERAL
Page 1

VALUES FOR RADIONUCLIDE-DEPENDENT PARAMETERS

Nuclide	Clearance Class	Particle Size (microns)	Scavenging Coefficient (per second)	Dry Deposition Velocity (m/s)
SR-90	D	1.0	1.60E-06	1.80E-03
AM-241	W	1.0	1.60E-06	1.80E-03

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Page 2

VALUES FOR RADIONUCLIDE-DEPENDENT PARAMETERS

	DECAY CONSTANT (PER DAY)			TRANSFER COEFFICIENT	
Nuclide	Radio-active (1)	Surface	Water	Milk (2)	Meat (3)
SR-90	0.00E+00	5.48E-05	0.00E+00	1.50E-03	3.00E-04
AM-241	0.00E+00	5.48E-05	0.00E+00	4.00E-07	3.50E-06

FOOTNOTES: (1) Effective radioactive decay constant in plume; set to zero if less than 1.0E-2

(2) Fraction of animal's daily intake of nuclide which appears in each L of milk (days/L)

(3) Fraction of animal's daily intake of nuclide which appears in each kg of meat (days/kg)

May 1, 2000 02:17 pmm

GENERAL
Page 3

VALUES FOR RADIONUCLIDE-DEPENDENT PARAMETERS

	CONCENTRATION UPTAKE FACTOR		GI UPTAKE FRACTION	
Nuclide	Forage (1)	Edible (2)	Inhalation	Ingestion
SR-90	2.50E+00	1.07E-01	3.00E-01	3.00E-01
AM-241	5.50E-03	1.07E-04	1.00E-03	1.00E-03

FOOTNOTES: (1) Concentration factor for uptake of nuclide from soil for pasture and forage (in pCi/kg dry weight per pCi/kg dry soil)

(2) Concentration factor for uptake of nuclide from soil by edible parts of crops (in pCi/kg wet weight per pCi/kg dry soil)

May 1, 2000 02:17 pmm GENERAL
Page 4

VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

HUMAN INHALATION RATE	
Cubic centimeters/hr	9.17E+05
SOIL PARAMETERS	
Effective surface density (kg/sq m, dry weight)	
(Assumes 15 cm plow layer)	2.15E+02
BUILDUP TIMES	
For activity in soil (years)	1.00E+02
For radionuclides deposited on ground/water (days)	3.65E+04
DELAY TIMES	
Ingestion of pasture grass by animals (hr)	0.00E+00
Ingestion of stored feed by animals (hr)	2.16E+03
Ingestion of leafy vegetables by man (hr)	3.36E+02
Ingestion of produce by man (hr)	3.36E+02
Transport time from animal feed-milk-man (day)	2.00E+00
Time from slaughter to consumption (day)	2.00E+01
WEATHERING	
Removal rate constant for physical loss (per hr)	2.90E-03
CROP EXPOSURE DURATION	
Pasture grass (hr)	7.20E+02
Crops/leafy vegetables (hr)	1.44E+03
AGRICULTURAL PRODUCTIVITY	
Grass-cow-milk-man pathway (kg/sq m)	2.80E-01
Produce/leafy veg for human consumption (kg/sq m)	7.16E-01
FALLOUT INTERCEPTION FRACTIONS	
Vegetables	2.00E-01
Pasture	5.70E-01
GRAZING PARAMETERS	
Fraction of year animals graze on pasture	4.00E-01
Fraction of daily feed that is pasture grass	
when animal grazes on pasture	4.30E-01

May 1, 2000 02:17 pmm GENERAL
Page 5

VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

ANIMAL FEED CONSUMPTION FACTORS	
Contaminated feed/forage (kg/day, dry weight)	1.56E+01
DAIRY PRODUCTIVITY	
Milk production of cow (L/day)	1.10E+01
MEAT ANIMAL SLAUGHTER PARAMETERS	
Muscle mass of animal at slaughter (kg)	2.00E+02
Fraction of herd slaughtered (per day)	3.81E-03
DECONTAMINATION	
Fraction of radioactivity retained after washing for leafy vegetables and produce	5.00E-01
FRACTIONS GROWN IN GARDEN OF INTEREST	
Produce ingested	1.00E+00
Leafy vegetables ingested	1.00E+00
INGESTION RATIOS:	
IMMEDIATE SURROUNDING AREA/TOTAL WITHIN AREA	
Vegetables	0.00E+00
Meat	0.00E+00
Milk	0.00E+00
MINIMUM INGESTION FRACTIONS FROM OUTSIDE AREA (Minimum fractions of food types from outside area listed below are actual fixed values.)	
Vegetables	0.00E+00
Meat	0.00E+00
Milk	0.00E+00
HUMAN FOOD UTILIZATION FACTORS	
Produce ingestion (kg/y)	1.76E+02
Milk ingestion (L/y)	1.12E+02
Meat ingestion (kg/y)	8.50E+01
Leafy vegetable ingestion (kg/y)	1.80E+01
SWIMMING PARAMETERS	
Fraction of time spent swimming	0.00E+00
Dilution factor for water (cm)	1.00E+00

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Version 2.00

Clean Air Act Assessment Package - 1988

W E A T H E R D A T A

Non-Radon Individual Assessment
May 1, 2000 02:17 pmm

Facility: Project W-519 (East of Grout Vaults 200-East Area)
Address: Hanford Site
City: Richland
State: WA Zip: 99336

Source Category:
Source Type: Stack
Emission Year: 2000

Comments: Project W-519

Dataset Name: Project W-519
Dataset Date: May 1, 2000 02:16 pm
Wind File: C:\CAP88PC2\WNDFILES\HS200E10.WND

May 1, 2000 02:17 pmm

WEATHER
Page 1

HARMONIC AVERAGE WIND SPEEDS (WIND TOWARDS)

	Pasquill Stability Class							
Dir	A	B	C	D	E	F	G	Wind Freq
N	2.030	1.900	2.080	1.870	1.760	1.660	1.530	0.035
NNW	2.170	2.130	2.090	1.920	1.850	1.730	1.680	0.050
NW	1.950	1.860	1.990	1.740	1.680	1.510	1.480	0.056
WNW	1.800	1.620	1.470	1.460	1.380	1.280	1.160	0.043
W	1.560	1.460	1.390	1.330	1.240	1.150	1.140	0.036
WSW	1.510	1.340	1.290	1.190	1.120	1.120	1.040	0.028
SW	1.780	1.380	1.450	1.300	1.230	1.080	0.960	0.032
SSW	2.090	1.710	1.730	1.510	1.530	1.260	1.000	0.039
S	1.920	1.800	1.660	1.490	1.520	1.270	1.040	0.043
SSE	1.980	1.830	1.720	1.590	1.480	1.380	1.240	0.049
SE	3.190	2.650	2.460	2.470	2.450	2.000	1.830	0.122
ESE	3.290	2.820	2.780	3.150	3.390	2.660	2.690	0.203
E	3.130	2.630	2.530	2.570	2.820	2.390	2.420	0.112
ENE	4.120	3.380	3.290	3.100	2.440	1.940	2.170	0.074
NE	3.140	3.390	2.640	2.720	2.220	1.540	1.490	0.047
NNE	2.270	2.120	2.160	2.000	1.830	1.470	1.320	0.029

ARITHMETIC AVERAGE WIND SPEEDS (WIND TOWARDS)

	Pasquill Stability Class						
Dir	A	B	C	D	E	F	G
N	3.120	2.890	3.220	3.120	2.870	2.530	2.240
NNW	3.010	3.020	3.060	2.960	2.820	2.510	2.520
NW	2.650	2.620	2.650	2.540	2.470	2.140	2.030
WNW	2.420	2.240	2.060	2.110	1.950	1.760	1.500
W	2.150	2.090	1.990	1.920	1.750	1.540	1.480
WSW	2.160	1.860	1.780	1.660	1.470	1.510	1.280
SW	2.950	2.180	2.290	2.040	2.170	1.430	1.090
SSW	3.170	2.790	2.610	2.580	3.030	2.130	1.180
S	2.820	2.700	2.510	2.380	2.640	1.990	1.280
SSE	2.840	2.640	2.520	2.450	2.240	2.000	1.740
SE	5.220	4.430	4.100	4.240	3.960	2.790	2.620
ESE	5.050	4.600	4.420	4.970	4.850	3.450	3.490
E	5.000	4.530	4.090	4.430	4.010	3.220	3.180
ENE	6.080	5.470	5.580	5.540	4.150	2.820	3.020
NE	4.950	5.350	4.910	5.550	4.370	2.260	2.130
NNE	3.650	3.610	3.440	4.020	3.640	2.140	1.820

May 1, 2000 02:17 pmm

FREQUENCIES OF STABILITY CLASSES (WIND TOWARDS)

	Pasquill Stability Class						
Dir	A	B	C	D	E	F	G
N	0.0977	0.0431	0.0374	0.2126	0.2672	0.2414	0.1006
NNW	0.1111	0.0417	0.0377	0.2401	0.2540	0.2103	0.1052
NW	0.1533	0.0624	0.0606	0.2941	0.2086	0.1515	0.0695
WNW	0.2014	0.0741	0.0602	0.3056	0.1921	0.1134	0.0532
W	0.2161	0.0831	0.0637	0.3352	0.1690	0.0914	0.0416
WSW	0.2465	0.0845	0.0775	0.3380	0.1408	0.0810	0.0317
SW	0.2539	0.0805	0.0743	0.3529	0.1486	0.0619	0.0279
SSW	0.2690	0.1041	0.0711	0.3376	0.1447	0.0584	0.0152
S	0.2401	0.0956	0.0746	0.3427	0.1585	0.0676	0.0210
SSE	0.1967	0.0820	0.0717	0.3361	0.1783	0.1004	0.0348
SE	0.1404	0.0509	0.0501	0.3120	0.2652	0.1338	0.0476
ESE	0.0512	0.0222	0.0192	0.2368	0.3732	0.2083	0.0891
E	0.0661	0.0223	0.0214	0.1716	0.3494	0.2565	0.1126
ENE	0.1531	0.0434	0.0366	0.2195	0.2859	0.1816	0.0799
NE	0.1498	0.0506	0.0380	0.2658	0.2743	0.1603	0.0612
NNE	0.1058	0.0444	0.0307	0.2423	0.2901	0.2082	0.0785
TOTAL	0.1358	0.0505	0.0433	0.2674	0.2677	0.1643	0.0690

ADDITIONAL WEATHER INFORMATION

Average Air Temperature: 12.0 degrees C
285.16 K
Precipitation: 16.0 cm/y
Lid Height: 1000 meters
Surface Roughness Length: 0.010 meters
Height Of Wind Measurements: 10.0 meters
Average Wind Speed: 0.000 m/s

Vertical Temperature Gradients:
STABILITY E 0.073 k/m
STABILITY F 0.109 k/m
STABILITY G 0.146 k/m

APPENDIX C

CAP88 PC REPORT FILES FOR GUZZLER DIGGING

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CAP88-PC

Version 2.00

Clean Air Act Assessment Package - 1988

D O S E A N D R I S K E Q U I V A L E N T S U M M A R I E S

Non-Radon Individual Assessment
May 3, 20Q0 03:28 pmm

Facility: Project W-519 (East of Grout Vaults 200-East Area)
Address: Hanford Site
City: Richland
State: WA Zip: 99336

Source Category:
Source Type: Stack
Emission Year: 2000

Comments: Project W-519

Dataset Name: Project W-519
Dataset Date: May 3, 2000 03:28 pm
Wind File: C:\CAP88PC2\WNDFILES\HS200E10.WND

May 3, 2000 03:28 pmm SUMMARY
Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)
GONADS	5.51E-03
BREAST	8.97E-04
R MAR	7.68E-02
LUNGS	3.75E-03
THYROID	8.81E-04
ENDOST	4.98E-01
RMNDR	1.90E-02
EFFEC	3.18E-02

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	7.89E-03
INHALATION	2.39E-02
AIR IMMERSION	4.71E-10
GROUND SURFACE	1.85E-05
INTERNAL	3.18E-02
EXTERNAL	1.85E-05
TOTAL	3.18E-02

May 3, 2000 03:28 pmm

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem/y)
SR-90	8.85E-03
AM-241	2.30E-02
TOTAL	3.18E-02

May 3, 2000 03:28 pmm

SUMMARY
Page 3

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
LEUKEMIA	1.51E-07
BONE	3.15E-08
THYROID	2.24E-10
BREAST	1.87E-09
LUNG	1.15E-08
STOMACH	1.07E-09
BOWEL	3.68E-09
LIVER	6.26E-08
PANCREAS	1.10E-09
URINARY	5.70E-10
OTHER	1.34E-09
TOTAL	2.67E-07

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	1.28E-07
INHALATION	1.39E-07
AIR IMMERSION	9.80E-15
GROUND SURFACE	3.86E-10
INTERNAL	2.66E-07
EXTERNAL	3.86E-10
TOTAL	2.67E-07

May 3, 2000 03:28 pmm

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
SR-90	1.49E-07
AM-241	1.18E-07
TOTAL	2.67E-07

May 3, 2000 03:28 pmm

SUMMARY
Page 5

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

	Distance (m)	
Direction	13190	15990
N	1.4E-02	1.2E-02
NNW	1.6E-02	1.4E-02
NW	1.5E-02	1.4E-02
WNW	1.3E-02	1.2E-02
W	1.2E-02	1.1E-02
WSW	1.1E-02	1.0E-02
SW	1.1E-02	1.0E-02
SSW	1.1E-02	1.1E-02
S	1.2E-02	1.1E-02
SSE	1.3E-02	1.2E-02
SE	2.1E-02	1.8E-02
ESE	3.2E-02	2.7E-02
E	2.4E-02	2.0E-02
ENE	1.7E-02	1.5E-02
NE	1.4E-02	1.2E-02
NNE	1.2E-02	1.1E-02

May 3, 2000 03:28 pmm

SUMMARY
Page 6

INDIVIDUAL LIFETIME RISK (deaths)
(All Radionuclides and Pathways)

	Distance (m)	
Direction	13190	15990
N	1.6E-07	1.5E-07
NNW	1.7E-07	1.6E-07
NW	1.7E-07	1.6E-07
WNW	1.6E-07	1.5E-07
W	1.5E-07	1.5E-07
WSW	1.5E-07	1.4E-07
SW	1.5E-07	1.4E-07
SSW	1.5E-07	1.4E-07
S	1.5E-07	1.5E-07
SSE	1.6E-07	1.5E-07
SE	2.0E-07	1.9E-07
ESE	2.7E-07	2.4E-07
E	2.2E-07	2.0E-07
ENE	1.8E-07	1.7E-07
NE	1.6E-07	1.5E-07
NNE	1.5E-07	1.5E-07

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Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Individual Assessment
May 3, 2000 03:28 pmm

Facility: Project W-519 (East of Grout Vaults 200-East Area)
Address: Hanford Site
City: Richland
State: WA Zip: 99336

Source Category:
Source Type: Stack
Emission Year: 2000

Comments: Project W-519

Effective Dose Equivalent (mrem/year)
3.18E-02

At This Location: 13190 Meters East Southeast
Dataset Name: Project W-519
Dataset Date: May 3, 2000 03:28 pm
Wind File: C:\CAP88PC2\WNDFILES\HS200E10.WND

May 3, 2000 03:28 pmm SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 13190 Meters East Southeast
Lifetime Fatal Cancer Risk: 2.67E-07

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Dose Equivalent (mrem/y)
GONADS	5.51E-03
BREAST	8.97E-04
R MAR	7.68E-02
LUNGS	3.75E-03
THYROID	8.81E-04
ENDOST	4.98E-01
RMNDR	1.90E-02
EFFEC	3.18E-02

May 3, 2000 03:28 pmm

RADIONUCLIDE EMISSIONS DURING THE YEAR 2000

Nuclide	Class	Size	Source #1 Ci/y	TOTAL Ci/y
SR-90	D	1.00	1.9E-01	1.9E-01
AM-241	W	1.00	1.3E-03	1.3E-03

SITE INFORMATION

Temperature:	12 degrees C
Precipitation:	16 cm/y
Mixing Height:	1000 m

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SOURCE INFORMATION

Source Number: 1

Stack Height (m): 1.
Diameter (m): 0.

Plume Rise Pasquill Cat:	A	B	C	D	E	F	G
Fixed (m): (Fixed Rise)	0.	0.	0.	0.	0.	0.	0.

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.000	0.000	0.000
Fraction From Assessment Area:	1.000	1.000	1.000
Fraction Imported:	0.000	0.000	0.000

Food Arrays were not generated for this run.
Default Values used.

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

13190 15990

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G E N E R A L D A T A

Non-Radon Individual Assessment
May 3, 2000 03:28 pmm

Facility: Project W-519 (East of Grout Vaults 200-East Area)
Address: Hanford Site
City: Richland
State: WA Zip: 99336

Source Category:
Source Type: Stack
Emission Year: 2000

Comments: Project W-519

Dataset Name: Project W-519
Dataset Date: May 3, 2000 03:28 pm
Wind File: C:\CAP88PC2\WNDFILES\HS200E10.WND

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VALUES FOR RADIONUCLIDE-DEPENDENT PARAMETERS

Nuclide	Clearance Class	Particle Size (microns)	Scavenging Coefficient (per second)	Dry Deposition Velocity (m/s)
SR-90	D	1.0	1.60E-06	1.80E-03
AM-241	W	1.0	1.60E-06	1.80E-03

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VALUES FOR RADIONUCLIDE-DEPENDENT PARAMETERS

	DECAY CONSTANT (PER DAY)			TRANSFER COEFFICIENT	
Nuclide	Radio-active (1)	Surface	Water	Milk (2)	Meat (3)
SR-90	0.00E+00	5.48E-05	0.00E+00	1.50E-03	3.00E-04
AM-241	0.00E+00	5.48E-05	0.00E+00	4.00E-07	3.50E-06

FOOTNOTES: (1) Effective radioactive decay constant in plume; set to zero if less than 1.0E-2

(2) Fraction of animal's daily intake of nuclide which appears in each L of milk (days/L)

(3) Fraction of animal's daily intake of nuclide which appears in each kg of meat (days/kg)

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VALUES FOR RADIONUCLIDE-DEPENDENT PARAMETERS

	CONCENTRATION UPTAKE FACTOR		GI UPTAKE FRACTION	
Nuclide	Forage (1)	Edible (2)	Inhalation	Ingestion
SR-90	2.50E+00	1.07E-01	3.00E-01	3.00E-01
AM-241	5.50E-03	1.07E-04	1.00E-03	1.00E-03

FOOTNOTES: (1) Concentration factor for uptake of nuclide from soil for pasture and forage (in pCi/kg dry weight per pCi/kg dry soil)

(2) Concentration factor for uptake of nuclide from soil by edible parts of crops (in pCi/kg wet weight per pCi/kg dry soil)

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VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

HUMAN INHALATION RATE	
Cubic centimeters/hr	9.17E+05
SOIL PARAMETERS	
Effective surface density (kg/sq m, dry weight)	
(Assumes 15 cm plow layer)	2.15E+02
BUILDUP TIMES	
For activity in soil (years)	1.00E+02
For radionuclides deposited on ground/water (days)	3.65E+04
DELAY TIMES	
Ingestion of pasture grass by animals (hr)	0.00E+00
Ingestion of stored feed by animals (hr)	2.16E+03
Ingestion of leafy vegetables by man (hr)	3.36E+02
Ingestion of produce by man (hr)	3.36E+02
Transport time from animal feed-milk-man (day)	2.00E+00
Time from slaughter to consumption (day)	2.00E+01
WEATHERING	
Removal rate constant for physical loss (per hr)	2.90E-03
CROP EXPOSURE DURATION	
Pasture grass (hr)	7.20E+02
Crops/leafy vegetables (hr)	1.44E+03
AGRICULTURAL PRODUCTIVITY	
Grass-cow-milk-man pathway (kg/sq m)	2.80E-01
Produce/leafy veg for human consumption (kg/sq m)	7.16E-01
FALLOUT INTERCEPTION FRACTIONS	
Vegetables	2.00E-01
Pasture	5.70E-01
GRAZING PARAMETERS	
Fraction of year animals graze on pasture	4.00E-01
Fraction of daily feed that is pasture grass	
when animal grazes on pasture	4.30E-01

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VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

ANIMAL FEED CONSUMPTION FACTORS	
Contaminated feed/forage (kg/day, dry weight)	1.56E+01
DAIRY PRODUCTIVITY	
Milk production of cow (L/day)	1.10E+01
MEAT ANIMAL SLAUGHTER PARAMETERS	
Muscle mass of animal at slaughter (kg)	2.00E+02
Fraction of herd slaughtered (per day)	3.81E-03
DECONTAMINATION	
Fraction of radioactivity retained after washing for leafy vegetables and produce	5.00E-01
FRACTIONS GROWN IN GARDEN OF INTEREST	
Produce ingested	1.00E+00
Leafy vegetables ingested	1.00E+00
INGESTION RATIOS:	
IMMEDIATE SURROUNDING AREA/TOTAL WITHIN AREA	
Vegetables	0.00E+00
Meat	0.00E+00
Milk	0.00E+00
MINIMUM INGESTION FRACTIONS FROM OUTSIDE AREA (Minimum fractions of food types from outside area listed below are actual fixed values.)	
Vegetables	0.00E+00
Meat	0.00E+00
Milk	0.00E+00
HUMAN FOOD UTILIZATION FACTORS	
Produce ingestion (kg/y)	1.76E+02
Milk ingestion (L/y)	1.12E+02
Meat ingestion (kg/y)	8.50E+01
Leafy vegetable ingestion (kg/y)	1.80E+01
SWIMMING PARAMETERS	
Fraction of time spent swimming	0.00E+00
Dilution factor for water (cm)	1.00E+00

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W E A T H E R D A T A

Non-Radon Individual Assessment
May 3, 2000 03:28 pmm

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Address: Hanford Site
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Source Category:
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May 3, 2000 03:28 pmm WEATHER
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HARMONIC AVERAGE WIND SPEEDS (WIND TOWARDS)

	Pasquill Stability Class							
Dir	A	B	C	D	E	F	G	Wind Freq
N	2.030	1.900	2.080	1.870	1.760	1.660	1.530	0.035
NNW	2.170	2.130	2.090	1.920	1.850	1.730	1.680	0.050
NW	1.950	1.860	1.990	1.740	1.680	1.510	1.480	0.056
WNW	1.800	1.620	1.470	1.460	1.380	1.280	1.160	0.043
W	1.560	1.460	1.390	1.330	1.240	1.150	1.140	0.036
WSW	1.510	1.340	1.290	1.190	1.120	1.120	1.040	0.028
SW	1.780	1.380	1.450	1.300	1.230	1.080	0.960	0.032
SSW	2.090	1.710	1.730	1.510	1.530	1.260	1.000	0.039
S	1.920	1.800	1.660	1.490	1.520	1.270	1.040	0.043
SSE	1.980	1.830	1.720	1.590	1.480	1.380	1.240	0.049
SE	3.190	2.650	2.460	2.470	2.450	2.000	1.830	0.122
ESE	3.290	2.820	2.780	3.150	3.390	2.660	2.690	0.203
E	3.130	2.630	2.530	2.570	2.820	2.390	2.420	0.112
ENE	4.120	3.380	3.290	3.100	2.440	1.940	2.170	0.074
NE	3.140	3.390	2.640	2.720	2.220	1.540	1.490	0.047
NNE	2.270	2.120	2.160	2.000	1.830	1.470	1.320	0.029

ARITHMETIC AVERAGE WIND SPEEDS (WIND TOWARDS)

	Pasquill Stability Class						
Dir	A	B	C	D	E	F	G
N	3.120	2.890	3.220	3.120	2.870	2.530	2.240
NNW	3.010	3.020	3.060	2.960	2.820	2.510	2.520
NW	2.650	2.620	2.650	2.540	2.470	2.140	2.030
WNW	2.420	2.240	2.060	2.110	1.950	1.760	1.500
W	2.150	2.090	1.990	1.920	1.750	1.540	1.480
WSW	2.160	1.860	1.780	1.660	1.470	1.510	1.280
SW	2.950	2.180	2.290	2.040	2.170	1.430	1.090
SSW	3.170	2.790	2.610	2.580	3.030	2.130	1.180
S	2.820	2.700	2.510	2.380	2.640	1.990	1.280
SSE	2.840	2.640	2.520	2.450	2.240	2.000	1.740
SE	5.220	4.430	4.100	4.240	3.960	2.790	2.620
ESE	5.050	4.600	4.420	4.970	4.850	3.450	3.490
E	5.000	4.530	4.090	4.430	4.010	3.220	3.180
ENE	6.080	5.470	5.580	5.540	4.150	2.820	3.020
NE	4.950	5.350	4.910	5.550	4.370	2.260	2.130
NNE	3.650	3.610	3.440	4.020	3.640	2.140	1.820

May 3, 2000 03:28 pmm

FREQUENCIES OF STABILITY CLASSES (WIND TOWARDS)

	Pasquill Stability Class						
Dir	A	B	C	D	E	F	G
N	0.0977	0.0431	0.0374	0.2126	0.2672	0.2414	0.1006
NNW	0.1111	0.0417	0.0377	0.2401	0.2540	0.2103	0.1052
NW	0.1533	0.0624	0.0606	0.2941	0.2086	0.1515	0.0695
WNW	0.2014	0.0741	0.0602	0.3056	0.1921	0.1134	0.0532
W	0.2161	0.0831	0.0637	0.3352	0.1690	0.0914	0.0416
WSW	0.2465	0.0845	0.0775	0.3380	0.1408	0.0810	0.0317
SW	0.2539	0.0805	0.0743	0.3529	0.1486	0.0619	0.0279
SSW	0.2690	0.1041	0.0711	0.3376	0.1447	0.0584	0.0152
S	0.2401	0.0956	0.0746	0.3427	0.1585	0.0676	0.0210
SSE	0.1967	0.0820	0.0717	0.3361	0.1783	0.1004	0.0348
SE	0.1404	0.0509	0.0501	0.3120	0.2652	0.1338	0.0476
ESE	0.0512	0.0222	0.0192	0.2368	0.3732	0.2083	0.0891
E	0.0661	0.0223	0.0214	0.1716	0.3494	0.2565	0.1126
ENE	0.1531	0.0434	0.0366	0.2195	0.2859	0.1816	0.0799
NE	0.1498	0.0506	0.0380	0.2658	0.2743	0.1603	0.0612
NNE	0.1058	0.0444	0.0307	0.2423	0.2901	0.2082	0.0785
TOTAL	0.1358	0.0505	0.0433	0.2674	0.2677	0.1643	0.0690

ADDITIONAL WEATHER INFORMATION

Average Air Temperature:	12.0 degrees C
	285.16 K
Precipitation:	16.0 cm/y
Lid Height:	1000 meters
Surface Roughness Length:	0.010 meters
Height Of Wind Measurements:	10.0 meters
Average Wind Speed:	0.000 m/s

Vertical Temperature Gradients:

STABILITY E	0.073 k/m
STABILITY F	0.109 k/m
STABILITY G	0.146 k/m

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