LA-UR-20-27358

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Author(s):	Fuehne, David Patrick Lattin, Rebecca Renee
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Using the CAP88 Plume Model & Dose Assessment Code for the FTWC Project

The Environmental Protection & Compliance Division (EPC) uses the Clean Air Act Assessment Package – 1988 (CAP88)¹ plume model and dose assessment code to evaluate measured emissions or projected emissions of airborne radionuclides from Los Alamos National Laboratory (LANL) facilities. This software package will use facility data (e.g., stack height and exit velocity), emissions parameters (chemical form and quantity), and environmental data (wind speed and direction) to predict downwind concentrations of radioactive material and subsequent dose to a member of the public at that location. The United States Environmental Protection Agency (EPA) has approved CAP88 for use in demonstrating compliance with the Radionuclide NESHAP², that portion of the Clean Air Act addressing emissions of airborne radioactive material from Department of Energy facilities.

EPC Division has two procedures which discuss the use of CAP88. Procedure EPC-ES-TP-501, *Dose Assessment Using CAP88*, discusses general use of the software. Procedure EPC-ES-TP-511, *Generating mrem per Curie Factors*, discusses using the CAP88 code to develop dose conversion factors for planning purposes and for potential emissions calculations. For the Flanged Tritium Waste Container (FTWC) project, we use these procedures to predict off-site dose consequence from predicted emissions of airborne tritium. Specifically, LANL used CAP88 in developing the Application for Pre-Construction Approval³ that was submitted to the EPA in 2019, and again in the development of the FTWC Emissions Management Plan.⁴ CAP88 will also be used to evaluate off-site dose consequence from each day of operation as the FTWCs are vented in the fall of 2020.

When using the CAP88 software, specific criteria are used to reflect planned operations to the greatest extent possible. When site-specific criteria are not available, the CAP88 default parameters are used in a manner to ensure conservatism; e.g., the goal is to not underestimate dose. Parameters specific to LANL include climate conditions such as average humidity and temperature, atmospheric mixing height, and annual rainfall. Operational conditions such as stack height, diameter, and exit velocity are entered, as well as a wind file specific to the time of operation. For planning purposes, LANL used either a five-year average wind file or a worst-case scenario wind file. CAP88 default parameters used for these analyses include the default agricultural parameters for the state of New Mexico; e.g., density of beef and milk cattle. LANL used a “local” agricultural scenario to predict radiological dose, a conservative assumption that

¹ A full description of CAP88 and associated software installation files can be found on the EPA web site:

<https://www.epa.gov/radiation/cap-88-pc>

² Title 40, Code of Federal Regulations, Part 61, Subpart H, National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities. Referred to as the Radionuclide NESHAP or Rad-NESHAP. This regulation can be found at: <https://www.ecfr.gov/cgi-bin/text-idx?node=sp40.9.61.h>

³ LA-UR-18-26283r2, Application for Pre-Construction Approval under 40 CFR 61 Subparts A and H for Venting of Flanged Tritium Waste Containers (FTWCs) at TA-54, May 16, 2019. Sent to EPA Region 6 as an attachment to letter EPC-DO-19-137, May 17, 2019.

⁴ EPC-CP-QP-0148, Emissions Management Plan for the FTWC Venting Project, February 12, 2020.

assumes receptors get their milk, vegetables, and meat from sources located at the same location as the receptor.

As a source term, LANL used a single curie of tritium (hydrogen-3) in water vapor form (HTO); this again is conservative, since any emissions from the FTWC venting operation will likely be elemental tritium gas (HT). The CAP88 software assumes a high level of conversion of emitted HT to HTO, so the difference in the off-site dose consequence predicted by CAP88 is not significant between the two chemical forms. In reality, however, tritiated water vapor (HTO) has a dose consequence approximately 10,000 times higher than that of elemental tritium gas (HT)⁵. For planning purposes, assuming all emissions are in the water vapor form is quite conservative.

The final input to the CAP88 code is the distance and direction of the public receptor location from the venting site. Two venting sites were evaluated, one at LANL Technical Area 54, Area G, and one at the Weapons Engineering Tritium Facility (WETF). The location of the maximally exposed individual (MEI) from Area G operations for Radionuclide NESHAP compliance purposes is in the community of White Rock, New Mexico, near the intersection of State Road 4 and Pajarito Road. The MEI location from WETF operations is the Ponderosa Campground on State Road 4 near West Jemez Road.

LANL also examined the effects of FTWC emissions to public receptors located in other locations around Northern New Mexico, notably the Los Alamos town site, nearby Pueblo communities, and the fence line north of LANL Technical Area 54 Area G. The north fence line represents the location of maximum impact with respect to the Department of Energy's all-pathway dose limit of 100 millirem.⁶

The output of these CAP88 runs reflect the off-site dose consequence from the emission of one curie of HTO. This is used as a dose conversion factor, or "millirem-per-curie" factor, representing the dose in millirem to an off-site receptor at a given location from the emission of one curie of HTO. This dose conversion factor is then multiplied by the actual measured emissions or the predicted emissions (in curies) to determine the total dose at that location. Also, the same dose conversion factor can be used to calculate curie emission limits; for example, the FTWC emission limit of 8 millirem is divided by the dose conversion factor to determine the corresponding curie limits associated with that off-site dose.

The remainder of this document summarizes the most significant CAP88 runs that were performed by EPC staff for the FTWC project. Table 1 summarizes the evaluated scenario, the

⁵ Relative dose consequence is found by determining Derived Air Concentration limits in 10 CFR 835, Appendix A. "Derived Air Concentrations (DAC) for Controlling Radiation Exposure to Workers at DOE Facilities."

https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&n=pt10.4.835&ty=HTML#ap10.4.835_11304.a

⁶ Department of Energy Order 458.1, Change 3. Radiation Protection of the Public and the Environment.

<https://www.directives.doe.gov/directives-documents/400-series/0458.1-BOrder-chg3-admchg>

resulting dose conversion factor, and the input parameters associated with the scenario. After Table 1, an explanation of the wind files used for the different scenarios appears. For completeness, the CAP88 Synopsis and Dose/Risk Summary files for each scenario are included as Attachment 1. Finally, printouts of the meteorology files used in the various assessments are included as Attachment 2. These data are also available in electronic format as individual files from Radionuclide NESHAP staff in EPC Division; contact information appears below.

Notes on parameters in Table 1 that vary between scenarios:

- Distance and direction. Distances and directions were measured using Google Earth Pro software. Note that directions are a standard 16-sector compass grid; each sector is 22.5° wide, centered on the cardinal direction. For example, the North sector is 348.75° to 11.25°; the East sector is 78.75° to 101.25°.
- Exit velocity: Bounding condition for Area G operations = 13.75 meters/second; bounding condition for WETF operations is 7.01 meters/second. Different exhaust blowers are in use at the two sites. Actual velocity may be higher than these values; using these bounding values results in conservative (higher) off-site doses.
- Atmospheric mixing (“Lid”) height: 1600 meters is the LANL annual average; specific monthly averages are used for worst-case assessments. For scenario 4, changing the lid height made no difference due to the very short distance evaluated.
- CAP88 version: LANL adopted CAP88 version 4.1 in July 2020; prior runs used version 4.0. Comparisons for scenarios 1, 2, and 4 show that the dose factors generated by Version 4.1 are slightly lower than those calculated with Version 4.0, by less than one-third of one percent (0.3%). The software version makes essentially no difference for these scenarios. Both versions are approved by EPA for Radionuclide NESHAP compliance.

Contact information to obtain electronic files of any CAP88 dataset, output files, or wind files in Table 1:

- David Fuehne
EPC-CP, Environmental Compliance Programs Group
Radioactive Air Emissions Management (RAEM) Team Leader
505-699-5619, davef@lanl.gov
- Rebecca Lattin
EPC-CP, Environmental Compliance Programs Group
RAEM Data Manager
505-695-6962, rlattin@lanl.gov

Table 1: CAP88 Input Parameters & Dose Conversion Factors for the FTWC Project

ID #	Scenario	Dose Conv. Factor (mrem/Ci)	Exit Velocity (m/sec)	Distance & Direction to receptor (m)	Wind File Name	Lid Height (m)	CAP88 version
1	Area G to White Rock, average wind	1.73E-04	13.75	2,195 m ESE	TA540711	1600	v4.0
2	Area G to White Rock, worst case wind Rad-NESHAP Planning Value/Area G	2.66E-04	13.75	2,195 m ESE	DF120118	430	v4.0
3	Area G to north fence/SISA, average wind	1.32E-03	13.75	500 m NNE	TA540711	1600	v4.0
4	Area G to north fence/SISA, worst case wind DOE Order 458.1 Planning Value	4.11E-03	13.75	500 m NNE	54_03142018	1600	v4.1
5	Area G to Ponderosa Campground, avg wind	3.03E-06	13.75	10,300 m W	TA540711	1600	v4.1
6	Area G to LA-West (Airnet Station 211)	2.37E-06	13.75	8708 m NW	TA540711	1600	v4.1
7	Area G to LA-East (Airnet Station 114)	5.44E-06	13.75	6374 m NNW	TA540711	1600	v4.1
8	WETF to Ponderosa Campground, average wind	5.22E-04	7.01	740 m SSW	TA6_0711	1600	v4.0
9	WETF to Ponderosa Campground, worst-case wind Rad-NESHAP Planning Value/WETF	5.09E-03	7.01	740 m SSW	6DF10219	460	v4.0
10	WETF to WR, average wind	1.59E-05	7.01	12,120 m E	TA6_0711	1600	v4.1
11	Area G to Totavi Gas Station	2.13E-05	13.75	7,622 m NE	TA540711	1600	v4.1
12	Area G to San Ildefonso Village (Airnet Station 294)	1.17E-05	13.75	12,000 m ENE	TA540711	1600	v4.0
13	Area G to Santa Clara Travel Center	7.65E-06	13.75	17,062 m NE	TA540711	1600	v4.1
14	Area G to San Felipe Travel Center	2.07E-06	13.75	48,210 m SSW	TA540711	1600	v4.1

CAP88 Input Parameters Common to All Scenarios:

-Stack height: 2 meters	-Temperature: 9 degrees Celsius (LANL average)
-Stack diameter: 0.25 meters (10 inches)	-Humidity: 5.5 grams per cubic meter (LANL average)
-Radionuclide: 1.0 curie of H-3 in vapor form	-Precipitation: 45 cm/year (LANL average)
	-Agriculture data: Local scenario; New Mexico defaults in CAP88

Notes on Wind Files used in Table 1 scenarios:

Most scenarios use five-year annual average wind data for general evaluation and comparison purposes. For determining specific emissions limits, however, EPC staff used a bounding “worst-case” wind file for each scenario. This bounding scenario represents the single worst day measured in 2018 for the scenario being evaluated. For example, the scenario of Area G emissions evaluated to a receptor in White Rock used wind data from December 1, 2018 – wind blowing steadily towards White Rock with little variation. Similar worst-case wind files were used for scenarios of Area G to the north fence line border with the San Ildefonso Sacred Area (SISA) and from the Weapons Engineering Tritium Facility (WETF) to the Ponderosa Campground. The dose conversion factors developed with these worst-case wind files are called out as “planning values” in Table 1. Prior to each day of operation, EPC staff will consult with LANL meteorologists to confirm that the forecasted weather is within the bounding conditions evaluated with these worst-case scenarios.

Specific wind files used in Table 1 scenarios:

- TA540711: Five-year average wind from 2007-2011, measured at the TA-54 meteorological tower. Most representative of operations at TA-54 Area G.
- TA6 0711: Five-year average wind from 2007-2011, measured at the TA-6 meteorological tower. Most representative of operations at WETF.
- DF120118: Worst-case wind from TA-54 to White Rock, representing daylight hours on December 1, 2018. Planning value for venting operations at Area G for Rad-NESHAP compliance.
- 54 03142018: Worst-case wind from TA-54 to the northern fence line/San Ildefonso Sacred Area, representing daylight hours on March 14, 2018. Planning value for venting operations at Area G for DOE Order 458.1 compliance.
- 6DF10219: Worst-case wind from TA-6, representing daylight hours on January 2, 2019. Planning value for venting operations at WETF for Rad-NESHAP compliance.

Attachment 1

Printouts of CAP88 Synopsis and Dose/Risk Summary Files

ID #	Scenario
1	Area G to White Rock, average wind
2	Area G to White Rock, worst case wind Rad-NESHAP Planning Value/Area G
3	Area G to north fence/SISA, average wind
4	Area G to north fence/SISA, worst case wind DOE Order 458.1 Planning Value
5	Area G to Ponderosa Campground, avg wind
6	Area G to LA-West (Airnet Station 211)
7	Area G to LA-East (Airnet Station 114)
8	WETF to Ponderosa Campground, average wind
9	WETF to Ponderosa Campground, worst-case wind Rad-NESHAP Planning Value/WETF
10	WETF to WR, average wind
11	Area G to Totavi Gas Station
12	Area G to San Ildefonso Village (Airnet Station 294)
13	Area G to Santa Clara Travel Center
14	Area G to San Felipe Travel Center

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ATTACHMENT 4 – REVIEW CHECKLIST FOR CAP88 OUTPUT

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Scenario 1 - Area G to White Rock MEI,
5-year average wind

FTWC Transport Venting

Case: TA-54-1028 5-yr Met Avg (lg blower) Output Name: TA-54-1028 5-Year Avg Met

Preparer review checklist for CAP88 Output

Initials: RRL

EPA test case data OK? ☒ Y / ☐ N
 Individual location correct? ☒ Y / ☐ N
 Individual dose correct? ☒ Y / ☐ N
 Radionuclides correct? ☒ Y / ☐ N
 Number of Curies correct? ☒ Y / ☐ N
 Release site parameters correct? ☒ Y / ☐ N
 Population data correct? ☐ Y / ☐ N / ☒ NA
 Meteorological data correct? ☒ Y / ☐ N
 Modifications OK? ☐ Y / ☐ N / ☒ NA

Met File: TA540711.WND

Forward this checklist and the output to the technical reviewer.

Technical reviewer checklist for CAP88 Output

Initials: JFC

Preparer reviewed, signed, and dated? ☒ Y / ☐ N
 Individual location correct? ☒ Y / ☐ N
 Individual dose correct? ☒ Y / ☐ N
 Radionuclides correct? ☒ Y / ☐ N
 Number of Curies correct? ☒ Y / ☐ N
 Release site parameters correct? ☒ Y / ☐ N
 Other reviews or notes:

Forward this checklist and output to the Rad-NESHAP Team leader.

Approver checklist for CAP88 Output

Initials: JFC

Technical review signed and date? ☒ Y / ☐ N
 Sign and date document? ☒ Y / ☐ N
 Document OK to forward to Records? ☒ Y / ☐ N
 Other reviews or notes:

Forward this checklist and the output to the records coordinator.

2/23/2020

C A P 8 8 - P C

Version 4.0

Clean Air Act Assessment Package - 1988

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

Non-Radon Individual Assessment

Wed Jan 08 09:54:10 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Stack
Source Type: Stack
Emission Year: 2019
DOSE Age Group: Adult

Comments: FTWC Venting Operation 2020. 5-Year Met Average
Large blower stack release to White Rock Nazarene

Committed Effective Dose Equivalent
(mrem)

1.73E-04 ✓ ✓

At This Location: 2195 Meters East Southeast ✓ ✓

Dataset Name: TA-54-1028 5-Yea ✓
Dataset Date: Jan 8, 2020 09:54 AM

Wind File: C:\Users\219035\Documents\CAP88\Wind Files\TA540711.WND ✓

↑
Wed Jan 08 09:54:10 2020

SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 2195 Meters East Southeast
 Lifetime Fatal Cancer Risk: 1.61E-10

ORGAN DOSE EQUIVALENT SUMMARY (RN-222 Working Level Calculations Excluded)

Organ	Dose Equivalent (mrem)
Adrenal	1.65E-04
UB_Wall	1.65E-04
Bone_Sur	1.65E-04
Brain	1.65E-04
Breasts	1.65E-04
St_Wall	2.19E-04
SI_Wall	1.66E-04
ULI_Wall	1.73E-04
LLI_Wall	1.89E-04
Kidneys	1.65E-04
Liver	1.65E-04
Muscle	1.65E-04
Ovaries	1.65E-04
Pancreas	1.65E-04
R_Marrow	1.65E-04
Skin	1.65E-04
Spleen	1.65E-04
Testes	1.65E-04
Thymus	1.65E-04
Thyroid	1.65E-04
GB_Wall	1.65E-04
Ht_Wall	1.65E-04
Uterus	1.65E-04
ET_Reg	1.65E-04
Lung_66	1.65E-04
Effectiv	1.73E-04

RADIONUCLIDE EMISSIONS DURING THE YEAR 2019

Source

Nuclide	Type	Size	#1 Ci/y	TOTAL Ci/y
H-3	✓ V ✓	0.000	1.0E+00	✓ 1.0E+00

SITE INFORMATION

Temperature: ✓ 9.000 degrees C
 Precipitation: ✓ 45.000 cm/y
 Humidity: ✓ 5.500 g/cu m
 Mixing Height: ✓ 1600.0 m

User specified location of max exposed individual.
 (ILOC, JLOC): ESE, 2195 meters

↑
 Wed Jan 08 09:54:10 2020

SYNOPSIS
 Page 2

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 2.00 ✓
 Diameter (m): 0.25 ✓

Plume Rise
 Momentum (m/s): 13.75 ✓
 (Exit Velocity)

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	1.0000 ✓	1.0000 ✓	1.0000 ✓
Fraction From Assessment Area:	0.0000	0.0000	0.0000
Fraction Imported:	0.0000	0.0000	0.0000

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

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

2195

DOSE AND RISK SUMMARIES

Non-Radon Individual Assessment

Wed Jan 08 09:54:10 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Stack
Source Type: Stack
Emission Year: 2019
DOSE Age Group: Adult

Comments: FTWC Venting Operation 2020. 5-Year Met Average
Large blower stack release to White Rock Nazarene

Dataset Name: TA-54-1028 5-Yea
Dataset Date: Jan 8, 2020 09:54 AM
Wind File: C:\Users\219035\Documents\CAP88\Wind Files\TA540711.WND

Wed Jan 08 09:54:10 2020

SUMMARY

Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem)
Adrenal	1.65E-04
UB_Wall	1.65E-04
Bone_Sur	1.65E-04
Brain	1.65E-04
Breasts	1.65E-04
St_Wall	2.19E-04
SI_Wall	1.66E-04
ULI_Wall	1.73E-04

LLI_Wall	1.89E-04
Kidneys	1.65E-04
Liver	1.65E-04
Muscle	1.65E-04
Ovaries	1.65E-04
Pancreas	1.65E-04
R_Marrow	1.65E-04
Skin	1.65E-04
Spleen	1.65E-04
Testes	1.65E-04
Thymus	1.65E-04
Thyroid	1.65E-04
GB_Wall	1.65E-04
Ht_Wall	1.65E-04
Uterus	1.65E-04
ET_Reg	1.65E-04
Lung_66	1.65E-04
Effectiv	1.73E-04

PATHWAY COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem)
INGESTION	1.60E-04
INHALATION	1.32E-05
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	1.73E-04
EXTERNAL	0.00E+00
TOTAL	1.73E-04

Wed Jan 08 09:54:10 2020

SUMMARY
Page 2

NUCLIDE COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem)
---------	----------------------------------

H-3 ✓

1.73E-04

TOTAL

1.73E-04 ✓

Wed Jan 08 09:54:10 2020

SUMMARY
Page 3

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
--------	--

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	1.59E-10
INHALATION	1.95E-12
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	1.61E-10
EXTERNAL	0.00E+00
TOTAL	1.61E-10

Wed Jan 08 09:54:10 2020

SUMMARY
Page 4

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
---------	--

H-3 1.61E-10

TOTAL 1.61E-10

Wed Jan 08 09:54:10 2020

SUMMARY
Page 5

INDIVIDUAL COMMITTED EFFECTIVE DOSE EQUIVALENT (mrem)
(All Radionuclides and Pathways)

Distance (m)

Direction 2195

N	5.2E-05
NNW	2.8E-05
NW	2.0E-05
WNW	2.6E-05
W	3.3E-05
WSW	5.2E-05
SW	8.9E-05
SSW	1.2E-04
S	1.5E-04
SSE	1.8E-04
SSE	2.4E-04
ESE	1.7E-04
E	1.5E-04
ENE	1.3E-04
NE	1.3E-04
NNE	1.1E-04

Wed Jan 08 09:54:10 2020

SUMMARY
Page 6

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

Distance (m)

Direction 2195

N	4.8E-11
NNW	2.6E-11
NW	1.9E-11
WNW	2.4E-11
W	3.0E-11
WSW	4.8E-11
SW	8.3E-11
SSW	1.1E-10
S	1.4E-10
SSE	1.7E-10
SSE	2.2E-10
ESE	1.6E-10
E	1.4E-10
ENE	1.2E-10
NE	1.2E-10
NNE	9.8E-11

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ATTACHMENT 4 – REVIEW CHECKLIST FOR CAP88 OUTPUT

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Scenario 2 - Area G to White Rock MEI,
worst-case wind

FTWC Transport Venting

Case: *TA-54-1028 Worst Case Met (1g blower)* Output Name: *TA-54-1028 Worst Case*

Preparer review checklist for CAP88 Output

Initials: *RRL*

EPA test case data OK?
Individual location correct?
Individual dose correct?
Radionuclides correct?
Number of Curies correct?
Release site parameters correct?
Population data correct?
Meteorological data correct?
Modifications OK?

☒ Y / ☐ N
☒ Y / ☐ N
☒ Y / ☐ N
☒ Y / ☐ N
☒ Y / ☐ N
☒ Y / ☐ N
Y / ☐ N / ☒ NA
☒ Y / ☐ N Met File: *DF120118.WUD* ✓
Y / ☐ N / ☒ NA

Forward this checklist and the output to the technical reviewer.

Technical reviewer checklist for CAP88 Output

Initials: *[Signature]*

Preparer reviewed, signed, and dated?
Individual location correct?
Individual dose correct?
Radionuclides correct?
Number of Curies correct?
Release site parameters correct?
Other reviews or notes:

☒ Y / ☐ N
☒ Y / ☐ N
☒ Y / ☐ N
☒ Y / ☐ N
☒ Y / ☐ N
☒ Y / ☐ N

Forward this checklist and output to the Rad-NESHAP Team leader.

Approver checklist for CAP88 Output

Initials: *[Signature]*

Technical review signed and date?
Sign and date document?
Document OK to forward to Records?
Other reviews or notes:

☒ Y / ☐ N
☒ Y / ☐ N
Y / ☐ N

Forward this checklist and the output to the records coordinator.

[Signature] 2/23/19

C A P 8 8 - P C

Version 4.0

Clean Air Act Assessment Package - 1988

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

Non-Radon Individual Assessment
Wed Jan 08 09:50:49 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Stack
Source Type: Stack
Emission Year: 2019
DOSE Age Group: Adult

Comments: FTWC Venting Operation 2020. Worst 2018 day met fi
Large blower stack release to White Rock Nazarene ✓

Committed Effective Dose Equivalent
(mrem)

2.66E-04 ✓ ✓

At This Location: 2195 Meters East Southeast ✓ ✓

Dataset Name: TA-54-1028 Worst
Dataset Date: Jan 8, 2020 09:50 AM ✓

Wind File: C:\Users\219035\Documents\CAP88\Wind Files\DF120118.WND ✓

↑
Wed Jan 08 09:50:49 2020

SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 2195 Meters East Southeast
Lifetime Fatal Cancer Risk: 2.48E-10

ORGAN DOSE EQUIVALENT SUMMARY (RN-222 Working Level Calculations Excluded)

Organ	Dose Equivalent (mrem)
Adrenal	2.53E-04
UB_Wall	2.53E-04
Bone_Sur	2.53E-04
Brain	2.53E-04
Breasts	2.53E-04
St_Wall	3.37E-04
SI_Wall	2.55E-04
ULI_Wall	2.65E-04
LLI_Wall	2.91E-04
Kidneys	2.53E-04
Liver	2.53E-04
Muscle	2.53E-04
Ovaries	2.53E-04
Pancreas	2.53E-04
R_Marrow	2.53E-04
Skin	2.53E-04
Spleen	2.53E-04
Testes	2.53E-04
Thymus	2.53E-04
Thyroid	2.53E-04
GB_Wall	2.53E-04
Ht_Wall	2.53E-04
Uterus	2.53E-04
ET_Reg	2.53E-04
Lung_66	2.53E-04
Effectiv	2.66E-04

RADIONUCLIDE EMISSIONS DURING THE YEAR 2019

Source

Nuclide	Type	Size	#1 Ci/y	TOTAL Ci/y
H-3	✓ V	0.000	1.0E+00	1.0E+00

SITE INFORMATION

Temperature: ✓ 9.000 degrees C
 Precipitation: ✓ 45.000 cm/y
 Humidity: ✓ 5.500 g/cu m
 Mixing Height: ✓ 430.0 m

User specified location of max exposed individual.
 (ILOC, JLOC): ESE, 2195 meters

↑
 Wed Jan 08 09:50:49 2020

SYNOPSIS
 Page 2

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 2.00 ✓
 Diameter (m): 0.25 ✓

Plume Rise
 Momentum (m/s): 13.75 ✓
 (Exit Velocity)

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	1.0000 ✓	1.0000 ✓	1.0000 ✓
Fraction From Assessment Area:	0.0000	0.0000	0.0000
Fraction Imported:	0.0000	0.0000	0.0000

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

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

2195

DOSE AND RISK SUMMARIES

Non-Radon Individual Assessment

Wed Jan 08 09:50:49 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Stack
Source Type: Stack
Emission Year: 2019
DOSE Age Group: Adult

Comments: FTWC Venting Operation 2020. Worst 2018 day met fi
Large blower stack release to White Rock Nazarene

Dataset Name: TA-54-1028 Worst
Dataset Date: Jan 8, 2020 09:50 AM
Wind File: C:\Users\219035\Documents\CAP88\Wind Files\DF120118.WND

Wed Jan 08 09:50:49 2020

SUMMARY

Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem)
Adrenal	2.53E-04
UB_Wall	2.53E-04
Bone_Sur	2.53E-04
Brain	2.53E-04
Breasts	2.53E-04
St_Wall	3.37E-04
SI_Wall	2.55E-04
ULI_Wall	2.65E-04

LLI_Wall	2.91E-04
Kidneys	2.53E-04
Liver	2.53E-04
Muscle	2.53E-04
Ovaries	2.53E-04
Pancreas	2.53E-04
R_Marrow	2.53E-04
Skin	2.53E-04
Spleen	2.53E-04
Testes	2.53E-04
Thymus	2.53E-04
Thyroid	2.53E-04
GB_Wall	2.53E-04
Ht_Wall	2.53E-04
Uterus	2.53E-04
ET_Reg	2.53E-04
Lung_66	2.53E-04
Effectiv	2.66E-04

PATHWAY COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem)
INGESTION	2.46E-04
INHALATION	2.02E-05
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	2.66E-04
EXTERNAL	0.00E+00
TOTAL	2.66E-04

Wed Jan 08 09:50:49 2020

SUMMARY
Page 2

NUCLIDE COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem)

H-3 ✓

2.66E-04

TOTAL

2.66E-04 ✓

Wed Jan 08 09:50:49 2020

SUMMARY

Page 3

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
--------	--

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	2.45E-10
INHALATION	2.99E-12
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	2.48E-10
EXTERNAL	0.00E+00
TOTAL	2.48E-10

Wed Jan 08 09:50:49 2020

SUMMARY

Page 4

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
---------	--

H-3 2.48E-10

TOTAL 2.48E-10

↑
Wed Jan 08 09:50:49 2020

SUMMARY
Page 5

INDIVIDUAL COMMITTED EFFECTIVE DOSE EQUIVALENT (mrem)
(All Radionuclides and Pathways)

Distance (m)

Direction 2195

N	0.0E+00
NNW	0.0E+00
NW	0.0E+00
WNW	0.0E+00
W	0.0E+00
WSW	0.0E+00
SW	0.0E+00
SSW	0.0E+00
S	0.0E+00
SSE	0.0E+00
SSE	1.9E-04
ESE	2.7E-04
E	3.6E-05
ENE	0.0E+00
NE	0.0E+00
NNE	0.0E+00

↑
Wed Jan 08 09:50:49 2020

SUMMARY
Page 6

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

Distance (m)

Direction 2195

N	0.0E+00
NNW	0.0E+00
NW	0.0E+00
WNW	0.0E+00
W	0.0E+00
WSW	0.0E+00
SW	0.0E+00
SSW	0.0E+00
S	0.0E+00
SSE	0.0E+00
SSE	1.7E-10
ESE	2.5E-10
E	3.4E-11
ENE	0.0E+00
NE	0.0E+00
NNE	0.0E+00

Dose Assessment Using Cap88	No: EPC-ES-TP-501	Page 17 of 17
	Revision: 11	Effective Date: 10/25/2018

ATTACHMENT 4 – REVIEW CHECKLIST FOR CAP88 OUTPUT

Page 1 of 1

Scenario 3 - Area G to northern fence line / San Ildefonso Sacred Area, 5-year average wind

Case: **FTWC to San Ildefonso Sacred Area 500m NNE** Output Name: **FTWC_San-I.dat .syn .sum**

Preparer review checklist for CAP88 Output

Initials: **DPF**

EPA test case data OK? **yes Y / N** **Run 4/6/2020**
 Individual location correct? **yes Y / N**
 Individual dose correct? **yes Y / N**
 Radionuclides correct? **yes Y / N**
 Number of Curies correct? **yes Y / N**
 Release site parameters correct? **yes Y / N**
 Population data correct? **yes Y / N / NA**
 Meteorological data correct? **yes Y / N** Met File: **ta540711.wnd**
 Modifications OK? **n/a Y / N / NA**

Digitally signed by DAVID FUEHNE (Affiliate)
 Date: 2020.04.06 14:11:40 -06'00'

Forward this checklist and the output to the technical reviewer.

Technical reviewer checklist for CAP88 Output

Initials: **RRL 4/6/2020**

Preparer reviewed, signed, and dated? **Yes Y / N**
 Individual location correct? **Yes Y / N**
 Individual dose correct? **Yes Y / N**
 Radionuclides correct? **Yes Y / N**
 Number of Curies correct? **Yes Y / N**
 Release site parameters correct? **Yes Y / N**

Other reviews or notes:

REBECCA LATTIN (Affiliate)

Digitally signed by REBECCA LATTIN (Affiliate)
 Date: 2020.04.06 15:03:43 -06'00'

Forward this checklist and output to the Rad-NESHAP Team leader.

Approver checklist for CAP88 Output

Initials: **DPF**

Technical review signed and date?
 Sign and date document?
 Document OK to forward to Records?
 Other reviews or notes:

Y/N
Y/N
Y/N

[Handwritten signature]

4/7/2020

Forward this checklist and the output to the records coordinator.

C A P 8 8 - P C

Version 4.0

Clean Air Act Assessment Package - 1988

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

Non-Radon Individual Assessment

Mon Apr 06 14:04:06 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Area
Source Type: Stack
Emission Year: 2019
DOSE Age Group: Adult

Comments: FTWC Venting; MEI is San I sacred area
Stack release; 5yrAvgMet

Committed Effective Dose Equivalent
(mrem)

1.32E-03

At This Location: 500 Meters North Northeast

Dataset Name: FTWC_San-I.
Dataset Date: Jan 31, 2020 11:26 AM
Wind File: C:\Users\115862\Documents\CAP88\Wind Files\ta540711.wnd

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 500 Meters North Northeast
Lifetime Fatal Cancer Risk: 1.23E-09

ORGAN DOSE EQUIVALENT SUMMARY
(RN-222 Working Level Calculations Excluded)

Organ	Dose Equivalent (mrem)
Adrenal	1.26E-03
UB_Wall	1.26E-03
Bone_Sur	1.26E-03
Brain	1.26E-03
Breasts	1.26E-03
St_Wall	1.67E-03
SI_Wall	1.26E-03
ULI_Wall	1.31E-03
LLI_Wall	1.44E-03
Kidneys	1.26E-03
Liver	1.26E-03
Muscle	1.26E-03
Ovaries	1.26E-03
Pancreas	1.26E-03
R_Marrow	1.26E-03
Skin	1.26E-03
Spleen	1.26E-03
Testes	1.26E-03
Thymus	1.26E-03
Thyroid	1.26E-03
GB_Wall	1.26E-03
Ht_Wall	1.26E-03
Uterus	1.26E-03
ET_Reg	1.26E-03
Lung_66	1.26E-03
Effectiv	1.32E-03

RADIONUCLIDE EMISSIONS DURING THE YEAR 2019

Source	
#1	TOTAL

Nuclide	Type	Size	Ci/y	Ci/y
H-3	V	0.000	1.0E+00	1.0E+00

SITE INFORMATION

Temperature: 9.000 degrees C
Precipitation: 45.000 cm/y
Humidity: 5.500 g/cu m
Mixing Height: 1600.0 m

User specified location of max exposed individual.
(ILOC, JLOC): NNE, 500 meters

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 2.00
Diameter (m): 0.25

Plume Rise
Momentum (m/s): 13.75
(Exit Velocity)

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	1.0000	1.0000	1.0000
Fraction From Assessment Area:	0.0000	0.0000	0.0000
Fraction Imported:	0.0000	0.0000	0.0000

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

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

500

D O S E A N D R I S K S U M M A R I E S

Non-Radon Individual Assessment

Mon Apr 06 14:04:06 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Area
Source Type: Stack
Emission Year: 2019
DOSE Age Group: Adult

Comments: FTWC Venting; MEI is San I sacred area
Stack release; 5yrAvgMet

Dataset Name: FTWC_San-I.
Dataset Date: Jan 31, 2020 11:26 AM
Wind File: C:\Users\115862\Documents\CAP88\Wind
Files\ta540711.wnd

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem)
Adrenal	1.26E-03
UB_Wall	1.26E-03
Bone_Sur	1.26E-03
Brain	1.26E-03
Breasts	1.26E-03
St_Wall	1.67E-03
SI_Wall	1.26E-03
ULI_Wall	1.31E-03
LLI_Wall	1.44E-03
Kidneys	1.26E-03
Liver	1.26E-03
Muscle	1.26E-03
Ovaries	1.26E-03
Pancreas	1.26E-03
R_Marrow	1.26E-03
Skin	1.26E-03
Spleen	1.26E-03
Testes	1.26E-03
Thymus	1.26E-03
Thyroid	1.26E-03
GB_Wall	1.26E-03
Ht_Wall	1.26E-03
Uterus	1.26E-03
ET_Reg	1.26E-03
Lung_66	1.26E-03
Effectiv	1.32E-03

PATHWAY COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem)
INGESTION	1.22E-03
INHALATION	1.00E-04
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00

INTERNAL	1.32E-03
EXTERNAL	0.00E+00
TOTAL	1.32E-03

NUCLIDE COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem)
H-3	1.32E-03
TOTAL	1.32E-03

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
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PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	1.21E-09
INHALATION	1.48E-11
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	1.23E-09
EXTERNAL	0.00E+00
TOTAL	1.23E-09

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
H-3	1.23E-09
TOTAL	1.23E-09

INDIVIDUAL COMMITTED EFFECTIVE DOSE EQUIVALENT (mrem)
(All Radionuclides and Pathways)

Distance (m)

Direction 500

N	6.6E-04
NNW	3.6E-04
NW	2.6E-04
WNW	3.2E-04
W	4.3E-04
WSW	6.4E-04
SW	1.1E-03
SSW	1.4E-03
S	1.7E-03
SSE	2.1E-03
SSE	2.7E-03
ESE	2.0E-03
E	1.8E-03
ENE	1.6E-03
NE	1.6E-03
NNE	1.3E-03

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

Distance (m)	
<hr/>	
Direction	500
<hr/>	
N	6.2E-10
NNW	3.4E-10
NW	2.4E-10
WNW	3.0E-10
W	4.0E-10
WSW	6.0E-10
SW	1.0E-09
SSW	1.3E-09
S	1.6E-09
SSE	1.9E-09
SSE	2.5E-09
ESE	1.9E-09
E	1.7E-09
ENE	1.4E-09
NE	1.5E-09
NNE	1.2E-09

Dose Assessment Using Cap88	No: EPC-ES-TP-501	Page 17 of 17
	Revision: 11	Effective Date: 10/25/2018

ATTACHMENT 4 – REVIEW CHECKLIST FOR CAP88 OUTPUT

Page 1 of 1

Scenario 4 - Area G to northern fence line /
San Ildefonso Sacred Area, worst-case wind

<p>Case: Area G to SISA, Worst-case wind</p> <p>Preparer review checklist for CAP88 Output</p> <p>EPA test case data OK? ☒ Y / N</p> <p>Individual location correct? ☒ Y / N</p> <p>Individual dose correct? ☒ Y / N</p> <p>Radionuclides correct? ☒ Y / N</p> <p>Number of Curies correct? ☒ Y / N</p> <p>Release site parameters correct? ☒ Y / N</p> <p>Population data correct? ☐ Y / N / NA ☒</p> <p>Meteorological data correct? ☒ Y / N</p> <p>Modifications OK? ☐ Y / N / NA ☒</p> <p>Forward this checklist and the output to the technical reviewer.</p>	<p>Output Name: FTWC SISA 03142018 v41ann</p> <p>Initials: D. Fuehne 9/12/2020</p> <div style="border: 1px solid red; padding: 5px; margin: 10px 0;"> <p><i>Checkbox indicates "Yes" or "N/A" - enter other comments in notes fields below.</i></p> </div> <p>Met File: 54_03142018.wnd</p> <p><i>David P Fuehne</i> Digitally signed by DAVID FUEHNE (Affiliate) Date: 2020.09.12 11:40:51 -06'00'</p>
<p>Technical reviewer checklist for CAP88 Output</p> <p>Preparer reviewed, signed, and dated? ☒ Y / N</p> <p>Individual location correct? ☒ Y / N</p> <p>Individual dose correct? ☒ Y / N</p> <p>Radionuclides correct? ☒ Y / N</p> <p>Number of Curies correct? ☒ Y / N</p> <p>Release site parameters correct? ☒ Y / N</p> <p>Other reviews or notes:</p> <p>Forward this checklist and output to the Rad-NESHAP Team leader.</p>	<p>Initials: RRL 9/14/2020</p> <p>REBECCA LATTIN (Affiliate)</p> <p><i>Rebecca Lattin</i> Digitally signed by REBECCA LATTIN (Affiliate) Date: 2020.09.14 13:10:01 -06'00'</p>
<p>Approver checklist for CAP88 Output</p> <p>Technical review signed and date? ☒ Y / N</p> <p>Sign and date document? ☒ Y / N</p> <p>Document OK to forward to Records? ☒ Y / N</p> <p>Other reviews or notes:</p> <p>Forward this checklist and the output to the records coordinator.</p>	<p>Initials: Dave Fuehne 9/14/2020</p> <p><i>David P Fuehne</i> Digitally signed by DAVID FUEHNE (Affiliate) Date: 2020.09.14 17:23:24 -06'00'</p>

Notes or comments:

This file used annual lid height of 1600m. Using March lid height made no difference in dose factor.

This file run using CAP88 v4.1; when comparing to v4.0, the new version dose is lower by <0.3%. OK.

C A P 8 8 - P C

Version 4.1

Clean Air Act Assessment Package - 1988

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

Non-Radon Individual Assessment
Sat Sep 12 09:37:25 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Area
Source Type: Stack
Emission Year: 2020
DOSE Age Group: Adult

Comments: FTWC Venting; MEI is San Ildefonso Sacred Area
Stack release; worst case met to SISA; ann. lid ht

Effective Dose Equivalent
(mrem)

4.11E-03

At This Location: 500 Meters North Northeast

Dataset Name: FTWC_SISA_031420
Dataset Date: Sep 12, 2020 09:37 AM
Wind File: C:\Users\115862\Documents\CAP88\Wind Files\54_03142018.

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 500 Meters North Northeast
Lifetime Fatal Cancer Risk: 2.56E-09

ORGAN DOSE EQUIVALENT SUMMARY
(RN-222 Working Level Calculations Excluded)

Organ	Dose Equivalent (mrem)
Adrenals	3.91E-03
UB_Wall	3.91E-03
Bone_Sur	3.91E-03
Brain	3.91E-03
Breasts	3.91E-03
St_Wall	5.21E-03
SI_Wall	3.94E-03
ULI_Wall	4.10E-03
LLI_Wall	4.48E-03
Kidneys	3.91E-03
Liver	3.91E-03
Muscle	3.91E-03
Ovaries	3.91E-03
Pancreas	3.91E-03
R_Marrow	3.91E-03
Skin	3.91E-03
Spleen	3.91E-03
Testes	3.91E-03
Thymus	3.91E-03
Thyroid	3.91E-03
GB_Wall	3.91E-03
Ht_Wall	3.91E-03
Uterus	3.91E-03
ET_Reg	3.91E-03
Lung	3.91E-03
Effectiv	4.11E-03

RADIONUCLIDE EMISSIONS DURING THE YEAR 2020

Source	
#1	TOTAL

Nuclide	Type	Size	Ci/y	Ci/y
H-3	V	0.000	1.0E+00	1.0E+00

SITE INFORMATION

Temperature: 9.000 degrees C
 Precipitation: 45.000 cm/y
 Humidity: 5.500 g/cu m
 Mixing Height: 1600.0 m

User specified location of max exposed individual.
 (ILOC, JLOC): NNE, 500 meters

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 2.00
Diameter (m): 0.25Plume Rise
Momentum (m/s): 13.75
(Exit Velocity)

ADJUSTED AGRICULTURAL DATA

	Vegetable	Milk	Meat
	<hr/>	<hr/>	<hr/>
Fraction Home Produced:	1.0000	1.0000	1.0000
Fraction From Assessment Area:	0.0000	0.0000	0.0000
Fraction Imported:	0.0000	0.0000	0.0000

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

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

500

D O S E A N D R I S K S U M M A R I E S

Non-Radon Individual Assessment
Sat Sep 12 09:37:25 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Area
Source Type: Stack
Emission Year: 2020
DOSE Age Group: Adult

Comments: FTWC Venting; MEI is San Ildefonso Sacred Area
Stack release; worst case met to SISA; ann. lid ht

Dataset Name: FTWC_SISA_031420
Dataset Date: Sep 12, 2020 09:37 AM
Wind File: C:\Users\115862\Documents\CAP88\Wind
Files\54_03142018.wnd

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem)
Adrenals	3.91E-03
UB_Wall	3.91E-03
Bone_Sur	3.91E-03
Brain	3.91E-03
Breasts	3.91E-03
St_Wall	5.21E-03
SI_Wall	3.94E-03
ULI_Wall	4.10E-03
LLI_Wall	4.48E-03
Kidneys	3.91E-03
Liver	3.91E-03
Muscle	3.91E-03
Ovaries	3.91E-03
Pancreas	3.91E-03
R_Marrow	3.91E-03
Skin	3.91E-03
Spleen	3.91E-03
Testes	3.91E-03
Thymus	3.91E-03
Thyroid	3.91E-03
GB_Wall	3.91E-03
Ht_Wall	3.91E-03
Uterus	3.91E-03
ET_Reg	3.91E-03
Lung	3.91E-03
Effectiv	4.11E-03

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem)
INGESTION	3.79E-03
INHALATION	3.13E-04
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00

INTERNAL	4.11E-03
EXTERNAL	0.00E+00
TOTAL	4.11E-03

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem)
H-3	4.11E-03
TOTAL	4.11E-03

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
Esophagu	4.73E-11
Stomach	2.49E-10
Colon	5.00E-10
Liver	6.66E-11
LUNG	4.05E-10
Bone	4.03E-12
Skin	4.30E-12
Breast	1.90E-10
Ovary	5.39E-11
Bladder	1.07E-10
Kidneys	2.29E-11
Thyroid	1.32E-11
Leukemia	2.44E-10
Residual	6.49E-10
Total	2.56E-09
TOTAL	2.56E-09

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	2.38E-09
INHALATION	1.77E-10
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	2.56E-09
EXTERNAL	0.00E+00
TOTAL	2.56E-09

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
H-3	2.56E-09
TOTAL	2.56E-09

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT (mrem)
(All Radionuclides and Pathways)

Distance (m)

Direction 500

N	8.8E-05
NNW	0.0E+00
NW	0.0E+00
WNW	0.0E+00
W	0.0E+00
WSW	0.0E+00
SW	0.0E+00
SSW	0.0E+00
S	0.0E+00
SSE	0.0E+00
SE	0.0E+00
ESE	0.0E+00
E	0.0E+00
ENE	0.0E+00
NE	9.4E-04
NNE	4.1E-03

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

Distance (m)	
<hr/>	
Direction	500
<hr/>	
N	5.5E-11
NNW	0.0E+00
NW	0.0E+00
WNW	0.0E+00
W	0.0E+00
WSW	0.0E+00
SW	0.0E+00
SSW	0.0E+00
S	0.0E+00
SSE	0.0E+00
SE	0.0E+00
ESE	0.0E+00
E	0.0E+00
ENE	0.0E+00
NE	5.8E-10
NNE	2.6E-09

Dose Assessment Using Cap88	No: EPC-ES-TP-501	Page 17 of 17
	Revision: 11	Effective Date: 10/25/2018

ATTACHMENT 4 – REVIEW CHECKLIST FOR CAP88 OUTPUT

Page 1 of 1

Scenario 5 - Area G to Ponderosa Campground,
5-year average wind

Case: FTWC Area G to Ponderosa Campground; Avg Met		Output Name: v41 AreaG to PCG	
Preparer review checklist for CAP88 Output		Initials: <u>DPF 9/14/2020</u>	
EPA test case data OK?	☒ Y / N	Checkbox indicates "Yes" or "N/A" - enter other comments in notes fields below.	
Individual location correct?	☒ Y / N		
Individual dose correct?	☒ Y / N		
Radionuclides correct?	☒ Y / N		
Number of Curies correct?	☒ Y / N		
Release site parameters correct?	☒ Y / N		
Population data correct?	☐ Y / N / NA ☒		
Meteorological data correct?	☒ Y / N		
Modifications OK?	☐ Y / N / NA ☒	Digitally signed by DAVID FUEHNE (Affiliate) Date: 2020.09.14 11:39:05 -06'00'	
Forward this checklist and the output to the technical reviewer.			
Technical reviewer checklist for CAP88 Output		Initials: <u>RRL 9/14/2020</u>	
Preparer reviewed, signed, and dated?	☒ Y / N		
Individual location correct?	☒ Y / N		
Individual dose correct?	☒ Y / N		
Radionuclides correct?	☒ Y / N		
Number of Curies correct?	☒ Y / N		
Release site parameters correct?	☒ Y / N		
Other reviews or notes:	REBECCA LATTIN (Affiliate) <div style="float: right; font-size: small;"> Digitally signed by REBECCA LATTIN (Affiliate) Date: 2020.09.14 13:05:35 -06'00' </div>		
Forward this checklist and output to the Rad-NESHAP Team leader.			
Approver checklist for CAP88 Output		Initials: <u>Dave Fuehne 9/14/2020</u>	
Technical review signed and date?	☒ Y / N		
Sign and date document?	☒ Y / N		
Document OK to forward to Records?	☒ Y / N		
Other reviews or notes:	Digitally signed by DAVID FUEHNE (Affiliate) Date: 2020.09.14 17:19:35 -06'00'		
Forward this checklist and the output to the records coordinator.			

Notes or comments:

Part of multiple vent site evaluation. This run models release from Area G to the WETF MEI location.

Average TA-54 meteorology

C A P 8 8 - P C

Version 4.1

Clean Air Act Assessment Package - 1988

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

Non-Radon Individual Assessment
Mon Sep 14 11:27:08 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Area
Source Type: Stack
Emission Year: 2019
DOSE Age Group: Adult

Comments: FTWC venting Area G to PonderosaCampGround
Stack release; high velocity

Effective Dose Equivalent
(mrem)

3.03E-06

At This Location: 10300 Meters West

Dataset Name: v41_AreaG_to_PCG
Dataset Date: Sep 14, 2020 11:25 AM
Wind File: C:\Users\115862\Documents\CAP88\Wind Files\2007 - 2011

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 10300 Meters West
Lifetime Fatal Cancer Risk: 1.88E-12

ORGAN DOSE EQUIVALENT SUMMARY
(RN-222 Working Level Calculations Excluded)

Organ	Dose Equivalent (mrem)
Adrenals	2.88E-06
UB_Wall	2.88E-06
Bone_Sur	2.88E-06
Brain	2.88E-06
Breasts	2.88E-06
St_Wall	3.84E-06
SI_Wall	2.91E-06
ULI_Wall	3.03E-06
LLI_Wall	3.31E-06
Kidneys	2.88E-06
Liver	2.88E-06
Muscle	2.88E-06
Ovaries	2.88E-06
Pancreas	2.88E-06
R_Marrow	2.88E-06
Skin	2.88E-06
Spleen	2.88E-06
Testes	2.88E-06
Thymus	2.88E-06
Thyroid	2.88E-06
GB_Wall	2.88E-06
Ht_Wall	2.88E-06
Uterus	2.88E-06
ET_Reg	2.88E-06
Lung	2.88E-06
Effectiv	3.03E-06

RADIONUCLIDE EMISSIONS DURING THE YEAR 2019

Source	
#1	TOTAL

Nuclide	Type	Size	Ci/y	Ci/y
H-3	V	0.000	1.0E+00	1.0E+00

SITE INFORMATION

Temperature: 9.000 degrees C
 Precipitation: 45.000 cm/y
 Humidity: 5.500 g/cu m
 Mixing Height: 1600.0 m

User specified location of max exposed individual.
 (ILOC, JLOC): W ,10300 meters

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 2.00
Diameter (m): 0.25

Plume Rise
Momentum (m/s): 13.75
(Exit Velocity)

ADJUSTED AGRICULTURAL DATA

	Vegetable	Milk	Meat
	<hr/>	<hr/>	<hr/>
Fraction Home Produced:	1.0000	1.0000	1.0000
Fraction From Assessment Area:	0.0000	0.0000	0.0000
Fraction Imported:	0.0000	0.0000	0.0000

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

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

10300

D O S E A N D R I S K S U M M A R I E S

Non-Radon Individual Assessment
Mon Sep 14 11:27:08 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Area
Source Type: Stack
Emission Year: 2019
DOSE Age Group: Adult

Comments: FTWC venting Area G to PonderosaCampGround
Stack release; high velocity

Dataset Name: v41_AreaG_to_PCG
Dataset Date: Sep 14, 2020 11:25 AM
Wind File: C:\Users\115862\Documents\CAP88\Wind Files\2007 -
2011 Avg Files\TA540711.WND

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem)
Adrenals	2.88E-06
UB_Wall	2.88E-06
Bone_Sur	2.88E-06
Brain	2.88E-06
Breasts	2.88E-06
St_Wall	3.84E-06
SI_Wall	2.91E-06
ULI_Wall	3.03E-06
LLI_Wall	3.31E-06
Kidneys	2.88E-06
Liver	2.88E-06
Muscle	2.88E-06
Ovaries	2.88E-06
Pancreas	2.88E-06
R_Marrow	2.88E-06
Skin	2.88E-06
Spleen	2.88E-06
Testes	2.88E-06
Thymus	2.88E-06
Thyroid	2.88E-06
GB_Wall	2.88E-06
Ht_Wall	2.88E-06
Uterus	2.88E-06
ET_Reg	2.88E-06
Lung	2.88E-06
Effectiv	3.03E-06

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem)
INGESTION	2.80E-06
INHALATION	2.31E-07
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00

INTERNAL	3.03E-06
EXTERNAL	0.00E+00
TOTAL	3.03E-06

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem)
H-3	3.03E-06
TOTAL	3.03E-06

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
Esophagu	3.49E-14
Stomach	1.83E-13
Colon	3.69E-13
Liver	4.91E-14
LUNG	2.98E-13
Bone	2.97E-15
Skin	3.17E-15
Breast	1.40E-13
Ovary	3.98E-14
Bladder	7.87E-14
Kidneys	1.69E-14
Thyroid	9.74E-15
Leukemia	1.80E-13
Residual	4.78E-13
Total	1.88E-12
TOTAL	1.88E-12

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	1.75E-12
INHALATION	1.31E-13
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	1.88E-12
EXTERNAL	0.00E+00
TOTAL	1.88E-12

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
H-3	1.88E-12
TOTAL	1.88E-12

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT (mrem)
(All Radionuclides and Pathways)

Distance (m)

Direction 10300

N	5.0E-06
NNW	2.7E-06
NW	1.9E-06
WNW	2.4E-06
W	3.0E-06
WSW	5.0E-06
SW	9.0E-06
SSW	1.3E-05
S	1.6E-05
SSE	2.0E-05
SE	2.6E-05
ESE	1.9E-05
E	1.7E-05
ENE	1.4E-05
NE	1.4E-05
NNE	1.0E-05

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

Distance (m)

Direction 10300

N	3.1E-12
NNW	1.7E-12
NW	1.2E-12
WNW	1.5E-12
W	1.9E-12
WSW	3.1E-12
SW	5.6E-12
SSW	8.1E-12
S	9.9E-12
SSE	1.2E-11
SE	1.6E-11
ESE	1.2E-11
E	1.0E-11
ENE	8.7E-12
NE	8.7E-12
NNE	6.5E-12

Dose Assessment Using Cap88	No: EPC-ES-TP-501	Page 17 of 17
	Revision: 11	Effective Date: 10/25/2018

ATTACHMENT 4 – REVIEW CHECKLIST FOR CAP88 OUTPUT

Page 1 of 1

Scenario 6 - Area G to Los Alamos town site
(west, Airnet 211), 5-year average wind

Case: Area G FTWC to LA-West		Output Name: LA-WestAirnet211	
(Airnet Station 211); Avg Met			
Preparer review checklist for CAP88 Output		Initials: <u>RRL 9/15/2020</u>	
EPA test case data OK?	☒ Y / N	Checkbox indicates "Yes" or "N/A" - enter other comments in notes fields below.	
Individual location correct?	☒ Y / N		
Individual dose correct?	☒ Y / N		
Radionuclides correct?	☒ Y / N		
Number of Curies correct?	☒ Y / N		
Release site parameters correct?	☒ Y / N		
Population data correct?	☐ Y / N / NA ☒		
Meteorological data correct?	☒ Y / N Met File: <u>TA540711.wnd</u>		
Modifications OK?	☐ Y / N / NA ☒	REBECCA LATTIN (Affiliate) <small>Digitally signed by REBECCA LATTIN (Affiliate) Date: 2020.09.15 14:18:50 -06'00'</small>	
Forward this checklist and the output to the technical reviewer.			
Technical reviewer checklist for CAP88 Output		Initials: <u>Dave Fuehne, 9/15/2020</u>	
Preparer reviewed, signed, and dated?	☒ Y / N		
Individual location correct?	☒ Y / N		
Individual dose correct?	☒ Y / N		
Radionuclides correct?	☒ Y / N		
Number of Curies correct?	☒ Y / N		
Release site parameters correct?	☒ Y / N		
Other reviews or notes:	<div style="text-align: right;"> <small>Digitally signed by DAVID FUEHNE (Affiliate) Date: 2020.09.15 20:29:06 -06'00'</small> </div>		
Forward this checklist and output to the Rad-NESHAP Team leader.			
Approver checklist for CAP88 Output		Initials: <u>Dave Fuehne, 9/15/2020</u>	
Technical review signed and date?	☒ Y / N		
Sign and date document?	☒ Y / N		
Document OK to forward to Records?	☒ Y / N		
Other reviews or notes:	<div style="text-align: right;"> <small>Digitally signed by DAVID FUEHNE (Affiliate) Date: 2020.09.15 20:30:07 -06'00'</small> </div>		
Forward this checklist and the output to the records coordinator.			

Notes or comments:

C A P 8 8 - P C

Version 4.1

Clean Air Act Assessment Package - 1988

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

Non-Radon Individual Assessment

Tue Sep 15 10:58:41 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Stack
Source Type: Stack
Emission Year: 2020
DOSE Age Group: Adult

Comments: FTWC emissions thru vent stack
To LA-West Airnet 211; bounding case

Effective Dose Equivalent
(mrem)

2.37E-06 ✓

At This Location: ✓
8708 Meters Northwest ✓

Dataset Name: LA-WestAirnet211

Dataset Date: Sep 15, 2020 10:58 AM

Wind File: C:\Users\219035\Documents\CAP88\Wind Files\TA540711.WND ✓

↑
Tue Sep 15 10:58:41 2020

SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 8708 Meters Northwest
Lifetime Fatal Cancer Risk: 1.47E-12

ORGAN DOSE EQUIVALENT SUMMARY (RN-222 Working Level Calculations Excluded)

Organ	Dose Equivalent (mrem)
Adrenals	2.25E-06
UB_Wall	2.25E-06
Bone_Sur	2.25E-06
Brain	2.25E-06
Breasts	2.25E-06
St_Wall	3.00E-06
SI_Wall	2.27E-06
ULI_Wall	2.37E-06
LLI_Wall	2.59E-06
Kidneys	2.25E-06
Liver	2.25E-06
Muscle	2.25E-06
Ovaries	2.25E-06
Pancreas	2.25E-06
R_Marrow	2.25E-06
Skin	2.25E-06
Spleen	2.25E-06
Testes	2.25E-06
Thymus	2.25E-06
Thyroid	2.25E-06
GB_Wall	2.25E-06
Ht_Wall	2.25E-06
Uterus	2.25E-06
ET_Reg	2.25E-06
Lung	2.25E-06
Effectiv	2.37E-06

RADIONUCLIDE EMISSIONS DURING THE YEAR 2020

Source

Nuclide	Type	Size	#1 Ci/y	TOTAL Ci/y
H-3	✓	V ✓	0.000	1.0E+00 1.0E+00 ✓

SITE INFORMATION

Temperature: ✓ 9.000 degrees C
 Precipitation: ✓ 45.000 cm/y
 Humidity: ✓ 5.500 g/cu m
 Mixing Height: ✓ 1600.0 m

User specified location of max exposed individual.
 (ILOC, JLOC): NW , 8708 meters

Tue Sep 15 10:58:41 2020

SYNOPSIS
 Page 2

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 2.00 ✓
 Diameter (m): 0.25 ✓
 Plume Rise
 Momentum (m/s): 13.75 ✓
 (Exit Velocity)

ADJUSTED AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	1.0000 ✓	1.0000 ✓	1.0000 ✓
Fraction From Assessment Area:	0.0000	0.0000	0.0000
Fraction Imported:	0.0000	0.0000	0.0000

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

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

8708

D O S E A N D R I S K S U M M A R I E S

Non-Radon Individual Assessment
Tue Sep 15 10:58:41 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Stack
Source Type: Stack
Emission Year: 2020
DOSE Age Group: Adult

Comments: FTWC emissions thru vent stack
To LA-West Airnet 211; bounding case

Dataset Name: LA-WestAirnet211
Dataset Date: Sep 15, 2020 10:58 AM
Wind File: C:\Users\219035\Documents\CAP88\Wind Files\TA540711.WND

Tue Sep 15 10:58:41 2020

SUMMARY
Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem)
Adrenals	2.25E-06
UB_Wall	2.25E-06
Bone_Sur	2.25E-06
Brain	2.25E-06
Breasts	2.25E-06
St_Wall	3.00E-06
SI_Wall	2.27E-06
ULI_Wall	2.37E-06

LLI_Wall	2.59E-06
Kidneys	2.25E-06
Liver	2.25E-06
Muscle	2.25E-06
Ovaries	2.25E-06
Pancreas	2.25E-06
R_Marrow	2.25E-06
Skin	2.25E-06
Spleen	2.25E-06
Testes	2.25E-06
Thymus	2.25E-06
Thyroid	2.25E-06
GB_Wall	2.25E-06
Ht_Wall	2.25E-06
Uterus	2.25E-06
ET_Reg	2.25E-06
Lung	2.25E-06
Effectiv	2.37E-06

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem)
INGESTION	2.19E-06
INHALATION	1.80E-07
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	2.37E-06
EXTERNAL	0.00E+00
TOTAL	2.37E-06

Tue Sep 15 10:58:41 2020

SUMMARY
Page 2

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem)

H-3 ✓

2.37E-06 ✓

TOTAL

2.37E-06 ✓

Tue Sep 15 10:58:41 2020

SUMMARY
Page 3

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
Esophagu	2.73E-14
Stomach	1.43E-13
Colon	2.89E-13
Liver	3.84E-14
LUNG	2.33E-13
Bone	2.33E-15
Skin	2.48E-15
Breast	1.10E-13
Ovary	3.11E-14
Bladder	6.15E-14
Kidneys	1.32E-14
Thyroid	7.62E-15
Leukemia	1.41E-13
Residual	3.74E-13
Total	1.47E-12
TOTAL	1.47E-12

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	1.37E-12
INHALATION	1.02E-13
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00

INTERNAL	1.47E-12
EXTERNAL	0.00E+00
TOTAL	1.47E-12

Tue Sep 15 10:58:41 2020

SUMMARY
Page 4

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
H-3	1.47E-12
TOTAL	1.47E-12

Tue Sep 15 10:58:41 2020

SUMMARY
Page 5

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT (mrem) (All Radionuclides and Pathways)

Distance (m)

Direction 8708

N	6.4E-06
NNW	3.5E-06
NW	2.4E-06
WNW	3.1E-06
W	3.8E-06
WSW	6.4E-06
SW	1.1E-05
SSW	1.6E-05
S	2.0E-05
SSE	2.5E-05
SE	3.3E-05
ESE	2.4E-05
E	2.1E-05
ENE	1.8E-05
NE	1.8E-05

NNE 1.3E-05

Tue Sep 15 10:58:41 2020

SUMMARY
Page 6

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

Distance (m)

Direction 8708

N	4.0E-12
NNW	2.1E-12
NW	1.5E-12
WNW	1.9E-12
W	2.4E-12
WSW	4.0E-12
SW	7.1E-12
SSW	1.0E-11
S	1.2E-11
SSE	1.6E-11
SE	2.0E-11
ESE	1.5E-11
E	1.3E-11
ENE	1.1E-11
NE	1.1E-11
NNE	8.3E-12

Dose Assessment Using Cap88	No: EPC-ES-TP-501	Page 17 of 17
	Revision: 11	Effective Date: 10/25/2018

ATTACHMENT 4 – REVIEW CHECKLIST FOR CAP88 OUTPUT

Page 1 of 1 Scenario 7 - Area G to Los Alamos town site
(east, Airnet 114), 5-year average wind

Case: Area G FTWC to LA-East		Output Name: LA-EastAirnet114	
(Airnet Station 114); Avg Met		Initials: <u>RRL 9/15/2020</u>	
Preparer review checklist for CAP88 Output		<div style="border: 1px solid red; padding: 5px; margin-bottom: 10px;"> <i>Checkbox indicates "Yes" or "N/A" - enter other comments in notes fields below.</i> </div> <div style="display: flex; justify-content: space-between;"> <div> <p>EPA test case data OK? ☒ Y / N</p> <p>Individual location correct? ☒ Y / N</p> <p>Individual dose correct? ☒ Y / N</p> <p>Radionuclides correct? ☒ Y / N</p> <p>Number of Curies correct? ☒ Y / N</p> <p>Release site parameters correct? ☒ Y / N</p> <p>Population data correct? ☐ Y / N / NA ☒</p> <p>Meteorological data correct? ☒ Y / N</p> <p>Modifications OK? ☐ Y / N / NA ☒</p> </div> <div> <p>Met File: <u>TA540711.wnd</u></p> <p>REBECCA LATTIN (Affiliate)</p> <p><small>Digitally signed by REBECCA LATTIN (Affiliate) Date: 2020.09.15 14:25:39 -06'00'</small></p> </div> </div>	
Forward this checklist and the output to the technical reviewer.			
Technical reviewer checklist for CAP88 Output			
Initials: <u>Dave Fuehne, 9/15/2020</u>			
Preparer reviewed, signed, and dated? ☒ Y / N			
Individual location correct? ☒ Y / N			
Individual dose correct? ☒ Y / N			
Radionuclides correct? ☒ Y / N			
Number of Curies correct? ☒ Y / N			
Release site parameters correct? ☒ Y / N			
Other reviews or notes:		<div style="display: flex; justify-content: space-between;"> <div> <p><i>Dave Fuehne</i></p> </div> <div> <p><small>Digitally signed by DAVID FUEHNE (Affiliate) Date: 2020.09.15 20:26:23 -06'00'</small></p> </div> </div>	
Forward this checklist and output to the Rad-NESHAP Team leader.			
Approver checklist for CAP88 Output		Initials: <u>Dave Fuehne, 9/15/2020</u>	
Technical review signed and date? ☒ Y / N		<div style="display: flex; justify-content: space-between;"> <div> <p><i>Dave Fuehne</i></p> </div> <div> <p><small>Digitally signed by DAVID FUEHNE (Affiliate) Date: 2020.09.15 20:26:42 -06'00'</small></p> </div> </div>	
Sign and date document? ☒ Y / N			
Document OK to forward to Records? ☒ Y / N			
Other reviews or notes:			
Forward this checklist and the output to the records coordinator.			

Notes or comments:

C A P 8 8 - P C

Version 4.1

Clean Air Act Assessment Package - 1988

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

Non-Radon Individual Assessment

Tue Sep 15 10:56:51 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Stack
Source Type: Stack
Emission Year: 2020
DOSE Age Group: Adult

Comments: FTWC emissions thru vent stack
To LA-East Airnet 114; bounding case

Effective Dose Equivalent
(mrem)

5.44E-06 ✓

At This Location: 6374 Meters North Northwest ✓

Dataset Name: LA-EastAirnet114

Dataset Date: Sep 15, 2020 10:56 AM

Wind File: C:\Users\219035\Documents\CAP88\Wind Files\TA540711.WND ✓

↑
Tue Sep 15 10:56:51 2020

SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 6374 Meters North Northwest
Lifetime Fatal Cancer Risk: 3.38E-12

ORGAN DOSE EQUIVALENT SUMMARY (RN-222 Working Level Calculations Excluded)

Organ	Dose Equivalent (mrem)
Adrenals	5.18E-06
UB_Wall	5.18E-06
Bone_Sur	5.18E-06
Brain	5.18E-06
Breasts	5.18E-06
St_Wall	6.89E-06
SI_Wall	5.22E-06
ULI_Wall	5.44E-06
LLI_Wall	5.94E-06
Kidneys	5.18E-06
Liver	5.18E-06
Muscle	5.18E-06
Ovaries	5.18E-06
Pancreas	5.18E-06
R_Marrow	5.18E-06
Skin	5.18E-06
Spleen	5.18E-06
Testes	5.18E-06
Thymus	5.18E-06
Thyroid	5.18E-06
GB_Wall	5.18E-06
Ht_Wall	5.18E-06
Uterus	5.18E-06
ET_Reg	5.18E-06
Lung	5.18E-06
Effectiv	5.44E-06

RADIONUCLIDE EMISSIONS DURING THE YEAR 2020

Source

Nuclide	Type	Size	#1 Ci/y	TOTAL Ci/y
H-3	✓	V ✓	0.000 1.0E+00	1.0E+00 ✓

SITE INFORMATION

Temperature: ✓ 9.000 degrees C
 Precipitation: ✓ 45.000 cm/y
 Humidity: ✓ 5.500 g/cu m
 Mixing Height: ✓ 1600.0 m

User specified location of max exposed individual.
 (ILOC, JLOC): NNW, 6374 meters

Tue Sep 15 10:56:51 2020

SYNOPSIS
 Page 2

SOURCE INFORMATION

Source Number: 1

 Stack Height (m): 2.00 ✓
 Diameter (m): 0.25 ✓
 Plume Rise
 Momentum (m/s): 13.75 ✓
 (Exit Velocity)

ADJUSTED AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	1.0000 ✓	1.0000 ✓	1.0000 ✓
Fraction From Assessment Area:	0.0000	0.0000	0.0000
Fraction Imported:	0.0000	0.0000	0.0000

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

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

6374

D O S E A N D R I S K S U M M A R I E S

Non-Radon Individual Assessment
Tue Sep 15 10:56:51 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Stack
Source Type: Stack
Emission Year: 2020
DOSE Age Group: Adult

Comments: FTWC emissions thru vent stack
To LA-East Airnet 114; bounding case

Dataset Name: LA-EastAirnet114
Dataset Date: Sep 15, 2020 10:56 AM
Wind File: C:\Users\219035\Documents\CAP88\Wind Files\TA540711.WND

Tue Sep 15 10:56:51 2020

SUMMARY
Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem)
Adrenals	5.18E-06
UB_Wall	5.18E-06
Bone_Sur	5.18E-06
Brain	5.18E-06
Breasts	5.18E-06
St_Wall	6.89E-06
SI_Wall	5.22E-06
ULI_Wall	5.44E-06

LLI_Wall	5.94E-06
Kidneys	5.18E-06
Liver	5.18E-06
Muscle	5.18E-06
Ovaries	5.18E-06
Pancreas	5.18E-06
R_Marrow	5.18E-06
Skin	5.18E-06
Spleen	5.18E-06
Testes	5.18E-06
Thymus	5.18E-06
Thyroid	5.18E-06
GB_Wall	5.18E-06
Ht_Wall	5.18E-06
Uterus	5.18E-06
ET_Reg	5.18E-06
Lung	5.18E-06
Effectiv	5.44E-06

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem)
INGESTION	5.02E-06
INHALATION	4.14E-07
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	5.44E-06
EXTERNAL	0.00E+00
TOTAL	5.44E-06

Tue Sep 15 10:56:51 2020

SUMMARY
Page 2

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem)

H-3 ✓

5.44E-06 ✓

TOTAL

5.44E-06 ✓

Tue Sep 15 10:56:51 2020

SUMMARY
Page 3

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
Esophagu	6.26E-14
Stomach	3.29E-13
Colon	6.63E-13
Liver	8.82E-14
LUNG	5.36E-13
Bone	5.34E-15
Skin	5.69E-15
Breast	2.52E-13
Ovary	7.14E-14
Bladder	1.41E-13
Kidneys	3.03E-14
Thyroid	1.75E-14
Leukemia	3.23E-13
Residual	8.59E-13
Total	3.38E-12
TOTAL	3.38E-12

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	3.15E-12
INHALATION	2.35E-13
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00

INTERNAL	3.38E-12
EXTERNAL	0.00E+00
TOTAL	3.38E-12

Tue Sep 15 10:56:51 2020

SUMMARY
Page 4

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
H-3	3.38E-12
TOTAL	3.38E-12

Tue Sep 15 10:56:51 2020

SUMMARY
Page 5

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT (mrem) (All Radionuclides and Pathways)

Distance (m)

Direction 6374

N	1.0E-05
NNW	5.4E-06
NW	3.7E-06
WNW	4.8E-06
W	6.1E-06
WSW	1.0E-05
SW	1.8E-05
SSW	2.5E-05
S	3.1E-05
SSE	3.9E-05
SE	5.0E-05
ESE	3.7E-05
E	3.2E-05
ENE	2.7E-05
NE	2.7E-05

NNE 2.1E-05

Tue Sep 15 10:56:51 2020

SUMMARY
Page 6

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

Distance (m)

Direction 6374

N	6.3E-12
NNW	3.4E-12
NW	2.3E-12
WNW	3.0E-12
W	3.8E-12
WSW	6.2E-12
SW	1.1E-11
SSW	1.6E-11
S	1.9E-11
SSE	2.4E-11
SE	3.1E-11
ESE	2.3E-11
E	2.0E-11
ENE	1.7E-11
NE	1.7E-11
NNE	1.3E-11

Dose Assessment Using Cap88	No: EPC-ES-TP-501	Page 17 of 17
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ATTACHMENT 4 – REVIEW CHECKLIST FOR CAP88 OUTPUT

Page 1 of 1

Scenario 8 - WETF to Ponderosa Campground,
5-year average wind

FTWC Transport Venting

Case: WETF Loading Dock (small blower) Output Name: WETF Ldg Dock

Preparer review checklist for CAP88 Output

Initials: RRL

EPA test case data OK?

(Y) / N

Individual location correct?

(Y) / N

Individual dose correct?

(Y) / N

Radionuclides correct?

(Y) / N

Number of Curies correct?

(Y) / N

Release site parameters correct?

(Y) / N

Population data correct?

Y / N / (NA)

Meteorological data correct?

(Y) / N

Met File: TAG-0711.WUD

Modifications OK?

Y / N / (NA)

Forward this checklist and the output to the technical reviewer.

Technical reviewer checklist for CAP88 Output

Initials: [Signature]

Preparer reviewed, signed, and dated?

(Y) / N

Individual location correct?

(Y) / N

Individual dose correct?

(Y) / N

Radionuclides correct?

(Y) / N

Number of Curies correct?

(Y) / N

Release site parameters correct?

(Y) / N

Other reviews or notes:

Forward this checklist and output to the Rad-NESHAP Team leader.

Approver checklist for CAP88 Output

Initials: [Signature]

Technical review signed and date?

(Y) / N

Sign and date document?

(Y) / N

Document OK to forward to Records?

(Y) / N

Other reviews or notes:

Forward this checklist and the output to the records coordinator.

[Signature] 2/23/2020

C A P 8 8 - P C

Version 4.0

Clean Air Act Assessment Package - 1988

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

Non-Radon Individual Assessment
Wed Jan 08 16:04:52 2020

Facility: WETF Loading Dock
Address: TA 16
Bldg 205
City: Los Alamos
State: NM Zip: NM

Source Category: Stack
Source Type: Stack
Emission Year: 2019
DOSE Age Group: Adult

Comments: FTWC Venting Operation 2020. 5-Year Met Average
Small blower stack release to Ponderosa Campground

Committed Effective Dose Equivalent
(mrem)

5.22E-04 ✓ ✓

At This Location: 740 Meters South Southwest ✓

Dataset Name: WETF Ldg Dock.

Dataset Date: Jan 8, 2020 04:04 PM

Wind File: C:\Users\219035\Documents\CAP88\Wind Files\TA6_0711.WND ✓

↑
Wed Jan 08 16:04:52 2020

SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 740 Meters South Southwest
Lifetime Fatal Cancer Risk: 4.86E-10

ORGAN DOSE EQUIVALENT SUMMARY (RN-222 Working Level Calculations Excluded)

Organ	Dose Equivalent (mrem)
Adrenal	4.97E-04
UB_Wall	4.97E-04
Bone_Sur	4.97E-04
Brain	4.97E-04
Breasts	4.97E-04
St_Wall	6.61E-04
SI_Wall	5.00E-04
ULI_Wall	5.20E-04
LLI_Wall	5.70E-04
Kidneys	4.97E-04
Liver	4.97E-04
Muscle	4.97E-04
Ovaries	4.97E-04
Pancreas	4.97E-04
R_Marrow	4.97E-04
Skin	4.97E-04
Spleen	4.97E-04
Testes	4.97E-04
Thymus	4.97E-04
Thyroid	4.97E-04
GB_Wall	4.97E-04
Ht_Wall	4.97E-04
Uterus	4.97E-04
ET_Reg	4.97E-04
Lung_66	4.97E-04
Effectiv	5.22E-04

RADIONUCLIDE EMISSIONS DURING THE YEAR 2019

Source

Nuclide	Type	Size	#1 Ci/y	TOTAL Ci/y
H-3	✓ V	0.000	1.0E+00	1.0E+00

SITE INFORMATION

Temperature: ✓ 9.000 degrees C
 Precipitation: ✓ 45.000 cm/y
 Humidity: ✓ 5.500 g/cu m
 Mixing Height: ✓ 1600.0 m

User specified location of max exposed individual.
 (ILOC, JLOC): SSW, 740 meters

Wed Jan 08 16:04:52 2020

SYNOPSIS
 Page 2

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 2.00 ✓
 Diameter (m): 0.25 ✓

Plume Rise
 Momentum (m/s): 7.01 ✓
 (Exit Velocity)

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	1.0000 ✓	1.0000 ✓	1.0000 ✓
Fraction From Assessment Area:	0.0000	0.0000	0.0000
Fraction Imported:	0.0000	0.0000	0.0000

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

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

740

DOSE AND RISK SUMMARIES

Non-Radon Individual Assessment

Wed Jan 08 16:04:52 2020

Facility: WETF Loading Dock
Address: TA 16
Bldg 205
City: Los Alamos
State: NM Zip: NM

Source Category: Stack
Source Type: Stack
Emission Year: 2019
DOSE Age Group: Adult

Comments: FTWC Venting Operation 2020. 5-Year Met Average
Small blower stack release to Ponderosa Campground

Dataset Name: WETF Ldg Dock.
Dataset Date: Jan 8, 2020 04:04 PM
Wind File: C:\Users\219035\Documents\CAP88\Wind Files\TA6_0711.WND

Wed Jan 08 16:04:52 2020

SUMMARY

Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem)
Adrenal	4.97E-04
UB_Wall	4.97E-04
Bone_Sur	4.97E-04
Brain	4.97E-04
Breasts	4.97E-04
St_Wall	6.61E-04
SI_Wall	5.00E-04
ULI_Wall	5.20E-04

LLI_Wall	5.70E-04
Kidneys	4.97E-04
Liver	4.97E-04
Muscle	4.97E-04
Ovaries	4.97E-04
Pancreas	4.97E-04
R_Marrow	4.97E-04
Skin	4.97E-04
Spleen	4.97E-04
Testes	4.97E-04
Thymus	4.97E-04
Thyroid	4.97E-04
GB_Wall	4.97E-04
Ht_Wall	4.97E-04
Uterus	4.97E-04
ET_Reg	4.97E-04
Lung_66	4.97E-04
Effectiv	5.22E-04

PATHWAY COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem)
INGESTION	4.83E-04
INHALATION	3.97E-05
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	5.22E-04
EXTERNAL	0.00E+00
TOTAL	5.22E-04

Wed Jan 08 16:04:52 2020

SUMMARY
Page 2

NUCLIDE COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem)

H-3 ✓	5.22E-04
TOTAL	5.22E-04 ✓

↑
Wed Jan 08 16:04:52 2020

SUMMARY
Page 3

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
_____	_____

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
_____	_____
INGESTION	4.80E-10
INHALATION	5.87E-12
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	4.86E-10
EXTERNAL	0.00E+00
TOTAL	4.86E-10

↑
Wed Jan 08 16:04:52 2020

SUMMARY
Page 4

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
_____	_____

H-3 4.86E-10

TOTAL 4.86E-10

↑
Wed Jan 08 16:04:52 2020

SUMMARY
Page 5

INDIVIDUAL COMMITTED EFFECTIVE DOSE EQUIVALENT (mrem)
(All Radionuclides and Pathways)

Distance (m)

Direction 740

N	6.1E-04
NNW	4.4E-04
NW	3.1E-04
WNW	2.7E-04
W	3.2E-04
WSW	3.0E-04
SW	3.6E-04
SSW	5.2E-04
S	7.0E-04
SSE	8.7E-04
SSE	1.1E-03
ESE	1.0E-03
E	1.1E-03
ENE	1.2E-03
NE	9.5E-04
NNE	7.4E-04

↑
Wed Jan 08 16:04:52 2020

SUMMARY
Page 6

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

Distance (m)

Direction 740

N	5.7E-10
NNW	4.1E-10
NW	2.9E-10
WNW	2.5E-10
W	3.0E-10
WSW	2.8E-10
SW	3.3E-10
SSW	4.9E-10
S	6.5E-10
SSE	8.1E-10
SSE	1.0E-09
ESE	9.5E-10
E	1.0E-09
ENE	1.1E-09
NE	8.9E-10
NNE	6.9E-10

Dose Assessment Using Cap88	No: EPC-ES-TP-501	Page 17 of 17
	Revision: 11	Effective Date: 10/25/2018

ATTACHMENT 4 – REVIEW CHECKLIST FOR CAP88 OUTPUT

Page 1 of 1

Scenario 9 - WETF to Ponderosa Campground,
worst-case wind

FTWC Transport Venting

Case: *WETF Loading Dock Worst Case Met* (small blower) Output Name: *WETF Ldg Dock Worst Met*

Preparer review checklist for CAP88 Output

Initials: *RRL*

EPA test case data OK?

(Y) N

Individual location correct?

(Y) N

Individual dose correct?

(Y) N

Radionuclides correct?

(Y) N

Number of Curies correct?

(Y) N

Release site parameters correct?

(Y) N

Population data correct?

Y / N / *(NA)*

Meteorological data correct?

(Y) N Met File: *6DF10219.WND*

Modifications OK?

Y / N / *(NA)*

Forward this checklist and the output to the technical reviewer.

Technical reviewer checklist for CAP88 Output

Initials: *[Signature]*

Preparer reviewed, signed, and dated?

(Y) N

Individual location correct?

(Y) N

Individual dose correct?

(Y) N

Radionuclides correct?

(Y) N

Number of Curies correct?

(Y) N

Release site parameters correct?

(Y) N

Other reviews or notes:

Forward this checklist and output to the Rad-NESHAP Team leader.

Approver checklist for CAP88 Output

Initials: *[Signature]*

Technical review signed and date?

(Y) N

Sign and date document?

(Y) N

Document OK to forward to Records?

(Y) N

Other reviews or notes:

Forward this checklist and the output to the records coordinator.

[Signature] 2/23/2017

C A P 8 8 - P C

Version 4.0

Clean Air Act Assessment Package - 1988

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

Non-Radon Individual Assessment

Mon Jan 13 15:47:11 2020

Facility: WETF Loading Dock
Address: TA 16
Bldg 205
City: Los Alamos
State: NM Zip: NM

Source Category: Stack
Source Type: Stack
Emission Year: 2019
DOSE Age Group: Adult

Comments: FTWC Venting Operation 2020. Worst Met
Small blower stack release to Ponderosa Campground

Committed Effective Dose Equivalent
(mrem)

5.09E-03

At This Location: 740 Meters South Southwest

Dataset Name: WETFLdgDockWorst
Dataset Date: Jan 13, 2020 03:47 PM
Wind File: C:\Users\219035\Documents\CAP88\Wind Files\6DF10219.WND

Mon Jan 13 15:47:11 2020

SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 740 Meters South Southwest
Lifetime Fatal Cancer Risk: 4.74E-09

ORGAN DOSE EQUIVALENT SUMMARY (RN-222 Working Level Calculations Excluded)

Organ	Dose Equivalent (mrem)
Adrenal	4.85E-03
UB_Wall	4.85E-03
Bone_Sur	4.85E-03
Brain	4.85E-03
Breasts	4.85E-03
St_Wall	6.44E-03
SI_Wall	4.87E-03
ULI_Wall	5.07E-03
LLI_Wall	5.56E-03
Kidneys	4.85E-03
Liver	4.85E-03
Muscle	4.85E-03
Ovaries	4.85E-03
Pancreas	4.85E-03
R_Marrow	4.85E-03
Skin	4.85E-03
Spleen	4.85E-03
Testes	4.85E-03
Thymus	4.85E-03
Thyroid	4.85E-03
GB_Wall	4.85E-03
Ht_Wall	4.85E-03
Uterus	4.85E-03
ET_Reg	4.85E-03
Lung_66	4.85E-03
Effectiv	5.09E-03

RADIONUCLIDE EMISSIONS DURING THE YEAR 2019

Source

Nuclide	Type	Size	#1 Ci/y	TOTAL Ci/y
H-3	✓ V	0.000	1.0E+00	✓ 1.0E+00

SITE INFORMATION

Temperature: ✓ 9.000 degrees C
 Precipitation: ✓ 45.000 cm/y
 Humidity: ✓ 5.500 g/cu m
 Mixing Height: ✓ 460.0 m

User specified location of max exposed individual.
 (ILOC, JLOC): SSW, 740 meters

↑
 Mon Jan 13 15:47:11 2020

SYNOPSIS
 Page 2

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 2.00 ✓
 Diameter (m): 0.25 ✓

Plume Rise
 Momentum (m/s): 7.01 ✓
 (Exit Velocity)

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	1.0000 ✓	1.0000 ✓	1.0000 ✓
Fraction From Assessment Area:	0.0000	0.0000	0.0000
Fraction Imported:	0.0000	0.0000	0.0000

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

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

740

DOSE AND RISK SUMMARIES

Non-Radon Individual Assessment

Mon Jan 13 15:47:11 2020

Facility: WETF Loading Dock
Address: TA 16
Bldg 205
City: Los Alamos
State: NM Zip: NM

Source Category: Stack
Source Type: Stack
Emission Year: 2019
DOSE Age Group: Adult

Comments: FTWC Venting Operation 2020. Worst Met
Small blower stack release to Ponderosa Campground

Dataset Name: WETFLdgDockWorst
Dataset Date: Jan 13, 2020 03:47 PM
Wind File: C:\Users\219035\Documents\CAP88\Wind Files\6DF10219.WND

↑
Mon Jan 13 15:47:11 2020

SUMMARY
Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem)
Adrenal	4.85E-03
UB_Wall	4.85E-03
Bone_Sur	4.85E-03
Brain	4.85E-03
Breasts	4.85E-03
St_Wall	6.44E-03
SI_Wall	4.87E-03
ULI_Wall	5.07E-03

LLI_Wall	5.56E-03
Kidneys	4.85E-03
Liver	4.85E-03
Muscle	4.85E-03
Ovaries	4.85E-03
Pancreas	4.85E-03
R_Marrow	4.85E-03
Skin	4.85E-03
Spleen	4.85E-03
Testes	4.85E-03
Thymus	4.85E-03
Thyroid	4.85E-03
GB_Wall	4.85E-03
Ht_Wall	4.85E-03
Uterus	4.85E-03
ET_Reg	4.85E-03
Lung_66	4.85E-03
Effectiv	5.09E-03

PATHWAY COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem)
INGESTION	4.71E-03
INHALATION	3.87E-04
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	5.09E-03
EXTERNAL	0.00E+00
TOTAL	5.09E-03

Mon Jan 13 15:47:11 2020

SUMMARY
Page 2

NUCLIDE COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem)
---------	----------------------------------

H-3 ✓

5.09E-03

TOTAL

5.09E-03 ✓

Mon Jan 13 15:47:11 2020

SUMMARY

Page 3

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
--------	--

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
---------	--

INGESTION	4.68E-09
INHALATION	5.72E-11
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	4.74E-09
EXTERNAL	0.00E+00

TOTAL	4.74E-09
-------	----------

Mon Jan 13 15:47:11 2020

SUMMARY

Page 4

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
---------	--

H-3 4.74E-09

TOTAL 4.74E-09

Mon Jan 13 15:47:11 2020

SUMMARY
Page 5

INDIVIDUAL COMMITTED EFFECTIVE DOSE EQUIVALENT (mrem)
(All Radionuclides and Pathways)

Distance (m)

Direction 740

N	0.0E+00
NNW	0.0E+00
NW	0.0E+00
WNW	0.0E+00
W	0.0E+00
WSW	0.0E+00
SW	4.6E-04
SSW	5.1E-03
S	1.1E-03
SSE	0.0E+00
SSE	0.0E+00
ESE	0.0E+00
E	0.0E+00
ENE	0.0E+00
NE	0.0E+00
NNE	0.0E+00

Mon Jan 13 15:47:11 2020

SUMMARY
Page 6

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

Distance (m)

Direction 740

N	0.0E+00
NNW	0.0E+00
NW	0.0E+00
WNW	0.0E+00
W	0.0E+00
WSW	0.0E+00
SW	4.3E-10
SSW	4.7E-09
S	1.0E-09
SSE	0.0E+00
SSE	0.0E+00
ESE	0.0E+00
E	0.0E+00
ENE	0.0E+00
NE	0.0E+00
NNE	0.0E+00

Dose Assessment Using Cap88	No: EPC-ES-TP-501	Page 17 of 17
	Revision: 11	Effective Date: 10/25/2018

ATTACHMENT 4 – REVIEW CHECKLIST FOR CAP88 OUTPUT

Page 1 of 1

Scenario 10 - WETF to White Rock MEI,
5-year average wind

<p>Case: FTWC: WETF to WR church 5-y avg annual TA-6 met</p> <p>Preparer review checklist for CAP88 Output</p> <p>EPA test case data OK? ☒ Y / N</p> <p>Individual location correct? ☒ Y / N</p> <p>Individual dose correct? ☒ Y / N</p> <p>Radionuclides correct? ☒ Y / N</p> <p>Number of Curies correct? ☒ Y / N</p> <p>Release site parameters correct? ☒ Y / N</p> <p>Population data correct? ☐ Y / N / NA ☒</p> <p>Meteorological data correct? ☒ Y / N</p> <p>Modifications OK? ☐ Y / N / NA ☒</p> <p>Forward this checklist and the output to the technical reviewer.</p>	<p>Output Name: v41 WETF to WRchurch annual</p> <p>Initials: <u>Dave Fuehne 9/14/2020</u></p> <div style="border: 1px solid red; padding: 5px; margin: 10px 0;"> <p>Checkbox indicates "Yes" or "N/A" - enter other comments in notes fields below.</p> </div> <p>Met File: <u>ta6_0711.wnd</u></p> <div style="text-align: right;"> <p><i>David Fuehne</i> Digitally signed by DAVID FUEHNE (Affiliate) Date: 2020.09.14 12:36:03 -06'00'</p> </div>
<p>Technical reviewer checklist for CAP88 Output</p> <p>Preparer reviewed, signed, and dated? ☒ Y / N</p> <p>Individual location correct? ☒ Y / N</p> <p>Individual dose correct? ☒ Y / N</p> <p>Radionuclides correct? ☒ Y / N</p> <p>Number of Curies correct? ☒ Y / N</p> <p>Release site parameters correct? ☒ Y / N</p> <p>Other reviews or notes:</p> <p>Forward this checklist and output to the Rad-NESHAP Team leader.</p>	<p>Initials: <u>RRL 9/14/2020</u></p> <div style="text-align: right;"> <p>REBECCA LATTIN (Affiliate) Digitally signed by REBECCA LATTIN (Affiliate) Date: 2020.09.14 13:22:22 -06'00'</p> </div>
<p>Approver checklist for CAP88 Output</p> <p>Technical review signed and date? ☒ Y / N</p> <p>Sign and date document? ☒ Y / N</p> <p>Document OK to forward to Records? ☒ Y / N</p> <p>Other reviews or notes:</p> <p>Forward this checklist and the output to the records coordinator.</p>	<p>Initials: <u>Dave Fuehne 9/14/2020</u></p> <div style="text-align: right;"> <p><i>David Fuehne</i> Digitally signed by DAVID FUEHNE (Affiliate) Date: 2020.09.14 17:17:11 -06'00'</p> </div>

Notes or comments:

using CAP88 v4.1.

Part of multi-vent-site analysis. This run is venting from WETF to White Rock (MEI for Area G).

C A P 8 8 - P C

Version 4.1

Clean Air Act Assessment Package - 1988

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

Non-Radon Individual Assessment
Mon Sep 14 11:52:56 2020

Facility: WETF Loading Dock
Address: TA-16
Bldg 205
City: Los Alamos
State: NM Zip: 87545

Source Category: Stack
Source Type: Stack
Emission Year: 2020
DOSE Age Group: Adult

Comments: WETF FTWC Venting to Nazarene Church
5-Year annual Average Met;

Effective Dose Equivalent
(mrem)

1.59E-05

At This Location: 12120 Meters East

Dataset Name: v41_WETF_to_WRch
Dataset Date: Sep 14, 2020 11:52 AM
Wind File: C:\Users\115862\Documents\CAP88\Wind Files\2007 - 2011

full path in SUM file coversheet
(later in PDF)

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 12120 Meters East
 Lifetime Fatal Cancer Risk: 9.90E-12

ORGAN DOSE EQUIVALENT SUMMARY
 (RN-222 Working Level Calculations Excluded)

Organ	Dose Equivalent (mrem)
Adrenals	1.51E-05
UB_Wall	1.51E-05
Bone_Sur	1.51E-05
Brain	1.51E-05
Breasts	1.51E-05
St_Wall	2.02E-05
SI_Wall	1.53E-05
ULI_Wall	1.59E-05
LLI_Wall	1.74E-05
Kidneys	1.51E-05
Liver	1.51E-05
Muscle	1.51E-05
Ovaries	1.51E-05
Pancreas	1.51E-05
R_Marrow	1.51E-05
Skin	1.51E-05
Spleen	1.51E-05
Testes	1.51E-05
Thymus	1.51E-05
Thyroid	1.51E-05
GB_Wall	1.51E-05
Ht_Wall	1.51E-05
Uterus	1.51E-05
ET_Reg	1.51E-05
Lung	1.51E-05
Effectiv	1.59E-05

RADIONUCLIDE EMISSIONS DURING THE YEAR 2020

Source	
#1	TOTAL

Nuclide	Type	Size	Ci/y	Ci/y
H-3	V	0.000	1.0E+00	1.0E+00

SITE INFORMATION

Temperature: 9.000 degrees C
Precipitation: 45.000 cm/y
Humidity: 5.500 g/cu m
Mixing Height: 1600.0 m

User specified location of max exposed individual.
(ILOC, JLOC): E ,12120 meters

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 2.00
Diameter (m): 0.25

Plume Rise
Momentum (m/s): 7.01
(Exit Velocity)

ADJUSTED AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	1.0000	1.0000	1.0000
Fraction From Assessment Area:	0.0000	0.0000	0.0000
Fraction Imported:	0.0000	0.0000	0.0000

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

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

12120

D O S E A N D R I S K S U M M A R I E S

Non-Radon Individual Assessment
Mon Sep 14 11:52:56 2020

Facility: WETF Loading Dock
Address: TA-16
 Bldg 205
City: Los Alamos
State: NM Zip: 87545

Source Category: Stack
Source Type: Stack
Emission Year: 2020
DOSE Age Group: Adult

Comments: WETF FTWC Venting to Nazarene Church
5-Year annual Average Met;

Dataset Name: v41_WETF_to_WRch
Dataset Date: Sep 14, 2020 11:52 AM
Wind File: C:\Users\115862\Documents\CAP88\Wind Files\2007 -
2011 Avg Files\TA6_0711.WND

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem)
Adrenals	1.51E-05
UB_Wall	1.51E-05
Bone_Sur	1.51E-05
Brain	1.51E-05
Breasts	1.51E-05
St_Wall	2.02E-05
SI_Wall	1.53E-05
ULI_Wall	1.59E-05
LLI_Wall	1.74E-05
Kidneys	1.51E-05
Liver	1.51E-05
Muscle	1.51E-05
Ovaries	1.51E-05
Pancreas	1.51E-05
R_Marrow	1.51E-05
Skin	1.51E-05
Spleen	1.51E-05
Testes	1.51E-05
Thymus	1.51E-05
Thyroid	1.51E-05
GB_Wall	1.51E-05
Ht_Wall	1.51E-05
Uterus	1.51E-05
ET_Reg	1.51E-05
Lung	1.51E-05
Effectiv	1.59E-05

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem)
INGESTION	1.47E-05
INHALATION	1.21E-06
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00

INTERNAL	1.59E-05
EXTERNAL	0.00E+00
TOTAL	1.59E-05

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem)
H-3	1.59E-05
TOTAL	1.59E-05

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
Esophagu	1.83E-13
Stomach	9.63E-13
Colon	1.94E-12
Liver	2.58E-13
LUNG	1.57E-12
Bone	1.56E-14
Skin	1.66E-14
Breast	7.37E-13
Ovary	2.09E-13
Bladder	4.13E-13
Kidneys	8.87E-14
Thyroid	5.12E-14
Leukemia	9.46E-13
Residual	2.51E-12
Total	9.90E-12
TOTAL	9.90E-12

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	9.21E-12
INHALATION	6.87E-13
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	9.90E-12
EXTERNAL	0.00E+00
TOTAL	9.90E-12

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
H-3	9.90E-12
TOTAL	9.90E-12

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT (mrem)
(All Radionuclides and Pathways)

Distance (m)

Direction 12120

N	7.7E-06
NNW	5.3E-06
NW	3.6E-06
WNW	3.2E-06
W	3.7E-06
WSW	3.6E-06
SW	4.6E-06
SSW	7.2E-06
S	1.0E-05
SSE	1.3E-05
SE	1.6E-05
ESE	1.5E-05
E	1.6E-05
ENE	1.7E-05
NE	1.4E-05
NNE	9.8E-06

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

Distance (m)

Direction 12120

N	4.8E-12
NNW	3.3E-12
NW	2.2E-12
WNW	2.0E-12
W	2.3E-12
WSW	2.2E-12
SW	2.9E-12
SSW	4.5E-12
S	6.3E-12
SSE	7.9E-12
SE	1.0E-11
ESE	9.2E-12
E	9.9E-12
ENE	1.0E-11
NE	8.4E-12
NNE	6.1E-12

Dose Assessment Using Cap88	No: EPC-ES-TP-501	Page 17 of 17
	Revision: 11	Effective Date: 10/25/2018

ATTACHMENT 4 – REVIEW CHECKLIST FOR CAP88 OUTPUT

Page 1 of 1 Scenario 11 - Area G to Totavi Gas Station,
5-year average wind

Case: FTWC Area G to Totavi Gas		Output Name: TotaviGasStation	
<div style="display: flex; justify-content: space-between;"> <div> <p style="color: red;">Station; Average Met</p> <p>Preparer review checklist for CAP88 Output</p> <p>EPA test case data OK? ☒ Y / N</p> <p>Individual location correct? ☒ Y / N</p> <p>Individual dose correct? ☒ Y / N</p> <p>Radionuclides correct? ☒ Y / N</p> <p>Number of Curies correct? ☒ Y / N</p> <p>Release site parameters correct? ☒ Y / N</p> <p>Population data correct? ☐ Y / N / NA ☒</p> <p>Meteorological data correct? ☒ Y / N</p> <p>Modifications OK? ☐ Y / N / NA ☒</p> <p>Forward this checklist and the output to the technical reviewer.</p> </div> <div> <p>Initials: <u>RRL 9/14/2020</u></p> <div style="border: 1px solid red; padding: 5px; margin-top: 10px;"> <p style="color: red; font-size: small;">Checkbox indicates "Yes" or "N/A" - enter other comments in notes fields below.</p> </div> <p>Met File: <u>TA540711.wnd</u></p> <p>REBECCA LATTIN (Affiliate)</p> <p style="font-size: x-small;">Digitally signed by REBECCA LATTIN (Affiliate) Date: 2020.09.14 15:21:48 -06'00'</p> </div> </div>			
<div style="display: flex; justify-content: space-between;"> <div> <p>Technical reviewer checklist for CAP88 Output</p> <p>Preparer reviewed, signed, and dated? ☒ Y / N</p> <p>Individual location correct? ☒ Y / N</p> <p>Individual dose correct? ☒ Y / N</p> <p>Radionuclides correct? ☒ Y / N</p> <p>Number of Curies correct? ☒ Y / N</p> <p>Release site parameters correct? ☒ Y / N</p> <p>Other reviews or notes:</p> <p>Forward this checklist and output to the Rad-NESHAP Team leader.</p> </div> <div> <p>Initials: <u>Dave Fuehne 9/14/2020</u></p> <p style="text-align: right;"><i>David P Fuehne</i></p> <p style="font-size: x-small;">Digitally signed by DAVID FUEHNE (Affiliate) Date: 2020.09.14 17:08:11 -06'00'</p> </div> </div>			
<div style="display: flex; justify-content: space-between;"> <div> <p>Approver checklist for CAP88 Output</p> <p>Technical review signed and date? ☒ Y / N</p> <p>Sign and date document? ☒ Y / N</p> <p>Document OK to forward to Records? ☒ Y / N</p> <p>Other reviews or notes:</p> <p>Forward this checklist and the output to the records coordinator.</p> </div> <div> <p>Initials: <u>Dave Fuehne 9/14/2020</u></p> <p style="text-align: right;"><i>David P Fuehne</i></p> <p style="font-size: x-small;">Digitally signed by DAVID FUEHNE (Affiliate) Date: 2020.09.14 17:08:52 -06'00'</p> </div> </div>			

Notes or comments:

Evaluating FTWC emissions from Area G to the Totavi gas station, NM-502 between

Los Alamos and Pojoaque.

C A P 8 8 - P C

Version 4.1

Clean Air Act Assessment Package - 1988

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

Non-Radon Individual Assessment

Mon Sep 14 15:02:52 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Stack
Source Type: Stack
Emission Year: 2020
DOSE Age Group: Adult

Comments: FTWC emissions thru vent stack
To Totavi gas station; bounding case

Effective Dose Equivalent
(mrem)

2.13E-05

At This Location: 7622 Meters Northeast

Dataset Name: TotaviGasStation
Dataset Date: Sep 14, 2020 03:02 PM
Wind File: C:\Users\219035\Documents\CAP88\Wind Files\TA540711.WND

Mon Sep 14 15:02:52 2020

SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 7622 Meters Northeast
Lifetime Fatal Cancer Risk: 1.33E-11

ORGAN DOSE EQUIVALENT SUMMARY (RN-222 Working Level Calculations Excluded)

Organ	Dose Equivalent (mrem)
Adrenals	2.03E-05
UB_Wall	2.03E-05
Bone_Sur	2.03E-05
Brain	2.03E-05
Breasts	2.03E-05
St_Wall	2.71E-05
SI_Wall	2.05E-05
ULI_Wall	2.13E-05
LLI_Wall	2.33E-05
Kidneys	2.03E-05
Liver	2.03E-05
Muscle	2.03E-05
Ovaries	2.03E-05
Pancreas	2.03E-05
R_Marrow	2.03E-05
Skin	2.03E-05
Spleen	2.03E-05
Testes	2.03E-05
Thymus	2.03E-05
Thyroid	2.03E-05
GB_Wall	2.03E-05
Ht_Wall	2.03E-05
Uterus	2.03E-05
ET_Reg	2.03E-05
Lung	2.03E-05
Effectiv	2.13E-05

RADIONUCLIDE EMISSIONS DURING THE YEAR 2020

Source

Nuclide	Type	Size	#1 Ci/y	TOTAL Ci/y
H-3	V	0.000	1.0E+00	1.0E+00

SITE INFORMATION

Temperature: 9.000 degrees C
 Precipitation: 45.000 cm/y
 Humidity: 5.500 g/cu m
 Mixing Height: 1600.0 m

User specified location of max exposed individual.
 (ILOC, JLOC): NE , 7622 meters

Mon Sep 14 15:02:52 2020

SYNOPSIS
 Page 2

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 2.00
 Diameter (m): 0.25

Plume Rise
 Momentum (m/s): 13.75
 (Exit Velocity)

ADJUSTED AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	1.0000	1.0000	1.0000
Fraction From Assessment Area:	0.0000	0.0000	0.0000
Fraction Imported:	0.0000	0.0000	0.0000

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

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

7622

D O S E A N D R I S K S U M M A R I E S

Non-Radon Individual Assessment
Mon Sep 14 15:02:52 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Stack
Source Type: Stack
Emission Year: 2020
DOSE Age Group: Adult

Comments: FTWC emissions thru vent stack
To Totavi gas station; bounding case

Dataset Name: TotaviGasStation
Dataset Date: Sep 14, 2020 03:02 PM
Wind File: C:\Users\219035\Documents\CAP88\Wind Files\TA540711.WND

Mon Sep 14 15:02:52 2020

SUMMARY
Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem)
Adrenals	2.03E-05
UB_Wall	2.03E-05
Bone_Sur	2.03E-05
Brain	2.03E-05
Breasts	2.03E-05
St_Wall	2.71E-05
SI_Wall	2.05E-05
ULI_Wall	2.13E-05

LLI_Wall	2.33E-05
Kidneys	2.03E-05
Liver	2.03E-05
Muscle	2.03E-05
Ovaries	2.03E-05
Pancreas	2.03E-05
R_Marrow	2.03E-05
Skin	2.03E-05
Spleen	2.03E-05
Testes	2.03E-05
Thymus	2.03E-05
Thyroid	2.03E-05
GB_Wall	2.03E-05
Ht_Wall	2.03E-05
Uterus	2.03E-05
ET_Reg	2.03E-05
Lung	2.03E-05
Effectiv	2.13E-05

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem)
INGESTION	1.97E-05
INHALATION	1.62E-06
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	2.13E-05
EXTERNAL	0.00E+00
TOTAL	2.13E-05

Mon Sep 14 15:02:52 2020

SUMMARY
Page 2

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem)

H-3 2.13E-05

TOTAL 2.13E-05

Mon Sep 14 15:02:52 2020

SUMMARY
Page 3

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
Esophagu	2.46E-13
Stomach	1.29E-12
Colon	2.60E-12
Liver	3.46E-13
LUNG	2.10E-12
Bone	2.10E-14
Skin	2.23E-14
Breast	9.89E-13
Ovary	2.80E-13
Bladder	5.55E-13
Kidneys	1.19E-13
Thyroid	6.87E-14
Leukemia	1.27E-12
Residual	3.37E-12
Total	1.33E-11
TOTAL	1.33E-11

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	1.24E-11
INHALATION	9.22E-13
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00

INTERNAL	1.33E-11
EXTERNAL	0.00E+00
TOTAL	1.33E-11

Mon Sep 14 15:02:52 2020

SUMMARY
Page 4

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
H-3	1.33E-11
TOTAL	1.33E-11

Mon Sep 14 15:02:52 2020

SUMMARY
Page 5

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT (mrem) (All Radionuclides and Pathways)

Distance (m)

Direction 7622

N	7.8E-06
NNW	4.2E-06
NW	2.9E-06
WNW	3.7E-06
W	4.7E-06
WSW	7.7E-06
SW	1.4E-05
SSW	2.0E-05
S	2.4E-05
SSE	3.0E-05
SE	3.9E-05
ESE	2.9E-05
E	2.5E-05
ENE	2.1E-05
NE	2.1E-05

NNE 1.6E-05

Mon Sep 14 15:02:52 2020

SUMMARY
Page 6

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

Distance (m)

Direction 7622

N	4.9E-12
NNW	2.6E-12
NW	1.8E-12
WNW	2.3E-12
W	2.9E-12
WSW	4.8E-12
SW	8.6E-12
SSW	1.2E-11
S	1.5E-11
SSE	1.9E-11
SE	2.5E-11
ESE	1.8E-11
E	1.6E-11
ENE	1.3E-11
NE	1.3E-11
NNE	1.0E-11

Dose Assessment Using Cap88	No: EPC-ES-TP-501	Page 17 of 17
	Revision: 11	Effective Date: 10/25/2018

ATTACHMENT 4 – REVIEW CHECKLIST FOR CAP88 OUTPUT

Page 1 of 1

Scenario 12 - Area G to San Ildefonso Village
(Ainet Station 294). 5-year Average Met

Case: **FTWC to San Ildefonso Village/Community Area** Output Name: **FTWC_SanI_Village.dat .syn .sum**

Preparer review checklist for CAP88 Output

Initials: DPF

EPA test case data OK? **yes** Y / N **Run 4/2/2020 on laptop**
 Individual location correct? **yes** Y / N
 Individual dose correct? **yes** Y / N
 Radionuclides correct? **yes** Y / N
 Number of Curies correct? **yes** Y / N
 Release site parameters correct? **yes** Y / N
 Population data correct? **yes** Y / N / NA
 Meteorological data correct? **yes** Y / N Met File: ta540711.wnd
 Modifications OK? **n/a** Y / N / NA

Forward this checklist and the output to the technical reviewer.

David P. Fehne

Digitally signed by DAVID
FUEHNE (Affiliate)

Date: 2020.04.06 14:10:47 -06'00'

Technical reviewer checklist for CAP88 Output

Initials: RRL 4/6/2020

Preparer reviewed, signed, and dated? **Yes** Y / N
 Individual location correct? **Yes** Y / N
 Individual dose correct? **Yes** Y / N
 Radionuclides correct? **Yes** Y / N
 Number of Curies correct? **Yes** Y / N
 Release site parameters correct? **Yes** Y / N

Other reviews or notes:

Forward this checklist and output to the Rad-NESHAP Team leader.

REBECCA

LATTIN (Affiliate)

Digitally signed by REBECCA
LATTIN (Affiliate)

Date: 2020.04.06 14:58:10
-06'00'

Approver checklist for CAP88 Output

Initials: DPF

Technical review signed and date?
 Sign and date document?
 Document OK to forward to Records?
 Other reviews or notes:

Y / N

Y / N

Y / N

DPF

4/7/2020

Forward this checklist and the output to the records coordinator.

C A P 8 8 - P C

Version 4.0

Clean Air Act Assessment Package - 1988

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

Non-Radon Individual Assessment
Fri Apr 03 19:11:26 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Area
Source Type: Stack
Emission Year: 2017
DOSE Age Group: Adult

Comments: FTWC emissions thru vent stack
To San Ildefonso village area Airnet station 294

Committed Effective Dose Equivalent
(mrem)

1.17E-05

At This Location: 12000 Meters East Northeast

Dataset Name: FTWC_SanI_Villag
Dataset Date: Apr 3, 2020 07:11 PM
Wind File: C:\Users\115862\Documents\CAP88\Wind Files\TA540711.WND

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 12000 Meters East Northeast
Lifetime Fatal Cancer Risk: 1.09E-11

ORGAN DOSE EQUIVALENT SUMMARY
(RN-222 Working Level Calculations Excluded)

Organ	Dose Equivalent (mrem)
Adrenal	1.11E-05
UB_Wall	1.11E-05
Bone_Sur	1.11E-05
Brain	1.11E-05
Breasts	1.11E-05
St_Wall	1.48E-05
SI_Wall	1.12E-05
ULI_Wall	1.17E-05
LLI_Wall	1.28E-05
Kidneys	1.11E-05
Liver	1.11E-05
Muscle	1.11E-05
Ovaries	1.11E-05
Pancreas	1.11E-05
R_Marrow	1.11E-05
Skin	1.11E-05
Spleen	1.11E-05
Testes	1.11E-05
Thymus	1.11E-05
Thyroid	1.11E-05
GB_Wall	1.11E-05
Ht_Wall	1.11E-05
Uterus	1.11E-05
ET_Reg	1.11E-05
Lung_66	1.11E-05
Effectiv	1.17E-05

RADIONUCLIDE EMISSIONS DURING THE YEAR 2017

Source
#1 TOTAL

Nuclide	Type	Size	Ci/y	Ci/y
H-3	V	0.000	1.0E+00	1.0E+00

SITE INFORMATION

Temperature: 9.000 degrees C
 Precipitation: 45.000 cm/y
 Humidity: 5.500 g/cu m
 Mixing Height: 1600.0 m

User specified location of max exposed individual.
 (ILOC, JLOC): ENE,12000 meters

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 2.00
Diameter (m): 0.25

Plume Rise
Momentum (m/s): 13.75
(Exit Velocity)

AGRICULTURAL DATA

	Vegetable	Milk	Meat
	<hr/>	<hr/>	<hr/>
Fraction Home Produced:	1.0000	1.0000	1.0000
Fraction From Assessment Area:	0.0000	0.0000	0.0000
Fraction Imported:	0.0000	0.0000	0.0000

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

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

12000

D O S E A N D R I S K S U M M A R I E S

Non-Radon Individual Assessment

Fri Apr 03 19:11:26 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Area
Source Type: Stack
Emission Year: 2017
DOSE Age Group: Adult

Comments: FTWC emissions thru vent stack
To San Ildefonso village area Airnet station 294

Dataset Name: FTWC_SanI_Villag
Dataset Date: Apr 3, 2020 07:11 PM
Wind File: C:\Users\115862\Documents\CAP88\Wind
Files\TA540711.WND

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem)
Adrenal	1.11E-05
UB_Wall	1.11E-05
Bone_Sur	1.11E-05
Brain	1.11E-05
Breasts	1.11E-05
St_Wall	1.48E-05
SI_Wall	1.12E-05
ULI_Wall	1.17E-05
LLI_Wall	1.28E-05
Kidneys	1.11E-05
Liver	1.11E-05
Muscle	1.11E-05
Ovaries	1.11E-05
Pancreas	1.11E-05
R_Marrow	1.11E-05
Skin	1.11E-05
Spleen	1.11E-05
Testes	1.11E-05
Thymus	1.11E-05
Thyroid	1.11E-05
GB_Wall	1.11E-05
Ht_Wall	1.11E-05
Uterus	1.11E-05
ET_Reg	1.11E-05
Lung_66	1.11E-05
Effectiv	1.17E-05

PATHWAY COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem)
INGESTION	1.08E-05
INHALATION	8.90E-07
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00

INTERNAL	1.17E-05
EXTERNAL	0.00E+00
TOTAL	1.17E-05

NUCLIDE COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem)
H-3	1.17E-05
TOTAL	1.17E-05

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
--------	--

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	1.08E-11
INHALATION	1.32E-13
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	1.09E-11
EXTERNAL	0.00E+00
TOTAL	1.09E-11

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
H-3	1.09E-11
TOTAL	1.09E-11

INDIVIDUAL COMMITTED EFFECTIVE DOSE EQUIVALENT (mrem)
(All Radionuclides and Pathways)

Distance (m)

Direction 12000

N	4.1E-06
NNW	2.2E-06
NW	1.5E-06
WNW	2.0E-06
W	2.5E-06
WSW	4.1E-06
SW	7.5E-06
SSW	1.1E-05
S	1.3E-05
SSE	1.7E-05
SSE	2.2E-05
ESE	1.6E-05
E	1.4E-05
ENE	1.2E-05
NE	1.2E-05
NNE	8.6E-06

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

Distance (m)

Direction 12000

N	3.8E-12
NNW	2.1E-12
NW	1.4E-12
WNW	1.8E-12
W	2.3E-12
WSW	3.8E-12
SW	6.9E-12
SSW	1.0E-11
S	1.2E-11
SSE	1.6E-11
SSE	2.1E-11
ESE	1.5E-11
E	1.3E-11
ENE	1.1E-11
NE	1.1E-11
NNE	8.0E-12

Dose Assessment Using Cap88	No: EPC-ES-TP-501	Page 17 of 17
	Revision: 11	Effective Date: 10/25/2018

ATTACHMENT 4 – REVIEW CHECKLIST FOR CAP88 OUTPUT

Page 1 of 1 **Scenario 13 - Area G to Santa Clara Gas Station, 5-year average wind**

Case: Area G FTWC to Santa Clara		Output Name: SantaClaraGasStation	
Gas Station; Average Met			
Preparer review checklist for CAP88 Output		Initials: <u>RRL 9/14/2020</u>	
EPA test case data OK?	☒ Y / N	Checkbox indicates "Yes" or "N/A" - enter other comments in notes fields below.	
Individual location correct?	☒ Y / N		
Individual dose correct?	☒ Y / N		
Radionuclides correct?	☒ Y / N		
Number of Curies correct?	☒ Y / N		
Release site parameters correct?	☒ Y / N		
Population data correct?	☐ Y / N / NA ☒		
Meteorological data correct?	☒ Y / N Met File: <u>TA540711.wnd</u>		
Modifications OK?	☐ Y / N / NA ☒	REBECCA LATTIN (Affiliate) <small>Digitally signed by REBECCA LATTIN (Affiliate) Date: 2020.09.14 15:30:03 -06'00'</small>	
Forward this checklist and the output to the technical reviewer.			
Technical reviewer checklist for CAP88 Output		Initials: <u>D.Fuehne 9/14/2020</u>	
Preparer reviewed, signed, and dated?	☒ Y / N		
Individual location correct?	☒ Y / N		
Individual dose correct?	☒ Y / N		
Radionuclides correct?	☒ Y / N		
Number of Curies correct?	☒ Y / N		
Release site parameters correct?	☒ Y / N		
Other reviews or notes:	<div style="text-align: right;"> <small>Digitally signed by DAVID FUEHNE (Affiliate) Date: 2020.09.14 16:51:33 -06'00'</small> </div>		
Forward this checklist and output to the Rad-NESHAP Team leader.			
Approver checklist for CAP88 Output		Initials: <u>D. Fuehne 9/14/2020</u>	
Technical review signed and date?	☒ Y / N		
Sign and date document?	☒ Y / N		
Document OK to forward to Records?	☒ Y / N		
Other reviews or notes:	<div style="text-align: right;"> <small>Digitally signed by DAVID FUEHNE (Affiliate) Date: 2020.09.14 16:51:50 -06'00'</small> </div>		
Forward this checklist and the output to the records coordinator.			

Notes or comments:

Modeling releases to Santa Clara Travel Center on NM-30; bounding case for Pueblo

C A P 8 8 - P C

Version 4.1

Clean Air Act Assessment Package - 1988

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

Non-Radon Individual Assessment

Mon Sep 14 15:08:37 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Stack
Source Type: Stack
Emission Year: 2020
DOSE Age Group: Adult

Comments: FTWC emissions thru vent stack
To Santa Clara gas station; bounding case

Effective Dose Equivalent
(mrem)

7.65E-06

At This Location: 17062 Meters Northeast

Dataset Name: SantaClaraGasSta
Dataset Date: Sep 14, 2020 03:08 PM
Wind File: C:\Users\219035\Documents\CAP88\Wind Files\TA540711.WND

↑
Mon Sep 14 15:08:37 2020

SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 17062 Meters Northeast
Lifetime Fatal Cancer Risk: 4.76E-12

ORGAN DOSE EQUIVALENT SUMMARY (RN-222 Working Level Calculations Excluded)

Organ	Dose Equivalent (mrem)
Adrenals	7.28E-06
UB_Wall	7.28E-06
Bone_Sur	7.28E-06
Brain	7.28E-06
Breasts	7.28E-06
St_Wall	9.69E-06
SI_Wall	7.34E-06
ULI_Wall	7.64E-06
LLI_Wall	8.35E-06
Kidneys	7.28E-06
Liver	7.28E-06
Muscle	7.28E-06
Ovaries	7.28E-06
Pancreas	7.28E-06
R_Marrow	7.28E-06
Skin	7.28E-06
Spleen	7.28E-06
Testes	7.28E-06
Thymus	7.28E-06
Thyroid	7.28E-06
GB_Wall	7.28E-06
Ht_Wall	7.28E-06
Uterus	7.28E-06
ET_Reg	7.28E-06
Lung	7.28E-06
Effectiv	7.65E-06

RADIONUCLIDE EMISSIONS DURING THE YEAR 2020

Source

Nuclide	Type	Size	#1 Ci/y	TOTAL Ci/y
H-3	V	0.000	1.0E+00	1.0E+00

SITE INFORMATION

Temperature: 9.000 degrees C
 Precipitation: 45.000 cm/y
 Humidity: 5.500 g/cu m
 Mixing Height: 1600.0 m

User specified location of max exposed individual.
 (ILOC, JLOC): NE ,17062 meters

Mon Sep 14 15:08:37 2020

SYNOPSIS

Page 2

SOURCE INFORMATION

Source Number: 1

 Stack Height (m): 2.00
 Diameter (m): 0.25
 Plume Rise
 Momentum (m/s): 13.75
 (Exit Velocity)

ADJUSTED AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	1.0000	1.0000	1.0000
Fraction From Assessment Area:	0.0000	0.0000	0.0000
Fraction Imported:	0.0000	0.0000	0.0000

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

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

17062

D O S E A N D R I S K S U M M A R I E S

Non-Radon Individual Assessment
Mon Sep 14 15:08:37 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Stack
Source Type: Stack
Emission Year: 2020
DOSE Age Group: Adult

Comments: FTWC emissions thru vent stack
To Santa Clara gas station; bounding case

Dataset Name: SantaClaraGasSta
Dataset Date: Sep 14, 2020 03:08 PM
Wind File: C:\Users\219035\Documents\CAP88\Wind Files\TA540711.WND

Mon Sep 14 15:08:37 2020

SUMMARY
Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem)
Adrenals	7.28E-06
UB_Wall	7.28E-06
Bone_Sur	7.28E-06
Brain	7.28E-06
Breasts	7.28E-06
St_Wall	9.69E-06
SI_Wall	7.34E-06
ULI_Wall	7.64E-06

LLI_Wall	8.35E-06
Kidneys	7.28E-06
Liver	7.28E-06
Muscle	7.28E-06
Ovaries	7.28E-06
Pancreas	7.28E-06
R_Marrow	7.28E-06
Skin	7.28E-06
Spleen	7.28E-06
Testes	7.28E-06
Thymus	7.28E-06
Thyroid	7.28E-06
GB_Wall	7.28E-06
Ht_Wall	7.28E-06
Uterus	7.28E-06
ET_Reg	7.28E-06
Lung	7.28E-06
Effectiv	7.65E-06

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem)
INGESTION	7.06E-06
INHALATION	5.82E-07
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	7.65E-06
EXTERNAL	0.00E+00
TOTAL	7.65E-06

Mon Sep 14 15:08:37 2020

SUMMARY
Page 2

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem)

H-3 7.65E-06

TOTAL 7.65E-06

Mon Sep 14 15:08:37 2020

SUMMARY
Page 3

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
Esophagu	8.80E-14
Stomach	4.63E-13
Colon	9.32E-13
Liver	1.24E-13
LUNG	7.53E-13
Bone	7.51E-15
Skin	8.00E-15
Breast	3.54E-13
Ovary	1.00E-13
Bladder	1.99E-13
Kidneys	4.27E-14
Thyroid	2.46E-14
Leukemia	4.55E-13
Residual	1.21E-12
Total	4.76E-12
TOTAL	4.76E-12

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	4.43E-12
INHALATION	3.30E-13
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00

INTERNAL	4.76E-12
EXTERNAL	0.00E+00
TOTAL	4.76E-12

Mon Sep 14 15:08:37 2020

SUMMARY
Page 4

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
H-3	4.76E-12
TOTAL	4.76E-12

Mon Sep 14 15:08:37 2020

SUMMARY
Page 5

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT (mrem) (All Radionuclides and Pathways)

Distance (m)

Direction 17062

N	2.6E-06
NNW	1.4E-06
NW	9.8E-07
WNW	1.3E-06
W	1.6E-06
WSW	2.6E-06
SW	4.8E-06
SSW	7.1E-06
S	8.9E-06
SSE	1.1E-05
SE	1.5E-05
ESE	1.1E-05
E	9.3E-06
ENE	7.7E-06
NE	7.6E-06

NNE 5.5E-06

Mon Sep 14 15:08:37 2020

SUMMARY
Page 6

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

Distance (m)

Direction 17062

N	1.6E-12
NNW	8.8E-13
NW	6.1E-13
WNW	7.9E-13
W	9.9E-13
WSW	1.6E-12
SW	3.0E-12
SSW	4.4E-12
S	5.5E-12
SSE	7.0E-12
SE	9.2E-12
ESE	6.6E-12
E	5.8E-12
ENE	4.8E-12
NE	4.8E-12
NNE	3.4E-12

Dose Assessment Using Cap88	No: EPC-ES-TP-501	Page 17 of 17
	Revision: 11	Effective Date: 10/25/2018

ATTACHMENT 4 – REVIEW CHECKLIST FOR CAP88 OUTPUT

Page 1 of 1

Scenario 14 - Area G to San Felipe Gas Station,
5-year average wind

Case: Area G to San Felipe Gas Station, Avg Met Output Name: SanFelipeGasStation	
Preparer review checklist for CAP88 Output EPA test case data OK? Individual location correct? Individual dose correct? Radionuclides correct? Number of Curies correct? Release site parameters correct? Population data correct? Meteorological data correct? Modifications OK? Forward this checklist and the output to the technical reviewer.	Initials: <u>RRL</u> <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;"> ☒ Y / N ☒ Y / N ☒ Y / N ☒ Y / N ☒ Y / N ☒ Y / N ☒ Y / N / NA ☒ Y / N ☒ Y / N / NA </div> <div style="text-align: right;"> Met File: <u>TA540711.wnd</u> REBECCA LATTIN (Affiliate) <small>Digitally signed by REBECCA LATTIN (Affiliate) Date: 2020.09.10 12:05:38 -06'00'</small> </div> </div>
Technical reviewer checklist for CAP88 Output Preparer reviewed, signed, and dated? Individual location correct? Individual dose correct? Radionuclides correct? Number of Curies correct? Release site parameters correct? Other reviews or notes: Forward this checklist and output to the Rad-NESHAP Team leader.	Initials: _____ DPF 9/13/20 <div style="text-align: center;"> ☒ Y / N ☒ Y / N ☒ Y / N ☒ Y / N ☒ Y / N ☒ Y / N </div> <div style="text-align: right; margin-top: 20px;"> <small>Digitally signed by DAVID FUEHNE (Affiliate) Date: 2020.09.13 17:33:05 -06'00'</small> </div>
Approver checklist for CAP88 Output Technical review signed and date? Sign and date document? Document OK to forward to Records? Other reviews or notes: Forward this checklist and the output to the records coordinator.	Initials: _____ DPF 9/13/20 <div style="text-align: center;"> ☒ Y / N ☒ Y / N ☒ Y / N </div> <div style="text-align: right; margin-top: 20px;"> <small>Digitally signed by DAVID FUEHNE (Affiliate) Date: 2020.09.13 17:33:51 -06'00'</small> </div>

C A P 8 8 - P C

Version 4.1

Clean Air Act Assessment Package - 1988

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

Non-Radon Individual Assessment

Thu Sep 10 11:49:38 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Stack
Source Type: Stack
Emission Year: 2020
DOSE Age Group: Adult

Comments: FTWC emissions thru vent stack
To San Felipe gas station on I-25; bounding case

Effective Dose Equivalent
(mrem)

2.07E-06 ✓

At This Location: 48210 Meters South Southwest ✓

Dataset Name: SanFelipeGasStat
Dataset Date: Sep 10, 2020 11:49 AM
Wind File: C:\Users\219035\Documents\CAP88\Wind Files\TA540711.WND ✓

↑
Thu Sep 10 11:49:38 2020

SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 48210 Meters South Southwest
Lifetime Fatal Cancer Risk: 1.29E-12

ORGAN DOSE EQUIVALENT SUMMARY (RN-222 Working Level Calculations Excluded)

Organ	Dose Equivalent (mrem)
Adrenals	1.97E-06
UB_Wall	1.97E-06
Bone_Sur	1.97E-06
Brain	1.97E-06
Breasts	1.97E-06
St_Wall	2.63E-06
SI_Wall	1.99E-06
ULI_Wall	2.07E-06
LLI_Wall	2.26E-06
Kidneys	1.97E-06
Liver	1.97E-06
Muscle	1.97E-06
Ovaries	1.97E-06
Pancreas	1.97E-06
R_Marrow	1.97E-06
Skin	1.97E-06
Spleen	1.97E-06
Testes	1.97E-06
Thymus	1.97E-06
Thyroid	1.97E-06
GB_Wall	1.97E-06
Ht_Wall	1.97E-06
Uterus	1.97E-06
ET_Reg	1.97E-06
Lung	1.97E-06
Effectiv	2.07E-06

RADIONUCLIDE EMISSIONS DURING THE YEAR 2020

Source

Nuclide	Type	Size	#1 Ci/y	TOTAL Ci/y
H-3	✓	V ✓	0.000	1.0E+00 1.0E+00 ✓

SITE INFORMATION

Temperature: ✓ 9.000 degrees C
 Precipitation: ✓ 45.000 cm/y
 Humidity: ✓ 5.500 g/cu m
 Mixing Height: ✓ 1600.0 m

User specified location of max exposed individual.
 (ILOC, JLOC): SSW,48210 meters

Thu Sep 10 11:49:38 2020

SYNOPSIS
 Page 2

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 2.00 ✓
 Diameter (m): 0.25 ✓

Plume Rise
 Momentum (m/s): 13.75 ✓
 (Exit Velocity)

ADJUSTED AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	1.0000 ✓	1.0000 ✓	1.0000 ✓
Fraction From Assessment Area:	0.0000	0.0000	0.0000
Fraction Imported:	0.0000	0.0000	0.0000

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

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

48210

D O S E A N D R I S K S U M M A R I E S

Non-Radon Individual Assessment
Thu Sep 10 11:49:38 2020

Facility: 54102800
Address: TA 54
Bldg 1028
City: Los Alamos
State: NM Zip: NM

Source Category: Stack
Source Type: Stack
Emission Year: 2020
DOSE Age Group: Adult

Comments: FTWC emissions thru vent stack
To San Felipe gas station on I-25; bounding case

Dataset Name: SanFelipeGasStat
Dataset Date: Sep 10, 2020 11:49 AM
Wind File: C:\Users\219035\Documents\CAP88\Wind Files\TA540711.WND

Thu Sep 10 11:49:38 2020

SUMMARY
Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem)
Adrenals	1.97E-06
UB_Wall	1.97E-06
Bone_Sur	1.97E-06
Brain	1.97E-06
Breasts	1.97E-06
St_Wall	2.63E-06
SI_Wall	1.99E-06
ULI_Wall	2.07E-06

LLI_Wall	2.26E-06
Kidneys	1.97E-06
Liver	1.97E-06
Muscle	1.97E-06
Ovaries	1.97E-06
Pancreas	1.97E-06
R_Marrow	1.97E-06
Skin	1.97E-06
Spleen	1.97E-06
Testes	1.97E-06
Thymus	1.97E-06
Thyroid	1.97E-06
GB_Wall	1.97E-06
Ht_Wall	1.97E-06
Uterus	1.97E-06
ET_Reg	1.97E-06
Lung	1.97E-06
Effectiv	2.07E-06

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem)
INGESTION	1.92E-06
INHALATION	1.58E-07
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	2.07E-06
EXTERNAL	0.00E+00
TOTAL	2.07E-06

Thu Sep 10 11:49:38 2020

SUMMARY
Page 2

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem)

H-3 ✓

2.07E-06 ✓

TOTAL

2.07E-06 ✓

Thu Sep 10 11:49:38 2020

SUMMARY
Page 3

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
Esophagu	2.39E-14
Stomach	1.25E-13
Colon	2.53E-13
Liver	3.36E-14
LUNG	2.04E-13
Bone	2.04E-15
Skin	2.17E-15
Breast	9.61E-14
Ovary	2.72E-14
Bladder	5.39E-14
Kidneys	1.16E-14
Thyroid	6.67E-15
Leukemia	1.23E-13
Residual	3.28E-13
Total	1.29E-12
TOTAL	1.29E-12

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	1.20E-12
INHALATION	8.96E-14
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00

INTERNAL	1.29E-12
EXTERNAL	0.00E+00
TOTAL	1.29E-12

Thu Sep 10 11:49:38 2020

SUMMARY
Page 4

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
H-3	1.29E-12
TOTAL	1.29E-12

Thu Sep 10 11:49:38 2020

SUMMARY
Page 5

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT (mrem) (All Radionuclides and Pathways)

Distance (m)

Direction 48210

N	6.8E-07
NNW	3.8E-07
NW	2.7E-07
WNW	3.5E-07
W	4.4E-07
WSW	7.3E-07
SW	1.3E-06
SSW	2.1E-06
S	2.7E-06
SSE	3.4E-06
SE	4.5E-06
ESE	3.3E-06
E	2.8E-06
ENE	2.3E-06
NE	2.2E-06

NNE 1.5E-06

Thu Sep 10 11:49:38 2020

SUMMARY
Page 6

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

Distance (m)

Direction 48210

N	4.2E-13
NNW	2.4E-13
NW	1.7E-13
WNW	2.2E-13
W	2.7E-13
WSW	4.5E-13
SW	8.2E-13
SSW	1.3E-12
S	1.7E-12
SSE	2.1E-12
SE	2.8E-12
ESE	2.0E-12
E	1.8E-12
ENE	1.5E-12
NE	1.4E-12
NNE	9.1E-13

Attachment 2
Printouts of CAP88 Wind Files

TA540711

5-year annual average wind from TA-54 meteorological tower.
Used for general planning & comparisons for FTWC operations at Area G.

TA6_0711

5-year annual average wind from TA-6 meteorological tower.
Used for general planning & comparisons for FTWC operations at WETF.

DF120118

Daytime winds from Dec 01, 2018 at the TA-54 meteorological tower.
Worst-case wind conditions for Area G operations to White Rock.

54_03142018

Daytime winds from March 14, 2018 at the TA-54 meteorological tower.
Worst-case wind conditions for Area G operations to northern boundary/San Ildefonso Sacred Area.

6DF10219

Daytime winds from January 2, 2019 at the TA-6 meteorological tower.
Worst-case wind conditions for WETF operations to Ponderosa Campground.

Wind File: TA540711.wnd

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3.32029

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1.2201	1.1051	0.0591	0.0481	0.0241	0.0601	0.0821	0.0831	1.1611	0.0261	0.0151	0.0401	1.1141	0.0941	1.1821	1.169
1.8341	1.8071	1.5971	1.5221	1.5101	1.5451	1.6261	1.6761	1.4761	1.4571	1.6841	1.7961	1.9121	1.5481	1.8801	1.958
2.3671	1.9961	1.7511	1.6601	1.7611	1.7591	1.9041	1.8651	1.7521	1.6992	2.2012	1.7172	1.9612	1.4172	1.1912	1.441
3.9592	1.7871	1.6491	1.3231	1.4731	1.6462	1.1652	1.3961	1.8321	1.6132	0.0012	1.3292	1.6273	1.0203	1.6654	1.366
2.3861	1.7641	1.3401	1.1181	1.2011	1.3771	1.5881	1.7271	1.6341	1.4271	1.6191	1.9261	1.9332	1.1612	1.9242	1.998
1.3411	1.0391	0.015	.812	.9211	0.0211	1.1781	1.3421	1.4061	1.5231	1.6851	1.4531	1.9372	1.1832	1.2511	1.737
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2.2772	1.2522	1.1012	1.0452	1.0332	1.0632	1.1382	1.1742	1.0432	1.0272	1.2842	1.4632	1.4262	1.1632	1.3442	1.364
2.7242	1.4562	1.2372	1.1752	1.2422	1.2682	1.3782	1.4182	1.4152	1.4903	1.1633	1.5383	1.5783	1.1052	1.8472	1.822
5.3524	1.5592	1.6282	1.0152	1.2042	1.3973	1.0643	1.6973	1.3562	1.8993	1.4903	1.9884	1.2454	1.6505	1.1225	1.603
3.1942	1.5651	1.9821	1.5891	1.7312	1.0442	1.3842	1.6662	1.5572	1.1332	1.2722	1.6242	1.6072	1.8623	1.5323	1.627
1.9771	1.5071	1.426	.8991	1.2031	1.4041	1.6951	1.9312	1.0172	1.1422	1.1992	1.0152	1.5602	1.7882	1.8852	1.466
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.1673	.0947	.2050	.3838	.0768	.0724	.0000									
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.0069	.0029	.0106	.2334	.1843	.5619	.0000									
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extended data

StationName=LANL TA-54

State=NM

Latitude=35.8259

Longitude=-106.2232

TimeZone=0

RecordPeriod=2007-2011 all

AveragePeriodTemperature=9

Comments=ELEVATION 6548 FT

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extended data

StationName=LANL TA-6

State=NM

Latitude=35.8615

Longitude=-106.3195

TimeZone=7

RecordPeriod=2007-2011 all

AveragePeriodTemperature=9

Comments=elevation 7424 ft

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extended data

StationName=LANL TA-54

State=NM

Latitude=35.8259

Longitude=-106.2232

TimeZone=0

RecordPeriod=Dec 1 2018

AveragePeriodTemperature=0

Comments=daylight hours only

II

6.37697

[illegible][illegible][illegible]

extended data

StationName=LANL TA-54

State=NM

Latitude=35.8259

Longitude=-106.2232

TimeZone=0

RecordPeriod=MARCH 14, 2018 DAY

AveragePeriodTemperature=9

Comments=daylight hours only

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extended data

StationName=LANL TA-6

State=NM

Latitude=35.8615

Longitude=-106.3195

TimeZone=0

RecordPeriod=Jan 2, 2019

AveragePeriodTemperature=9

Comments=daylight hours only