FORT ST. VRAIN NUCLEAR GENERATING STATION

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CR-UE Eisenhunt Worksheet 1 Issue 14 Page 1 of 9

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This attachment is to be used only if the TI-59 calculator program is not used. If the TI-59 is used, Worksheet 2 is to be used.

WORKSHEET 1

ASSESSMENT OF RELEASE-MONITORED RELEASE

This attachment is used to determine the following:

- a) Estimated noble gas and iodine release and release rate;
- b) The estimated whole body and thyroid gamma dose and dose rate at the EAB;
- c) Classification of the release;
- Projected whole body and thyroid gamma dose at the EAB; and
- e) Recommended protective action for the general population.
- 1. Date/Time of beginning of release.
- Date/Time of ending of release. If release is still occurring, enter the Date/Time of the calculation.
- 3. Hours between 1. and 2.
- Collect the following data:
 - a) Maximum CPM, RIS-7324-1: (RR-93539, red pen)
 - b) Sensitivity, RIS-7324-1: (I-14, 403-P7)
 - c) Maximum CPM, RIS-7324-2: (RR-93539, blue pen)
 - d) Sensitivity, RIS-7324-2: (I-14, 203-P7)
 - e) Maximum CPM/Min, RIS-73437-1:

NOTE: Maximum CPM/Min must be calculated as:

(Maximum CPM - Initial or Intermediate CPM) (Elapsed Time (min))

from strip chart.

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8209140050 820826 PDR ADDCK 05000267 PDR

_____Cpm

CDM

____uCi/cc/cpm

uCi/cc/cpm

cpm/min



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	f)	Sensitivity, RIS-73437-1:	_uCi/cc/cpm/min
	g)	Site Area Emergency Limit (as posted):	
		1) <u>6.6E-2</u> µCi/cc noble gas	
		2) <u>6.7E-5</u> µCi/cc ¹³¹ I	
	5)	Ten Times Technical Specification Limits (as posted):	
		1) <u>2.5E-2</u> uCi/cc noble gas	
		2) <u>7.0E-8</u> uCi/cc ¹³¹ I	
	1)	Exhaust Stack Flow (cfm): (I-15, FI-7320)	_cfm
	j)	Exhaust Stack Flow (cc/sec): (Step 41 x 4.72E + 2)	_cc/sec
	k)	Average Wind Speed:	_mph
	1)	Wind Direction: From	_Degrees
		NOTE: North = 0° increasing degrees - c.w.	
	m)	(200 ft 20 ft.) Differential Temperature:	_°F
5.	Deta	ermine sectors affected using Site Sector Map.	
		(Figure 2) Sector(s)	
6.	Dete Step	ermine Stability Category using Table 1, $(4k)$, and $4m$).	
		Stability Category	
		Noble Gas Concentration	
7.	Calc	culate the exhaust stack noble gas concentration.	



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a) RIS-7324-1 concentration = (step 4a) x (step 4b) = () x () = uCi/cc b) RIS-7324-2 concentration = (step 4c) x (step 4d) = () x () = uCi/cc If either RIS-7324-1 or RIS-7324-2 is off-scale high, c)

record the stack concentration as obtained by local, portable instrument (refer to HPP-56 or Figure 1 for instructions).

Local Indicated Concentration = µCi/cc

d) Enter the highest of 7a), 7b), or 7c) _____uCi/cc

Noble Gas Release Rate

8. Calculate the Source Term, Q (i.e., Noble Gas Release Rate).

 $O = (step 7d) \times (step 4j) \times (1 E - 6 Ci/uci)$

= () x () x (1 E - 6)

= Ci/sec

Classification of Event

9. Determine weighted noble gas dose conversion Rem/hour 7.5E+2 factor from Table 2. Ci/m³

10. Determine the EAB dilution factor from Attachment 1 using the Stability Category (Step 6) and wind speed (Step 4k). Dilution Factor = sec/m³



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General Emergency Determination

11. Determine whole body dose rate at the EAB.

Dose Rate = $(step 8) \times (step 9) \times (step 10)$

= () x () x (

= Rem/hour

If the resulting dose rate at the EAB is \geq 1 Rem/hour, the classification of the event is GENERAL EMERGENCY. Inform the Shift Supervisor of the General Emergency condition. Then go directly to Step 14 of this attachment.

Site Area Emergency Determination

12. Criteria for Site Emergency: If Step 7d) is greater than or equal to $6.6E-2 \mu Ci/cc$, the classification of the event is SITE AREA EMERGENCY. Inform the Shift Supervisor of the Site Emergency Condition. Then go directly to Step 14 of this attachment.

Radiological Alert Determination

13. Criteria for Radiological Alert: If Step 7d) is greater than or equal to ten times the Technical Specification limit 2.5E-2 uCi/cc, the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 14.

Curies of Noble Gas Released

14. Calculate the curies of noble gas released to present time.

Curies released = (step 8) x (step 3) x (3.6 E + 3 s/hr)

= () x () x (3.6 E +3)

= Curies



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Worksheet 1 Issue 14 Page 5 of 9

Accumulated Whole Body Gamma Dose at EAB

15. Calculate the dose received at the EAB.

Dose = (step 11) x (step 3) = () x () = _____Rem

NOTE:

This calculation assumes the recipient was at the EAB for the entire duration of the release.

Projections

16. If the release is continuing, consult with the Shift Supervisor and <u>estimate</u> the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter N/A.

Preliminary estimate of release hours hours.

 Project the totoal whole body gamma dose at the EAB. If the release has terminated, enter N/A.

Projected dose at EAB = (step 11) x (step 16)

= () x () = _____Rem





131 I Concentration 18. Calculate the exhaust stack ¹³¹I concentration. RIS-73437-1 concentration = (step 4e) x (step 4f) = () x () = µCi/cc 1311 and Total Radioiodine Release Rate 19. Calculate the source term Q (131] release rate). $Q = (step 18) \times (step 4j) \times (1 E -6)$ = () x () x (1 E - 6) = Ci/sec 20. Calculate Q_{τ} for total radioiodine release. $Q_{T} = (\text{step 19}) \times (1.05 \text{ E} + 2)^{*}$ $= () \times (1.05 E + 2)^*$ = Ci/sec * Ratio of total radioiodines to ¹³¹I in design inventory. Classification of Event 21. Determine weighted radioiodine dose conversion 5.3E+4 Rem/hour factor from Attachment 8. Ci/m³

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General Emergency Determination

22. Determine the thyroid dose rate at the EAB.

Dose Rate = $(step 20) \times (step 21) \times (step 10)$

= () x () x () = Rem/hour

If the resulting dose rate at the EAB is \geq 5 Rem/hour, the classification of the event is GENERAL EMERGENCY. Inform the Shift Supervisor of the General Emergency Condition. Then go directly to Step 25 of this attachment.

Site Area Emergency Determination

23. Criteria for Site Area Emergency: If Step 18 is great than or equal to $6.7E-5 \mu Ci/cc$, the classification of the event is SITE EMERGENCY. Inform the Shift Supervisor of the Site Emergency Condition. Then go directly to Step 25 of this attachment.

Radiological Alert Determination

24. Criteria for Radiological Alert: If Step 18 is greater than or equal to ten times the Technical Specification limit 7.0E-8 µCi/cc, the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 25.

Curies of Radioiodine Released

25. Calculate the curies of radioiodine released to present time.

Curies Released = (step 20) x (step 3) x (3.6 E + 3)

= () x () x (3.6 E +3)

= curies





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Accumulated Thyroid Dose at EAB

26. Calculate the dose received at the EAB.

 $Dose = (step 22) \times (step 3)$

= () x () Rem =

NOTE: This calculation assumes the recipient was at the EAB for the entire duration of the release.

Projections

27. If the release is continuing, consult with the Shift Supervisor and estimate the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter $N/A_{\rm \cdot}$

Preliminary estimate of release hours hours.

28. Project the total thyroid dose at the EAB. If the release has terminated, enter N/A.

Projected Dose at EAB = (step 22) x (step 27)



29. Determine the recommended protective action for the general population based on the results of steps 17 and 28, refer to RERP-PAG.

- 30. The whole body gamma dose rate at the EAB is Rem/hour (step 11):
- 31. The classification of the event based on noble gases is (step 11 or step 12 or step 13):

32. The noble gas release rate is (step 8): _____Ci/sec



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33.	The accumulated whole body gamma dose at the EAB is (step 15):	Rem
34.	The total number of curies of noble gas release to the present time is (step 14):	_Curies
35.	The projected whole body gamma dose at the EAB is (step 17):	Rem
	Based on projected release duration of (step 16):	hours
36.	The thyroid dose rate at the EAB is (step 22):	Rem/hour
37.	*The classification of the event based on radio- iodines is (step 22 or step 23 or step 24):	
38.	The radioiodine release rate is (step 20):	Ci/sec
39.	The accumulated thyroid dose at the EAB is	Rem
40.	The total number of curies of radioiodine released to the present time is (step 25):	_Curies
41.	The projected thyroid dose at the EAB is	Rem
	Based on projected release duration of (step 27):	hours

*If this classification differs from the classification in step 31, the higher (i.e., more severe) classification is to be used to determine recommended protective action.





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WORKSHEET 1

ASSESSMENT OF RELEASE-MONITORED RELEASE

This attachment is to be used only if the TI-59 calculator program is not used. If the TI-59 is used, Worksheet 2 is to be used.

This attachment is used to determine the following:

- a) Estimated noble gas and iodine release and release rate;
- b) The estimated whole body and thyroid gamma dose and dose rate at the EAB;
- c) Classification of the release;
- Projected whole body and thyroid gamma dose at the EAB; and
- e) Recommended protective action for the general population.
- 1. Date/Time of beginning of release.
- Date/Time of ending of release. If release is still occurring, enter the Date/Time of the calculation.
- 3. Hours between 1. and 2.
- Collect the following data:
 - a) Maximum CPM, RIS-7324-1: (RR-93539, red pen) _____cpm
 - b) Sensitivity, RIS-7324-1: (I-14, 403~P7)
 - c) Maximum CPM, RIS-7324-2: (RR-93539, blue pen)
 - d) Sensitivity, RIS-7324-2: (I-14, 203-P7)

uCi/cc/cpm

CDM

uCi/cc/cpm

cpm/min

NOTE: Maximum CPM/Min must be calculated as:

(Maximum CPM - Initial or Intermediate CPM) Elapsed Time (min)

from strip chart.

Maximum CPM/Min, RIS-73437-1:

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e)



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	f)	Sensitivity, RIS-73437-1:		uCi/cc/cpm/min
	g)	Site Area Emergency Limit	(as posted):	
		1) 6.6E-2 µCi/cc n	oble gas	
		2) 6.7E-5 uCi/cc13	1 I	
	h)	Ten Times Technical Speci Limits (as posted):	fication	
		1) <u>2.5E-2</u> µCi/cc n	oble gas	
		2) 7.0E-8 µCi/cc ¹³	1I	
	i)	Exhaust Stack Flow (cfm): (I-15, FI-7320)		_cfm
	j)	Exhaust Stack Flow (cc/se (Step 4i x 4.72E + 2)	c):	_cc/sec
	k)	Average Wind Speed:	in the second	_mph
	1)	Wind Direction:	From	Degrees
		NOTE: North = 0° increas degrees = c.w.	ing	
	m)	(200 ft 20 ft.) Differential Temperature:		_°F
5.	Dete	rmine sectors affected usin	g Site Sector Map.	
		(Figure 2)	Sector(s)	
6.	Dete Step	rmine Stability Category us 4k), and 4m).	ing Table 1, tability Category	
		Noble Gas Con	centration	
7.	Calc	ulate the exhaust stack nob	le gas concentration.	



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a)	RIS-7324-1	concentration		(step	4a)	х	(step	4b)
			=	(.)	x	()
			=	-			_uCi/co	:
b)	RIS-7324-2	concentration	=	(step	4c)	x	(step	4d)
			=	()	x	()
			=				_uCi/co	:
c)	If either	RIS-7324-1	or	RIS-	7324	-2	is of	ff-sc

c) If either RIS-7324-1 or RIS-7324-2 is off-scale high, record the stack concentration as obtained by local, portable instrument (refer to HPP-56 or Figure 1 for instructions).

Local Indicated Concentration = _____uCi/cc

d) Enter the highest of 7a), 7b), or 7c) _____uCi/cc

Noble Gas Release Rate

8. Calculate the Source Term, Q (i.e., Noble Gas Release Rate).

Q = (step 7d) x (step 4j) x (1 E -6 Ci/µci)

= () x () x (1 E -6)

= ____Ci/sec

Classification of Event

 Determine weighted noble gas dose conversion factor from Table 2.
<u>7.5E+2</u> Rem/hour Ci/m³

 Determine the EAB dilution factor from Attachment 1 using the Stability Category (Step 6) and wind speed (Step 4k).

Dilution Factor = ______sec/m³

X

FORT ST. VRAIN NUCLEAR GENERATING STATION

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General Emergency Determination

11. Determine whole body dose rate at the EAB.

Dose Rate = (step 8) x (step 9) x (step 10)

= () x () x ()

= Rem/hour

If the resulting dose rate at the EAB is ≥ 1 Rem/hour, the classification of the event is GENERAL EMERGENCY. Inform the Shift Supervisor of the General emergency condition. Then go directly to Step 14 of this attachment.

Site Area Emergency Determination

12. Criteria for Site Emergency: If Step 7d) is greater than or equal to $6.6E-2 \mu Ci/cc$, the classification of the event is SITE AREA EMERGENCY. Inform the Shift Supervisor of the Site Emergency Condition. Then go directly to Step 14 of this attachment.

Radiological Alert Determination

13. Criteria for Radiological Alert: If Step 7d) is greater than or equal to ten times the Technical Specification limit 2.5E-2 uCi/cc, the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 14.

Curies of Noble Gas Released

14. Calculate the curies of noble gas released to present time.

Curies released = (step 8) x (step 3) x (3.6 E + 3 s/hr)

= () x () x (3.6 E + 3)

= Curies



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Worksheet 1 Issue 14 Page 5 of 9

Accumulated Whole Body Gamma Dose at EAB

15. Calculate the dose received at the EAB.

Dose = (step 11) x (step 3) = () x () = ______Rem

NOTE: This calculation assumes the recipient was at the EAB for the entire duration of the release.

Projections

16. If the release is continuing, consult with the Shift Supervisor and <u>estimate</u> the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter N/A.

Preliminary estimate of release hours hours.

 Project the totoal whole body gamma dose at the EAB. If the release has terminated, enter N/A.

Projected dose at EAB = (step 11) x (step 16)



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	131 I Concentration
18.	Calculate the exhaust stack ¹³¹ I concentration.
	RIS-73437-1 concentration = (step 4e) x (step 4f)
	= () x ()
	=uCi/cc
	131I and Total Radioiodine Release Rate
19.	Calculate the source term Q (131 I release rate).
	Q = (step 18) x (step 4j) x (1 E -6)
	= () x () x (1 E -6)
	=Ci/sec
20.	Calculate Q _T for total radioiodine release.
	$Q_T = (step 19) \times (1.05 E + 2)^*$
	= () x (1.05 E + 2)*
	=Ci/sec
	* Ratio of total radioiodines to ¹³¹ I in design inventory.
	Classification of Event
21.	Determine weighted radioiodine dose conversion factor from Attachment 8. $\frac{5.3E+4}{Ci/m^3}$

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General Emergency Determination

22. Determine the thyroid dose rate at the EAB.

Dose Rate = (step 20) x (step 21) x (step 10)

= () x () x ()

= Rem/hour

If the resulting dose rate at the EAB is \geq 5 Rem/hour, the classification of the event is GENERAL EMERGENCY. Inform the Shift Supervisor of the General Emergency Condition. Then go directly to Step 25 of this attachment.

Site Area Emergency Determination

23. Criteria for Site Area Emergency: If Step 18 is great than or equal to 6.7E-5 µCi/cc, the classification of the event is SITE EMERGENCY. Inform the Shift Supervisor of the Site Emergency Condition. Then go directly to Step 25 of this attachment.

Radiological Alert Determination

24. Criteria for Radiological Alert: If Step 18 is greater than or equal to ten times the Technical Specification limit 7.0E-8 uCi/cc, the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 25.

Curies of Radioiodine Released

25. Calculate the curies of radioiodine released to present time.

Curies Released = (step 20) x (step 3) x (3.6 E + 3)

= () x () x (3.6 E + 3)

= curies



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Accumulated Thyroid Dose at EAB

26. Calculate the dose received at the EAB.

=

 $Dose = (step 22) \times (step 3)$

= () x ()

Rem

NOTE: This calculation assumes the recipient was at the EAB for the entire duration of the release.

Projections

27. If the release is continuing, consult with the Shift Supervisor and estimate the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter N/A.

Preliminary estimate of release hours hours.

28. Project the total thyroid dose at the EAB. If the release has terminated, enter N/A.

Projected Dose at EAB = (step 22) x (step 27)



29. Determine the recommended protective action for the general population based on the results of steps 17 and 28, refer to RERP-PAG.

- 30. The whole body gamma dose rate at the EAB is Rem/hour (step 11):
- 31. The classification of the event based on noble gases is (step 11 or step 12 or step 13):

32. The noble gas release rate is (step 8): Ci/sec



FORT ST. VRAIN NUCLEAR GENERATING STATION

33.	The accumulated whole body gamma dose at the EAB is (step 15):	Rem
34.	The total number of curies of noble gas release to the present time is (step 14):	Curies
35.	The <u>projected</u> whole body gamma dose at the EAB is (step 17):	Rem
	Based on projected release duration of (step 16):	hours
36.	The thyroid dose rate at the EAB is (step 22):	Rem/hour
37.	*The classification of the event based on radio- iodines is (step 22 or step 23 or step 24):	
38.	The radioiodine release rate is (step 20):	_Ci/sec
39.	The accumulated thyroid dose at the EAB is	Rem
40.	The total number of curies of radioiodine released to the present time is (step 25):	Curies
41.	The projected thyroid dose at the EAB is	Rem
	Based on projected release duration of (step 27):	hours

*If this classification differs from the classification in step 31, the higher (i.e., more severe) classification is to be used to determine recommended protective action.



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CDM

cpm

uCi/cc/cpm

uCi/cc/cpm

cpm/min

WORKSHEET 1

ASSESSMENT OF RELEASE-MONITORED RELEASE

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This attachment is used to determine the following:

- a) Estimated noble gas and iodine release and release rate;
- b) The estimated whole body and thyroid gamma dose and dose rate at the EAB;
- c) Classification of the release;
- Projected whole body and thyroid gamma dose at the EAB; and
- e) Recommended protective action for the general population.
- 1. Date/Time of beginning of release.
- Date/Time of ending of release. If release is still occurring, enter the Date/Time of the calculation.
- 3. Hours between 1. and 2.
- 4. Collect the following data:
 - a) Maximum CPM, RIS-7324-1: (RR-93539, red pen)
 - b) Sensitivity, RIS-7324-1: (I-14, 403-P7)
 - c) Maximum CPM, RIS-7324-2: (RR-93539, blue pen)
 - d) Sensitivity, RIS-7324-2: (I-14, 203-P7)
 - e) Maximum CPM/Min, RIS-73437-1:
 - NOTE: Maximum CPM/Min must be calculated as:

(Maximum CPM - Initial or Intermediate CPM) (Elapsed Time (min))

from strip chart.



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f)	Sensitivity, RIS-73437-1:		uCi/cc/cpm/min
g)	Site Area Emergency Limit (as	posted):	
	1) <u>6.6E-2</u> µCi/cc noble	gas	
	2) <u>6.7E-5</u> µCi/cc ¹³¹ I		
h)	Ten Times Technical Specificat Limits (as posted):	tion	
	1) <u>2.5E-2</u> µCi/cc noble	gas	
	2) 7.0E-8 µCi/cc ¹³¹ I		
i)	Exhaust Stack Flow (cfm): (I-15, FI-7320)		cfm
j)	Exhaust Stack Flow (cc/sec): (Step 4i x 4.72E + 2)		cc/sec
k)	Average Wind Speed:		mph
1)	Wind Direction:	From	Degrees
	NOTE: North = 0° increasing degrees - c.w.		
m)	(200 ft 20 ft.) Differential Temperature:	· · · · · · · · · · · · · · · · · · ·	•F
Dete	ermine sectors affected using Si	te Sector Map	
	(Figure 2) So	ector(s)	
Dete	ermine Stability Category using	Table 1,	
Step	o 4k), and 4m). Stabi	lity Category	
	Noble Gas Concent	ration	
Calc	culate the exhaust stack noble g	as concentrat	ion.

5

6

7



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a)	RIS-7324-1 concentration = (step 4a) x (step 4b)
	= () x ()
	=uCi/cc
b)	RIS-7324-2 concentration = (step 4c) x (step 4d)
	= () x ()
	=uCi/cc
c)	If either RIS-7324-1 or RIS-7324-2 is off-scale high, record the stack concentration as obtained by local, portable instrument (refer to HPP-56 or Figure 1 for instructions).
	Local Indicated Concentration =µCi/cc
d)	Enter the highest of 7a), 7b), or 7c) uCi/cc

Noble Gas Release Rate

8. Calculate the Source Term, Q (i.e., Noble Gas Release Rate).

 $Q = (step 7d) \times (step 4j) \times (1 E -6 Ci/uci)$

 $= () \times () \times (1 E - 6)$

= Ci/sec

Classification of Event

9. Determine weighted noble gas dose conversion 7.5E+2 factor from Table 2. Rem/hour Ci/m³

10. Determine the EAB dilution factor from Attachment 1 using the Stability Category (Step 6) and wind speed (Step 4k).

Dilution Factor = sec/m³



FORT ST. VRAIN NUCLEAR GENERATING STATION

Worksheet 1 Issue 14 Page 4 of 9

General Emergency Determination

11. Determine whole body dose rate at the EAB.

Dose Rate = $(step 8) \times (step 9) \times (step 10)$

= () x () x ()

= Rem/hour

If the resulting dose rate at the EAB is ≥ 1 Rem/hour, the classification of the event is GENERAL EMERGENCY. Inform the Shift Supervisor of the General Emergency condition. Then go directly to Step 14 of this attachment.

Site Area Emergency Determination

12. Criteria for Site Emergency: If Step 7d) is greater than or equal to $6.6E+2 \mu Ci/cc$, the classification of the event is SITE AREA EMERGENCY. Inform the Shift Supervisor of the Site Emergency Condition. Then go directly to Step 14 of this attachment.

Radiological Alert Determination

13. Criteria for Radiological Alert: If Step 7d) is greater than or equal to ten times the Technical Specification limit 2.5E-2 µCi/cc, the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 14.

Curies of Noble Gas Released

14. Calculate the curies of noble gas released to present time.

Curies released = (step 8) x (step 3) x (3.6 E + 3 s/hr)

= () x () x (3.6 E +3)

= Curies



FORT ST. VRAIN NUCLEAR GENERATING STATION

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Accumulated Whole Body Gamma Dose at EAB

15. Calculate the dose received at the EAB.

Dose	=	(step	11)	х	(step	3)
	=	()	x	()
	=				Rem	

NOTE: This calculation assumes the recipient was at the EAB for the entire duration of the release.



16. If the release is continuing, consult with the Shift Supervisor and <u>estimate</u> the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter N/A.

Preliminary estimate of release hours hours.

17. Project the totoal whole body gamma dose at the EAB. If the release has terminated, enter N/A.

Projected dose at EAB = (step 11) x (step 16)



Ø.	FORT ST. VRAIN NUCLEAR GENERATING STATION Worksheet 1 Issue 14 Page 6 of 9
	131 I Concentration
18.	Calculate the exhaust stack ¹³¹ I concentration.
	RIS-73437-1 concentration = (step 4e) x (step 4f)
	= () x ()
	=uCi/cc
	1311 and Total Radioiodine Release Rate
19.	Calculate the source term Q (131 I release rate).
	Q = (step 18) x (step 4j) x (1 E -6)
	= () x () x (1 E -6)
	=Ci/sec
20.	Calculate Q _T for total radioiodine release.
	$Q_T = (step 19) \times (1.05 E + 2)^*$
	= () x (1.05 E + 2)*
	=C1/sec
	* Ratio of total radioiodines to ¹³¹ I in design inventory.
	Classification of Event
21.	Determine weighted radioiodine dose conversion factor from Attachment 8. <u>5.3E+4</u> <u>Rem/hour</u> Ci/m ³

×ð.

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General Emergency Determination

22. Determine the thyroid dose rate at the EAB.

Dose Rate = (step 20) x (step 21) x (step 10)

= () x () x ()

= _____Rem/hour

If the resulting dose rate at the EAB is ≥ 5 Rem/hour, the classification of the event is GENERAL EMERGENCY. Inform the Shift Supervisor of the General Emergency Condition. Then go directly to Step 25 of this attachment.

Site Area Emergency Determination

23. Criteria for Site Area Emergency: If Step 18 is great than or equal to 6.7E-5 µCi/cc, the classification of the event is SITE EMERGENCY. Inform the Shift Supervisor of the Site Emergency Condition. Then go directly to Step 25 of this attachment.

Radiological Alert Determination

24. Criteria for Radiological Alert: If Step 18 is greater than or equal to ten times the Technical Specification limit 7 OE-8 µCi/cc, the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 25.

Curies of Radioiodine Released

25. Calculate the curies of radioiodine released to present time.

Curies Released = $(step 20) \times (step 3) \times (3.6 E + 3)$

= () x () x (3.6 E +3)

= curies



FORT ST. VRAIN NUCLEAR GENERATING STATION

Worksheet 1 Issue 14 Page 8 of 9

Accumulated Thyroid Dose at EAB

26. Calculate the dose received at the EAB.

Dose = (step 22) x (step 3) = () x () = Rem

NOTE: This calculation assumes the recipient was at the EAB for the entire duration of the release.

Projections

27. If the release is continuing, consult with the Shift Supervisor and <u>estimate</u> the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter N/A.

Preliminary estimate of release hours _____ hours.

28. Project the total thyroid dose at the EAB. If the release has terminated, enter N/A.

Projected Dose at EAB = (step 22) x (step 27)

= () x ()

= _____Rem

 Determine the recommended protective action for the general population based on the results of steps 17 and 28, refer to RERP-PAG.

- 30. The whole body gamma dose rate at the EAB is (step 11): ______ Rem/hour
- 31. The classification of the event based on noble gases is (step 11 or step 12 or step 13):

32. The noble gas release rate is (step 8): _____Ci/sec

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33.	The accumulated whole body gamma dose at the EAB is (step 15):	_Rem
34.	The total number of curies of noble gas release to the present time is (step 34):	_Curies
35.	The projected whole body gamma dose at the EAB is (step 17):	Rem
	Based on projected release duration of (step 16):	hours
36.	The thyroid dose rate at the EAB is (step 22):	Rem/hour
37.	*The classification of the event based on radio- iodines is (step 22 or step 23 or step 24):	_
38.	The radioiodine release rate is (step 20):	_Ci/sec
39.	The accumulated thyroid dose at the EAB is	Rem
40.	The total number of curies of radioiodine released to the present time is (step 25):	_Curies
41.	The projected thyroid dose at the EAB is	_Rem
	Based on projected release duration of (step 27):	hours

*If this classification differs from the classification in step 31, the higher (i.e., more severe) classification is to be used to determine recommended protective action.

X

FORT ST. VRAIN NUCLEAR GENERATING STATION

CR-UE Worksheet 1 Issue 14 Page 1 of 9

WORKSHEET 1

ASSESSMENT OF RELEASE-MONITORED RELEASE

This attachment is to be used only if the TI-59 calculator program is not used. If the TI-59 is used, Wo ksheet 2 is to be used.

This attachment is used to determine the following:

- a) Estimated noble gas and iodine release and release rate;
- b) The estimated whole body and thyroid gamma dose and dose rate at the EAB;
- c) Classification of the release;
- d) Projected whole body and thyroid gamma dose at the EAB; and
- e) Recommended protective action for the general population.
- 1. Date/Time of beginning of release.
- Date/Time of ending of release. If release is still occurring, enter the Date/Time of the calculation.
- 3. Hours between 1. and 2.
- Collect the following data:
 - a) Maximum CPM, RIS-7324-1: (RR-93539, red pen)
 - b) Sensitivity, RIS-7324-1: (I-14, 403-P7)

uCi/cc/cpm

CDM

- c) Maximum CPM, RIS-7324-2: (RR-93539, blue pen)
- d) Sensitivity, RIS-7324-2: (I-14, 203-P7)

uCi/cc/cpm

cpm/min

cpm

Maximum CPM/Min, RIS-73437-1:

NOTE: Maximum CPM/Min must be calculated as:

(Maximum CPM - Initial or Intermediate CPM) (Elapsed Time (min))

from strip chart.

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e)

2		FORT ST. VRAIN NUCLEAR GENERATING STATION	worksheet 1 Issue 14 Page 2 of 9
	f)	Sensitivity, RIS-73437-1:	_uCi/cc/cpm/min
\$	g)	Site Area Emergency Limit (as posted):	
		1) <u>6.6E-2</u> µCi/cc noble gas	
		2) <u>6.7E-5</u> µC1/cc ¹³¹ I	
	h)	Ten Times Technical Specification Limits (as posted):	
		1) <u>2.5E-</u> uCi/cc noble gas	
		2) <u>7.0E-8</u> µCi/cc ¹³¹ I	
	1)	Exhaust Stack Flow (cfm): (I-15, FI-7320)	_cfm
	j)	Exhaust Stack Flow (cc/sec): (Step 4i x 4.72E + 2)	_cc/sec
	k)	Average Wind Speed:	_mph
	1)	Wind Direction: From	Degrees
		NOTE: North = 0° increasing degrees = c.w.	
,	m)	(200 ft 20 ft.) Differential Temperature:	°F
. 1	Deter	mine sectors affected using Site Sector Map.	
		(Figure 2) Sector(s)	
•	Deter Step	mine Stability Category using Table 1, 4k), and 4m). Stability Category	
		Noble Gas Concentration	
	Calcu	late the exhaust stack noble gas concentration.	



FORT ST. VRAIN NUCLEAR GENERATING STATION

Worksheet 1 Issue 14 Page 3 of 9



c) record the stack concentration as obtained by local, portable instrument (refer to HPP-56 or Figure 1 for instructions).

Local Inditated Concentration = _____µCi/cc

b)

d) Enter the highest of 7a), 7b), or 7c) _____µCi/cc

Noble Ges Release Rate

8. Calculate the Source Term, Q (i.e., Noble Gas Release Rate).

 $Q = (\text{step 7d}) \times (\text{step 4j}) \times (1 \text{ E -6 Ci/µci})$

 $= () \times () \times (1 \in -6)$

Ci/sec

Classification of Event

- 9. Determine weighted noble gas dose conversion Rem/hour factor from Table 2. 7.5E+2 Ci/m³
- 10. Determine the EAB dilution factor from Attachment 1 using the Stability Category (Step 6) and wind speed (Step 4k).

Dilution Factor = sec/m³

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X

FORT ST. VRAIN NUCLEAR GENERATING STATION

Worksheet 1 Issue 14 Page 4 of 9

General Emergency Determination

11. Determine whole body dose rate at the EAB.

Dose Rate = (step 8) x (step 9) x (step 10)

= () x () x ()

= Rem/hour

If the resulting dose rate at the EAB is ≥ 1 Rem/hour, the classification of the event is GENERAL EMERGENCY. Inform the Shift Supervisor of the General Emergency condition. Then go directly to Step 14 of this attachment.

Site Area Emergency Determination

12. Criteria for Site Emergency: If Step 7d) is greater than or equal to $6.6E-2 \mu Ci/cc$, the classification of the event is SITE AREA EMERGENCY. Inform the Shift Supervisor of the Site Emergency Condition. Then go directly to Step 14 of this attachment.

Radiological Alert Determination

13. Criteria for Radiological Alert: If Step 7d) is greater than or equal to ten times the Technical Specification limit 2.5E-2 μ Ci/cc, the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 14.

Curies of Noble Gas Released

14. Calculate the curies of noble gas released to present time.

Curies released = (step 8) x (step 3) x (3.6 E + 3 s/hr)

= () x () x (3.6 E +3)

= Curies



FORT ST. VRAIN NUCLEAR GENERATING STATION

Worksheet 1 Issue 14 Page 5 of 9

Accumulated Whole Body Gamma Dose at EAB

15. Calculate the dose received at the EAB. Dose = (step 11) x (step 3) = () x () = Rem

NOTE: This calculation assumes the recipient was at the EAB for the entire duration of the release.

Projections

16. If the release is continuing, consult with the Shift Supervisor and <u>estimate</u> the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter N/A.

Preliminary estimate of release hours _____hours.

17. Project the totoal whole body gamma dose at the EAB. If the release has terminated, enter N/A.

Projected dose at EAB = (step 11) x (step 16)





X

FORT ST. VRAIN NUCLEAR GENERATING STATION

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General Emergency Determination

22. Determine the thyroid dose rate at the EAB.

Dose Rate = (step 20) x (step 21) x (step 10)

= () x () x () = Rem/hour

If the resulting dose rate at the EAB is \geq 5 Rem/hour, the classification of the event is GENERAL EMERGENCY. Inform the Shift Supervisor of the General Emergency Condition. Then go directly to Step 25 of this attachment.

Site Area Emergency Determination

23. Criteria for Site Area Emergency: If Step 18 is great than or equal to $6.7E-5 \ \mu Ci/cc$, the classification of the event is SITE EMERGENCY. Inform the Shift Supervisor of the Site Emergency Condition. Then go directly to Step 25 of this attachment.

Radiological Alert Determination

24. Criteria for Radiological Alert: If Step 18 is greater than or equal to ten times the Technical Specification limit 7.0E-8 µCi/cc, the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 25.

Curies of Radioiodine Released

25. Calculate the curies of radioiodine released to present time.

Curies Released = $(step 20) \times (step 3) \times (3.6 E +3)$

= () x () x (3.6 E + 3)

= curies



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FORT ST. VRAIN NUCLEAR GENERATING STATION

CR-UE Worksheet 1 Issue 14 Page 8 of 9

Accumulated Thyroid Dose at EAB

26. Calculate the dose received at the EAB.

Dose = (step 22) x (step 3) = () x () = _____ Rem

NOTE: This calculation assumes the recipient was at the EAB for the entire duration of the release.

27. If the release is continuing, consult with the Shift Supervisor and <u>estimate</u> the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter N/A.

Projections

Preliminary estimate of release hours _____hours.

28. Project the total thyroid dose at the EAB. If the release has terminated, enter N/A.

Projected Dose at EAB = (step 22) x (step 27)

= () x () = Rem

29. Determine the recommended protective action for the general population based on the results of steps 17 and 28, refer to RERP-PAG.

- 30. The whole body gamma dose rate at the EAB is (step 11): ______ Rem/hour
- 31. The classification of the event based on noble gases is (step 11 or step 12 or step 13):

32. The noble gas release rate is (step 8): _____Ci/sec



FORT ST. VRAIN NUCLEAR GENERATING STATION

Worksheet 1 Issue 14 Page 9 of 9

33.	The accumulated whole body gamma dose at the EAB is (step 15):	Rem
34.	The total number of curies of noble gas release to the present time is (step 14):	Curies
35.	The projected whole body gamma dose at the EAB is (step 17):	Rem
	Based on projected release duration of (step 16):	hours
36.	The thyroid dose rate at the EAB is (step 22):	Rem/hour
37.	*The classification of the event based on radio- iodines is (step 22 or step 23 or step 24):	
38.	The radioiodine release rate is (step 20):	Ci/sec
39.	The accumulated thyroid dose at the EAB is	Rem
40.	The total number of curies of radioiodine released to the present time is (step 25):	Curies
41.	The projected thyroid dose at the EAB is	Rem
	Based on projected release duration of (step 27):	hours

to determine recommended protective action.


FORT ST. VRAIN NUCLEAR GENERATING STATION

CR-UE Worksheet 1 Issue 14 Page 1 of 9

WORKSHEET 1

ASSESSMENT OF RELEASE-MONITORED RELEASE

This attachment is to be used only if the TI-59 calculator program is not used. If the TI-59 is used, Worksheet 2 is to be used.

This attachment is used to determine the following:

- a) Estimated noble gas and iodine release and release rate;
- b) The estimated whole body and thyroid gamma dose and dose rate at the EAB;
- c) Classification of the release;
- Frojected whole body and thyroid gamma dose at the EAB; and
- e) Recommended protective action for the general population.
- 1. Date/Time of beginning of release.
- Date/Time of ending of release. If release is still occurring, enter the Date/Time of the calculation.
- 3. Hours between 1. and 2.
- Collect the following data:
 - a) Maximum CPM, RIS-7324-1: (RR-93539, red pen)
 - b) Sensitivity, RIS-7324-1: (I-14, 403-P7)

____uCi/cc/cpm

CDM

- c) Maximum CPM, RIS-7324-2: (RR-93539, blue pen)
- d) Sensitivity, RIS-7324-2: (I-14, 203-P7)

uCi/cc/cpm

cpm/min

cpm

- e) Maximum CPM/Min, RIS-73437-1:
 - NOTE: Maximum CPM/Min must be calculated as:

(Maximum CPM - Initial or Intermediate CPM) (Elapsed Time (min))

from strip chart.

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R		FORT ST. VRAIN NUCLEAR GENERATING STATION	Issue 14 Page 2. of
	f)	Sensitivity RIS-73437-1.	uCi/cc/com/min
	2)	Site Area Emergency Limit (ac posted):	
	3)	1) 6 6E-2 wGi/co poblo cos	
		$\frac{0.0E-2}{2} \mu CT/CC HODTE gas$	
		2) <u>6.7E-5</u> µC1/cc···1	
	h)	Ten Times Technical Specification Limits (as posted):	
		1) <u>2.5E-2</u> uCi/cc noble gas	
		2) <u>7.0E-8</u> µCi/cc ¹³¹ I	
	1)	Exhaust Stack Flow (cfm): (I-15, FI-7320)	cfm
	j)	Exhaust Stack Flow (cc/sec): (Step 4i x 4.72E + 2)	cc/sec
	k)	Average Wind Speed:	mph
	1)	Wind Direction: From	Degrees
		NOTE: North = 0° increasing degrees - c.w.	
	m)	(200 ft 20 ft.) Differential Temperature:	°F
	Dete	ermine sectors affected using Site Sector Map.	
		(Figure 2) Sector(s)	
	Dete	rmine Stability Category using Table 1,	
	Step	0 4k), and 4m).	

Noble Gas Concentration

7. Calculate the exhaust stack noble gas concentration.



FORT ST. VRAIN NUCLEAR GENERATING STATION

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)	RIS-7324-1	concentration	=	(step	4a)	x	(step	4b)	
			=	()	x	()	
			=				_uCi/cc		
)	RIS-7324-2	concentration	=	(step	4c)	x	(step	4d)	
			=	()	x	()	
			=				_uCi/cc		

c) If either RIS-7324-1 or RIS-7324-2 is off-scale high, record the stack concentration as obtained by local, portable instrument (refer to HPP-56 or Figure 1 for instructions).

Local Indicated Concentration = _____µCi/cc

d) Enter the highest of 7a), 7b), or 7c) _____µCi/cc

Noble Gas Release Rate

8. Calculate the Source Term, Q (i.e., Noble Gas Release Rate).

 $Q = (step 7d) \times (step 4j) \times (1 E - 6 Ci/uci)$

= () x () x (1 E -6)

= Ci/sec

Classification of Event

 Determine weighted noble gas dose conversion factor from Table 2.
 <u>7.5E+2</u> Rem/hour Ci/m³

 Determine the EAB dilution factor from Attachment 1 using the Stability Category (Step 6) and wind speed (Step 4k).

Dilution Factor = ______sec/m³

FORT ST. VRAIN NUCLEAR GENERATING STATION



Worksheet 1 Issue 14 Page 4 of 9

General Emergency Determination

11. Determine whole body dose rate at the EAB.

Dose Rate = (step 8) x (step 9) x (step 10)

= () x () x ()

= Rem/hour

If the resulting dose rate at the EAB is ≥ 1 Rem/hour, the classification of the event is GENERAL EMERGENCY. Inform the Shift Supervisor of the General Emergency condition. Then go directly to Step 14 of this attachment.

Site Area Emergency Determination

12. Criteria for Site Emergency: If Step 7d) is greater than or equal to $6.6E-2 \mu Ci/cc$, the classification of the event is SITE AREA EMERGENCY. Inform the Shift Supervisor of the Site Emergency Condition. Then go directly to Step 14 of this attachment.

Radiological Alert Determination

13. Criteria for Radiological Alert: If Step 7d) is greater than or equal to ten times the Technical Specification limit 2.5E-2 uCi/cc, the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 14.

Curies of Noble Gas Released

14. Calculate the curies of noble gas released to present time.

Curies released = $(step 8) \times (step 3) \times (3.6 E + 3 s/hr)$

= () x () x (3.6 E +3)

= Curies



FORT ST. VRAIN NUCLEAR GENERATING STATION

Worksheet 1 Issue 14 Page 5 of 9

Accumulated Whole Body Gamma Dose at EAB

15. Calculate the dose received at the EAB.

Dose = (step 11) x (step 3) = () x () = _____Rem

NOTE: This calculation assumes the recipient was at the EAB for the entire duration of the release.

Projections

16. If the release is continuing, consult with the Shift Supervisor and <u>estimate</u> the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter N/A.

Preliminary estimate of release hours hours.

17. Project the totoal whole body gamma dose at the EAB. If the release has terminated, enter N/A.

Projected dose at EAB = (step 11) x (step 16)

= () x () = ______Rem



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Worksheet 1 Issue 14 Page 7 of 9

General Emergency Determination

22. Determine the thyroid dose rate at the EAB.

Dose Rate = (step 20) x (step 21) x (step 10)

= () x () x ()

= Rem/hour

If the resulting dose rate at the EAB is \geq 5 Rem/hour, the classification of the event is GENERAL EMERGENCY. Inform the Shift Supervisor of the General Emergency Condition. Then go directly to Step 25 of this attachment.

Site Area Emergency Determination

23. Criteria for Site Area Emergency: If Step 18 is great than or equal to $6.7E-5 \mu Ci/cc$, the classification of the event is SITE EMERGENCY. Inform the Shift Supervisor of the Site Emergency Condition. Then go directly to Step 25 of this attachment.

Radiological Alert Determination

24. Criteria for Radiological Alert: If Step 18 is greater than or equal to ten times the Technical Specification limit 7.0E-8 μ Ci/cc, the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 25.

Curies of Radioiodine Released

25. Calculate the curies of radioiodine released to present time.

Curies Released = $(step 20) \times (step 3) \times (3.6 E +3)$

= () x () x (3.6 E + 3)

= curies



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Accumulated Thyroid Dose at EAB

26. Calculate the dose received at the EAB.

Dose = (step 22) x (step 3) = () x ()

= Rem

NOTE: This calculation assumes the recipient was at the EAB for the entire duration of the release.

Projections

27. If the release is continuing, consult with the Shift Supervisor and <u>estimate</u> the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter N/A.

Preliminary estimate of release hours hours.

28. Project the total thyroid dose at the EAB. If the release has terminated, enter N/A.

Projected Dose at EAB = (step 22) x (step 27)

= () x () = Rem

 Determine the recommended protective action for the general population based on the results of steps 17 and 28, refer to RERP-PAG.

- 30. The whole body gamma dose rate at the EAB is (step 11): Rem/hour
- 31. The classification of the event based on noble gases is (step 11 or step 12 or step 13):

32. The noble gas release rate is (step 8): _____Ci/sec



FORT ST. VRAIN NUCLEAR GENERATING STATION

33.	The accumulated whole body gamma dose at the EAB is (step 15):	Rem
34.	The total number of curies of noble gas release to the present time is (step 14):	_Curies
35.	The projected whole body gamma dose at the EAB is (step 17):	Rem
	Based on projected release duration of (step 16):	hours
36.	The thyroid dose rate at the EAB is (step 22):	Rem/hour
37.	*The classification of the event based on radio- iodines is (step 22 or step 23 or step 24):	_
38.	The radioiodine release rate is (step 20):	_Ci/sec
39.	The accumulated thyroid dose at the EAB is	Rem
40.	The total number of curies of radioiodine released to the present time is (step 25):	_Curies
41.	The projected thyroid dose at the EAB is	Rem
	Based on projected release duration of (step 27):	hours
	*If this classification differs from the classific 31, the higher (i.e., more severe) classification i to determine recommended protective action.	ation in step s to be used

X

FORT ST. VRAIN NUCLEAR GENERATING STATION

WORKSHEET 2

ASSESSMENT OF RELEASE USING TI-59 CALCULATOR PROGRAM-MONITORED RELEASE

This attachment is only to be used if the TI-59 calculator program is used. If the program is not used, use Worksheet 1.

This attachment is used to determine the following:

- a) Estimated noble gas and radioiodine release and release rate;
- Estimated whole body and thyroid gamma dose and dose rate at the EAB;
- c) Classification of the release;
- Projected whole body and thyroid gamma dose at the EAB; and
- e) Recommended protective action for the general population.
- 1. Collect the following data:
 - a) Date/Time of beginning of release:
 - b) Date/Time of ending of release. If release is still occurring, enter the Date/Time of the calculation:
 - c) Hours between 1a) and 1b):
 - d) Maximum CPM, RIS-7324-1: (RR-93539, red pen)
 - e) Sensitivity RIS-7324-1: (I-14, 403-P7)
 - f) Maximum CPM, RIS-7324-2: (RR-93539, blue pen)
 - g) Sensitivity, RIS-7324-2: (I-14, 203-P7)
 - *h) Maximum mR/hr, Cutie Pie-2520 Probe:
- (STO 01)

hours

CDM

(STO 05)

(STO 11)

(STO 03)

(STO 04)

uCi/cc/cpm

uCi/cc/cpm

(STO 06)

mR/hr



FORT ST. VRAIN NUCLEAR GENERATING STATION

1)	Maximum mR/hr, E-500-GM Pr		mR/hr (STO 02)
j)	Maximum CPM/MIN, RIS-73437	-1:	cpm/min (STO 07)
	NOTE: Maximum CPM/Min mus	t be calculated as:	
	(Maximum CPM - Init (Elapse	ial or Intermediate d Time (min)	CPM)
	from strip chart.		
k)	Sensitivity, RIS-73437-1:		uCi/cc/cpm/min (STO 08)
1)	Site Emergency Limit (as posted):	<u>1) 6.6E-2</u>	uCi/cc noble gas
		2) 6.7E-5	uCi/cc 131I
m)	Ten Times Technical Specif Limits (as posted):	ication <u>1) 5.3E-2</u>	uCi/cc noble gas
		2) 7.0E-8	uCi/cc 131I
n)	Exhaust Stack Flow (cfm): (I-15, FI-7320)		cfm (STO 09)
0)	Average Wind Speed:		mph
p)	Wind Direction:		
NOTE:	North = 0° increasing deg:	ees-c.w. From	Degrees
q)	(200 ft 20 ft.) Differe Temperature	ntial	۰F
*Step off-s	s lh) and li) used onl cale high.	y if RIS-7324-1	or RIS-7324-2
Deter Secto	mine sectors affected using r Map (Figure 2): Sector(Site s)	
Deter Table	mine Stability Category usi 1 and Steps 10) and 1q). Stabili	ng ty Category	

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2.

3.



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_sec/m³ (STO 10)

- Determine the EAB dilution factor from Attachment 1 using the Stability Category (Step 3) and wind speed (Step 10).
 Dilution Factor
- If the release is continuing, consult with the Shift Supervisor and <u>estimate</u> the total number of hours the release will continue (i.e., from beginning to end). If the release have terminated, enter 0.

Preliminary estimate of release hours _____ hours. (STO 12)

- 6. Prepare the TI-59 for data entry.
 - a) Place TI-59 in printer/security cradle.
 - b) Plug in printer/security cradle.
 - c) Turn on printer/security cradle and TI-59.
 - d) Depress "TRACE" button on printer.
 - e) Obtain the magnetic card labeled "FSV Off-Site Dose Calculation (RERP) - Monitored Release."
 - f) Read magnetic card into TI-59.
 - 1) Depress |1| , |INV| , |2nd| , |WRITE| keys.
 - Insert magnetic card into right side of TI-59. Card should be right side up with the "1" in the upper left-hand corner.
 - 3) "1" will be displayed if the card was read properly -continue with Step 7. If a flashing number is displayed, the card was not read properly. Obtain the other magnetic card with the same title and repeat Step 6f).



FORT ST. VRAIN NUCLEAR GENERATING STATION

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7.	Input	the r	nece	ssar	y data	into	the	indicated	TI-59	storage	registers.	
	a)	Step	1c)	=	1 <u>570</u> 1	11						
	D)	Step	1d)	=	ISTO	03						
	c)	Step	le)	=	ISTOI	04						
	d)	Step	1f)	=		05						
	e)	Step	1g)	=	1 <u>STO</u> 1	06						
	f)	Step	lh)	=	1 <u>STO</u> 1	01						
	g)	Step	1i)	=	ISTOI	02						
	h)	Step	1j)	=	1 <u>570</u> 1	07						
	i)	Step	1k)	=	1 <u>570</u> 1	80						
	j)	Step	ln)	=	1 <u>5T0</u> 1	09						
	k)	Step	4)	=	1 <u>570</u> 1	10						
	1)	Step	5)	=	ISTOI	12						
8.	Run De	ose A	sses	smen	t Prog	ram						
	a)	Depre	e s s	R/S	key.							
	b)	Wait impro keys	unt oper and	il a exe rep	number cution beat Ste	of theps 7	disp ne pr and	layed. A rogram. D 8.	flashir epress	ig number <u>CLR</u> ar	n indicates	
9.	Deter popula	mine ation	basi	reco ed c	ommende on RERP	d prot PAG.	tect	ive action	for th	ne genera	a1	



FORT ST. VRAIN NUCLEAR GENERATING STATION

		SUMMARY	
10.	a)	The whole body gamma dose rate at the EAB is(RCL 19):	_Rem/hour
	Þ)	The classification of the event based	
		 If Step 10a) ≥ 1 Rem/hour, GENERAL EMERGENCY. 	
		2) If RCL 17 ≥ 1.6.6E-2 µCi/cc (Step 1 1)1), SITE AREA EMERGENCY1.	
		3) If RCL 17 ≥ 1.2.5E-2 µCi/cc (Step 1m)1) and ≤ 6.6E-21. µCi/cc, RADIOLOGICAL ALERT.	
	c)	The noble gas release rate is (RCL 18):	_Ci/sec
	d)	The accumulated whole body gamma dose at the EAB is (RCL 21):	_Rem
	e)	The total number of curies of noble . gas released to the present time is (RCL 20):	_C1
	f)	The <u>projected</u> whole body gamma dose at the EAB is (RCL 22):	_Rem
	g)	The thyroid dose rate at the EAB	_Rem/hour
	*h)	The classification of the event based on radioiodines is:	
		 If Step 10g) ≥ 5 Rem/hour, GENERAL EMERGENCY. 	
		<pre>2) If RCL 23 ≥ 1.6.7E-5 µCi/cc (Step 1 1)2), SITE AREA EMERGENCY.1.</pre>	
		<pre>3) If RCL 23 ≥ 1.7.0E-8 µCi/cc (Step lm)2) and < 6.7E-51. µCi/cc, RADIOLOGICAL ALERT.</pre>	
	i)	The radioiodine release rate is (RCL 26):	_Ci/sec

FORT ST. VRAIN NUCLEAR GENERATING STATION



Worksheet 2 Issue 14 Page 6 of 6

Rem

hours

j) The accumulated thyroid dose at the EAB is (RCL 29):

- k) The total number of curies of radioiodine released to the present time is (RCL 28):
- The projected thyroid dose at the EAB is (RCL 30):

Based on projected release duration of (RCL 12):

*If this classification differs from the classification in Step 10b), the higher (i.e., more severe) classification is to be used to determine recommended protective actions.



FORT ST. VRAIN NUCLEAR GENERATING STATION

hours (STO 11)

cpm (STO 03)

CDM

uCi/cc/cpm

(STO 04)

(STO 05)

(STO 06)

(STO 01)

mR/hr

uCi/cc/cpm

WORKSHEET 2

ASSESSMENT OF RELEASE USING TI-59 CALCULATOR PROGRAM-MONITORED RELEASE

This attachment is only to be used if the TI-59 calculator program is used. If the program is not used, use Worksheet 1.

This attachment is used to determine the following:

- a) Estimated noble gas and radioiodine release and release rate;
- Estimated whole body and thyroid gamma dose and dose rate at the EAB;
- c) Classification of the release;
- Projected whole body and thyroid gamma dose at the EAB; and
- e) Recommended protective action for the general population.
- 1. Collect the following data:
 - a) Date/Time of beginning of release:
 - b) Date/Time of ending of release. If release is still occurring, enter the Date/Time of the calculation:
 - c) Hours between la) and lb):
 - d) Maximum CPM, RIS-7324-1: (RR-93539, red pen)
 - e) Sensitivity RIS-7324-1: (I-14, 403-P7)
 - f) Maximum CPM, RIS-7324-2: (RR-93539, blue pen)
 - g) Sensitivity, RIS-7324-2: (I-14, 203-P7)
 - *h) Maximum mR/hr, Cutie Pie-2520 Probe:

FORT ST. VRAIN NUCLEAR GENERATING STATION



Worksheet 2 Issue 14 Page 2 of 6

1)	Maximum mR/hm, E-500-GM Prot		mR/hr (STO 02)
j)	Maximum CPM/MIN, RIS-73437-1	l:	cpm/min (STO 07)
	NOTE: Maximum CPM/Min must	be calculated as	:
	(Maximum CPM - Initia (Elapsed	al or Intermediat Time (min)	e CPM))
	from strip chart.		
k)	Sensitivity, RIS-73437-1:		uCi/cc/cpm/min (STO 08)
1)	Site Emergency Limit (as posted):	1) 6.6E-2	uCi/cc noble gas
		2) 6.7E-5	µCi/cc 131I
m)	Ten Times Technical Specific Limits (as posted):	ation <u>1) 5.3E-2</u>	uCi/cc noble gas
		2) 7.0E-8	µCi/cc ¹³¹ I
n)	Exhaust Stack Flow (cfm): (I-15, FI-7320)	-	cfm (STO 09)
0)	Average Wind Speed:		mph
p)	Wind Direction:		
NOTE:	North = 0° increasing degree	es-c.w. From	Degrees
q)	(200 ft 20 ft.) Differen Temperature	tial	۰F
*Step off-s	s lh) and li) used only cale high.	if RIS-7324-1	or RIS-7324-2
Deter Secto	mine sectors affected using r Map (Figure 2): Sector(s	Site)	
Deter Table	mine Stability Category usin 1 and Steps lo) and lq). Stabilit	g y Category	

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2

3



FORT ST. VRAIN NUCLEAR GENERATING STATION

4.	Deter Attac Cater (Ster	rmine th chment 1 gory (St p 1o).	ne EAB dilution factor from Lusing the Stability cep 3) and wind speed	
			Dilution Factor	sec/m³ (STO 10)
5.	If the Shift of he begin nated	he relea t Superv ours the nning to d. enter	ise is continuing, consult with the release will continue (i.e., from e end). If the release have termi- 0.	
	Prel	iminary	estimate of release hours	hours. (STO 12)
б.	Prep	are the	TI-59 for data entry.	
	a)	Place	TI-59 in printer/security cradle.	
	b)	Plug i	in printer/security cradle.	
	c)	Turn o	on printer/security cradle and TI-59.	
	d)	Depres	ss "TRACE" button on printer.	
	e)	Obtain Dose C	the magnetic card labeled "FSV Off- Calculation (RERP) - Monitored Release	Site e."
	f)	Read m	magnetic card into TI-59.	
		1)	Depress $ \overline{1} $, $ \overline{INV} $, $ \overline{2nd} $, $ \overline{WRIT} $	Ēļ keys.
		2)	Insert magnetic card into right side Card should be right side up with t the upper left-hand corner.	e of TI-59. he "1" in
		3)	"1" will be displayed if the card w properly -continue with Step 7. If number is displayed, the card was n properly. Obtain the other magneti with the same title and repeat Step	as read a flashing ot read c card 6f).



FORT ST. VRAIN NUCLEAR GENERATING STATION

Worksheet 2 Issue 14 Page 4 of 6

7.	Input	he necessary data into the indicated TI-59 storage registers.
	a)	$tep lc) = \overline{STO} 11$
	b)	$tep 1d) = \overline{STO} O3$
	c)	$tep le) = \underline{STO} 04$
	d)	$tep 1f) = \overline{STO} 05$
	e)	$tep lg) = \overline{STO} 06$
	f)	$tep lh) = \overline{STO} 0l$
	g)	$tep li) = \overline{STO} 02$
	h)	$tep lj) = \overline{STO} = 07$
	i)	$tep 1k) = \overline{STO} OS$
	j)	$tep ln) = \overline{STO} O9$
	k)	$tep 4) = \overline{STO} 10$
	1)	tep 5) = $ \overline{STO} $ 12
8.	Run Di	e Assessment Program
	â)	epress <u>R/S</u> key.
	b)	ait until a number is displayed. A flashing number indicates mproper execution of the program. Depress $ CLR $ and $ RST $ eys and repeat Steps 7 and 8.

 Determine the recommended protective action for the general population based on RERP-PAG.

K

Worksheet 2 Issue 14 Page 5 of 6

		SUMMARY	
10.	a)	The whole body gamma dose rate at the EAB is(RCL 19):	_Rem/hour
	b)	The classification of the event based	
		 If Step 10a) ≥ 1 Rem/hour, GENERAL EMERGENCY. 	
		2) If RCL 17 \geq 1.6.6E-2 µCi/cc (Step 1 1)1), SITE AREA EMERGENCY1.	
		3) If RCL 17 \ge 1.2.5E-2 µCi/cc (Step 1m)1) and \le 6.6E-21. µCi/cc, RADIOLOGICAL ALERT.	
	c)	The noble gas release rate is (RCL 18):	_Ci/sec
	d)	The accumulated whole body gamma dose at the EAB is (RCL 21):	_Rem
	e)	The total number of curies of noble gas released to the present time is (RCL 20):	_C1
	f)	The projected whole body gamma dose at the EAB is (RCL 22):	_Rem
	g)	The thyroid dose rate at the EAB	_Rem/hour
	*h)	The classification of the event based on radioiodines is:	_
		 If Step 10g) ≥ 5 Rem/hour, GENERAL EMERGENCY. 	
		2) If RCL 23 \geq 1.6.7E-5 μ Ci/cc (Step 1 1)2), SITE AREA EMERGENCY.1.	
		3) If RCL 23 \geq 1.7.0E-8 μ Ci/cc (Step 1m)2) and < 6.7E-51. μ Ci/cc, RADIOLOGICAL ALERT.	
	1)	The radioiodine release rate is (RCL 26):	_Ci/sec

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FORT ST. VRAIN NUCLEAR GENERATING STATION

Rem

Ci

Rem

hours

j) The accumulated thyroid dose at the EAB is (RCL 29):

- k) The total number of curies of radioiodine released to the present time is (RCL 28):
- The projected thyroid dose at the EAB is (RCL 30):

Based on projected release duracion of (RCL 12):

*If this classification differs from the classification in Step 10b), the higher (i.e., more severe) classification is to be used to determine recommended protective actions.



FORT ST. VRAIN NUCLEAR GENERATING STATION

WORKSHEET 2

ASSESSMENT OF RELEASE USING TI-59 CALCULATOR PROGRAM-MONITORED RELEASE

This attachment is only to be used if the TI-59 calculator program is used. If the program is not used, use Worksheet 1.

This attachment is used to determine the following:

- a) Estimated noble gas and radioiodine release and release rate;
- Estimated whole body and thyroid gamma dose and dose rate at the EAB;
- c) Classification of the release;
- Projected whole body and thyroid gamma dose at the EAB; and
- e) Recommended protective action for the general population.
- Collect the following data:
 - a) Date/Time of beginning of release:
 - b) Date/Time of ending of release. If release is still occurring, enter the Date/Time of the calculation:
 - c) Hours between 1a) and 1b):
 - d) Maximum CPM, RIS-7324-1: (RR-93539, red pen)
 - e) Sensitivity RIS-7324-1: (I-14, 403-P7)
 - f) Maximum CPM, RIS-7324-2: (RR-93539, blue pen)
 - g) Sensitivity, RIS-7324-2: (I-14, 203-P7)
 - *h) Maximum mR/hr, Cutie Pie-2520 Probe:
- _____mR/hr (STO 01)

hours

(STO 03)

CDM

(STO 11)

uCi/cc/cpm

(STO 04)

(STO 05)

(STO 06)

uCi/cc/cpm



FORT ST. VRAIN NUCLEAR GENERATING STATION

Worksheet 2 Issue 14 Page 2 of 6

-				
	1)	Maximum mR/hr, E-500-GM Pro	be	
	j)	Maximum CPM/MIN, RIS-73437-	1:	cpm/min (STO 07)
		NOTE: Maximum CPM/Min must	be calculated as:	
		(Maximum CPM - Initi (Elapsed	al or Intermediate (Time (min)	CPM)
		from strip chart.		
	k)	Sensitivity, RIS-73437-1:		uCi/cc/cpm/min (STO 08)
	1)	Site Emergency Limit (as posted):	1) 6.6E-2	uCi/cc noble gas
			2) 6.7E-5	uCi/cc 191I
	m)	Ten Times Technical Specifi Limits (as posted):	cation <u>1) 5.3E-2</u>	uCi/cc noble
			2) 7.0E-8	µC1/cc ¹³¹ I
	n)	Exhaust Stack Flow (cfm): (I-15, FI-7320)		cfm (STO C9)
	0)	Average Wind Speed:		mph
	p)	Wind Direction:		
	NOTE:	North = 0° increasing degre	ees-c.w. From	Degrees
	q)	(200 ft 20 ft.) Differen Temperature	ntial	•F
	*Step off-s	os lh) and li) used only scale high.	y if RIS-7324-1 o	or RIS-7324-2
	Deter Secto	rmine sectors affected using or Map (Figure 2): Sector(Site s)	
	Deter Table	rmine Stability Category usi e 1 and Steps 10) and 1q). Stabili	ng ty Category	

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2.

3.

8



FORT ST. VRAIN NUCLEAR GENERATING STATION

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	1.11			
4.	Deter Attac Categ (Step	mine the hment 1 ory (Ste 10).	e EAB dilution factor from using the Stability ep 3) and wind speed Dilution Factor	sec/m³
				(510 10)
5.	If th Shift of ho begin nated	e relea Superv urs the ning to , enter	se is continuing, consult with the isor and <u>estimate</u> the total number release will continue (i.e., from end). If the release have termi- 0.	
	Preli	minary	estimate of release hours hour	rs. (STO 12)
6.	Prepa	re the	TI-59 for data entry.	
	a)	Place	TI-59 in printer/security cradle.	
	b)	Plug i	n printer/security cradle.	
	c)	Turn o	n printer/security cradle and TI-59.	
	d)	Depres	s "TRACE" button on printer.	
	e)	Obtain Dose C	the magnetic card labeled "FSV Off-Site alculation (RERP) - Monitored Release."	e
	f)	Read m	agnetic card into TI-59.	
		1)	Depress $ \overline{1} $, $ \overline{INV} $, $ \overline{2nd} $, $ \overline{WRITE} $	keys.
		2)	Insert magnetic card into right side o Card should be right side up with the the upper left-hand corner.	f TI-59. "1" in
		3)	"1" will be displayed if the card was properly -continue with Step 7. If a number is displayed, the card was not	read flashing read
			with the same title and repeat Step 6f).



X

Worksheet 2 Issue 14 Page 4 of 6

7.	Input	the necessary data into the indicated TI-59 storage registers.
	a)	Step 1c) = $ \overline{STO} $ 11
	b)	Step 1d) = $ \overline{STO} $ 03
	c)	Step le) = $ \overline{\text{STO}} $ 04
	d)	Step 1f) = $ \overline{STO} $ 05
	e)	Step 1g) = $ \overline{STO} $ 06
	f)	Step 1h) = $ \overline{STO} $ 01
	g)	Step 1i) = $ \overline{STO} $ 02
	h)	Step 1j) = $ \overline{STO} $ 07
	i)	$Step 1k) = \overline{STO} 08$
	j)	Step ln) = $ \overline{STO} $ 09
	k)	Step 4) = $ \overline{STO} $ 10
	1)	Step 5) = $ \overline{STO} $ 12
8.	Run D	ose Assessment Program
	a)	Depress <u>R/S</u> key.
	b)	Wait until a number is displayed. A flashing number indicates improper execution of the program. Depress $ CLR $ and $ RST $ keys and repeat Steps 7 and 8.

 Determine the recommended protective action for the general population based on RERP-PAG.



FORT ST. VRAIN NUCLEAR GENERATING STATION

a) The whole body gamma dose rate at the EAB is(RCL 19):	_Rem/hour
b) The classification of the event based on noble gases is:	
 If Step 10a) ≥ 1 Rem/hour, GENERAL EMERGENCY. 	
2) If RCL 17 ≥ 1.6.6E-2 µCi/cc (Step 1 1)1), SITE AREA EMERGENCY1.	
3) If RCL 17 \geq 1.2.5E-2 µCi/cc (Step 1m)1) and \leq 6.6E-21. µCi/cc, RADIOLOGICAL ALERT.	
c) The noble gas release rate is (RCL 18):	_Ci/sec
d) The accumulated whole body gamma dose at the EAB is (RCL 21):	Rem
e) The total number of curies of noble . gas released to the present time is (RCL 20):	_C1
f) The projected whole body gamma dose at the EAB is (RCL 22):	Rem
g) The thyroid dose rate at the EAB is (RCL 27):	_Rem/hour
*h) The classification of the event based on radioiodines is:	2003
 If Step 10g) ≥ 5 Rem/hour, GENERAL EMERGENCY. 	
<pre>2) If RCL 23 ≥ 1.6.7E-5 µC1/cc (Step 1 1)2), SITE AREA EMERGENCY.1.</pre>	
<pre>3) If RCL 23 ≥ 1.7.0E-8 µCi/cc (Step 1m)2) and < 6.7E-51. µCi/cc, RADIOLOGICAL ALERT.</pre>	
 The radioiodine release rate is (RCL 26): 	_Ci/sec



FORT ST. VRAIN NUCLEAR GENERATING STATION

Worksheet 2 Issue 14 Page 6 of 6

Rem

Ci

Rem

hours

j) The accumulated thyroid dose at the EAB is (RCL 29):

- k) The total number of curies of radioiodine released to the present time is (RCL 28):
- The projected thyroid dose at the EAB is (RCL 30):

Based on projected release duration of (RCL 12):

*If this classification differs from the classification in Step 10b), the higher (i.e., more severe) classification is to be used to determine recommended protective actions.



FORT ST. VRAIN NUCLEAR GENERATING STATION

Worksheet 2 Issue 14 Page 1 of 6

hours

CDM

mR/hr

(STO 01)

(STO 05)

(STO 11)

WORKSHEET 2

ASSESSMENT OF RELEASE USING TI-59 CALCULATOR PROGRAM-MONITORED RELEASE

This attachment is only to be used if the TI-59 calculator program is used. If the program is not used, use Worksheet 1.

This attachment is used to determine the following:

- a) Estimated noble gas and radioiodine release and release rate;
- Estimated whole body and thyroid gamma dose and dose rate at the EAB;
- c) Classification of the release;
- Projected whole body and thyroid gamma dose at the EAB; and
- e) Recommended protective action for the general population.

1. Collect the following data:

- a) Date/Time of beginning of release:
- b) Date/Time of ending of release. If release is still occurring, enter the Date/Time of the calculation:
- c) Hours between la) and lb):
- d) Maximum CPM, RIS-7324-1: _____cpm _____(RR-93539, red pen) (STO D3)
- e) Sensitivity RIS-7324-1: _____uCi/cc/cpm (I-14, 403-P7) (STO 04)
- f) Maximum CPM, RIS-7324-2: (RR-93539, blue pen)
- g) Sensitivity, RIS-7324-2: _____uCi/cc/cpm (I-14, 203-P7) (STO 06)

*h) Maximum mR/hr, Cutie Pie-2520 Probe:



FORT ST. VRAIN NUCLEAR GENERATING STATION

Worksheet 2 Issue 14 Page 2 of 6

1)	Maximum mR/hr, E-500-GM Probe		mR/hr (STO 02)
j)	Maximum CPM/MIN, RIS-73437-1:		cpm/min (STO 07)
	NOTE: Maximum CPM/Min must be	e calculated as:	
	(Maximum CPM - Initial (Elapsed T	or Intermediate ime (min)	CPM)
	from strip chart.		
k)	Sensitivity, RIS-73437-1:		uCi/cc/cpm/min (STO 08)
1)	Site Emergency Limit (as posted):	1) 6.6E-2	uCi/cc noble gas
		2) 6.7E-5	uCi/cc 131I
m)	Ten Times Technical Specifica Limits (as posted):	tion <u>1) 5.3E-2</u>	uCi/cc nobie gas
		2) 7.0E-8	uCi/cc ¹³¹ I
n)	Exhaust Stack Flow (cfm): (I-15, FI-7320)		cfm (STO 09)
0)	Average Wind Speed:		mph
p)	Wind Direction:		
NOTE :	North = 0° increasing degrees	-c.w. From	Degrees
q)	(200 ft 20 ft.) Differenti Temperature	a]	°F
*Step off-s	s lh) and li) used only cale high.	if RIS-7324-1 o	or RIS-7324-2
Deter Secto	mine sectors affected using Si or Map (Figure 2): Sector(s)	te	
Deter Table	mine Stability Category using 1 and Steps 10) and 1q). Stability	Category	

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2.

3



FORT ST. VRAIN NUCLEAR GENERATING STATION

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4.	Deter Attac Categ (Ster	rmine th chment 1 gory (St p 1o).	e EAB dilution factor from using the Stability ep 3) and wind speed Dilution Factor	_sec/m³ (STO 10)
5.	If th Shift of ho begin nated	he relea t Superv ours the nning to d, enter	se is continuing, consult with the isor and <u>estimate</u> the total number release will continue (i.e., from end). If the release have termi- 0.	
	Prel	iminary	estimate of release hours hours.	(STO 12)
6.	Prepa	are the	TI-59 for data entry.	
	a)	Place	TI-59 in printer/security cradle.	
	b)	Plug i	n printer/security cradle.	
	c)	Turn o	n printer/security cradle and TI-59.	
	d)	Depres	s "TRACE" button on printer.	
	e)	Obtain Dose C	the magnetic card labeled "FSV Off-Site alculation (RERP) - Monitored Release."	
	f)	Read m	agnetic card into TI-59.	
		1)	Depress $ \overline{1} $, $ \overline{INV} $, $ \overline{2nd} $, $ \overline{WRITE} $ keys	
		2)	Insert magnetic card into right side of TI Card should be right side up with the "1" the upper left-hand corner.	-59. in
		3)	"1" will be displayed if the card was read properly -continue with Step 7. If a flas number is displayed, the card was not read properly. Obtain the other magnetic card with the same title and repeat Step 6f).	hing



FORT ST. VRAIN NUCLEAR GENERATING STATION

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7.	Input	the r	neces	ssar	y data	into	the	indicated	TI-59	storage	registers.
	a)	Step	1c)	=	ISTOI	11					
	b)	Step	1d)	=	ISTOI	03					
	c)	Step	le)	=	STO	04					
	d)	Step	1f)	=	ISTOI	05					
	e)	Step	lg)	=	1 <u>STO</u> 1	06					
	f)	Step	lh)	=	I STO I	01					
	g)	Step	li)	=	1 <u>570</u> 1	02					
	h)	Step	1j)	=	ISTOI	07					
	1)	Step	1k)	=	ISTOI	08					
	j)	Step	ln)	=	ISTOI	09					
	k)	Step	4)	=	STO	10					
	1)	Step	5)	=	ISTOI	12					
8.	Run D	ose A	sses	sme	nt Prog	ram					
	a)	Depr	ess	R/	S key.						
	b)	Wait impr keys	unt oper and	il ex re	a numbe ecution peat St	r is of t eps 7	disp he p and	layed. A rogram. [8.	flashi Depress	ng numbe <u>CLR</u> a	r indicates nd <u>RST</u>
9.	Deter popul	mine ation	the bas	rec ed	ommende on RERP	d pro -PAG.	tect	ive action	n for t	he gener	al
6.65											



FORT ST. VRAIN NUCLEAR GENERATING STATION

	SUMMARY	
10. a)	The whole body gamma dose rate at the EAB is(RCL 19):	_Rem/hour
b)	The classification of the event based	
	 If Step 10a) ≥ 1 Rem/hour, GENERAL EMERGENCY. 	
	2) If RCL 17 ≥ 1.6.6E-2 µCi/cc (Step 1 1)1), SITE AREA EMERGENCY1.	
	3) If RCL 17 \geq 1.2.5E-2 uCi/cc (Step 1m)1) and \leq 6.6E-21. uCi/cc, RADIOLOGICAL ALERT.	
c)	The noble gas release rate is (RCL 18):	_Ci/sec
d)	The accumulated whole body gamma dose at the EAB is (RCL 21):	_Rem
e)	The total number of curies of noble gas released to the present time is (RCL 20):	_Ci
f)	The projected whole body gamma dose at the EAB is (RCL 22):	Rem
g)	The thyroid dose rate at the EAB is (RCL 27):	_Rem/hour
*h)	The classification of the event based on radioiodines is:	
	 If Step 10g) ≥ 5 Rem/hour, GENERAL EMERGENCY. 	
	<pre>2) If RCL 23 ≥ 1.6.7E-5 µCi/cc (Step 1 1)2), SITE AREA EMERGENCY.1.</pre>	
	3) If RCL 23 \geq 1.7.0E-8 μ Ci/cc (Step 1m)2) and < 6.7E-51. μ Ci/cc, RADIOLOGICAL ALERT.	
1)	The radioiodine release rate is (RCL 26):	_Ci/sec





FORT ST. VRAIN NUCLEAR GENERATING STATION

j)	The accumulated thyroid dose at the EAB is (RCL 29):	Rem
k)	The total number of curies of radioiodine released to the present time is (RCL 28):	Ci
1)	The projected thyroid dose at the EAB is (RCL 30):	Rem
	Based on projected release duration of (RCL 12):	hours

*If this classification differs from the classification in Step 10b), the higher (i.e., more severe) classification is to be used to determine recommended protective actions.



FORT ST. VRAIN NUCLEAR GENERATING STATION

hours (STO 11)

CDM

(STO 05)

(STO 06)

mR/hr (STO 01)

uCi/cc/com

WORKSHEET 2

ASSESSMENT OF RELEASE USING TI-59 CALCULATOR PROGRAM-MONITORED RELEASE

This attachment is only to be used if the TI-59 calculator program is used. If the program is <u>not</u> used, use Worksheet 1.

This attachment is used to determine the following:

- a) Estimated noble gas and radioiodine release and release rate;
- Estimated whole body and thyroid gamma dose and dose rate at the EAB;
- c) Classification of the release;
- d) Projected whole body and thyroid gamma dose at the EAB; and
- e) Recommended protective action for the general population.
- Collect the following data:
 - a) Date/Time of beginning of release:
 - b) Date/Time of ending of release. If release is still occurring, enter the Date/Time of the calculation:
 - c) Hours between 1a) and 1b):
 - d) Maximum CPM, RIS-7324-1: (RR-93539, red pen) (STO 03)
 - e) Sensitivity RIS-7324-1: _____µCi/cc/cpm (I-14, 403-P7) (STO 04)
 - f) Maximum CPM, RIS-7324-2: (RR-93539, blue pen)
 - g) Sensitivity, RIS-7324-2: (I-14, 203-P7)
 - *h) Maximum mR/hr, Cutie Pie-2520 Probe:



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1)	Maximum mR/hr, E-500-GM Prot		mR/hr (STO 02)
j)	Maximum CPM/MIN, RIS-73437-1	u	cpm/min (STO 07)
	NOTE: Maximum CPM/Min must	be calculated as	:
	(Maximum CPM - Initia (Elapsed	al or Intermediat Time (min)	e CPM))
	from strip chart.		
k)	Sensitivity, RIS-73437-1:	-	uCi/cc/cpm/min (STO 08)
1)	Site Emergency Limit (as posted):	<u>1) 6.6E-2</u>	µCi/cc noble gas
		2) 6.7E-5	uCi/cc 131I
m)	Ten Times Technical Specific Limits (as posted):	1) 5.3E-2	uCi/cc noble gas
		2) 7.0E-8	µCi/cc 131I
n)	Exhaust Stack Flow (cfm): (I-15, FI-7320)		cfm (STO 09)
0)	Average Wind Speed:		mph
p)	Wind Direction:		
NOTE:	North = 0° increasing degree	es-c.w. From	Degrees
q)	(200 ft 20 ft.) Different Temperature	tial	•F
*Step off-s	s lh) and li) used only cale high.	if RIS-7324-1	or RIS-7324-2
Deter Secto	mine sectors affected using S or Map (Figure 2): Sector(s)	Site)	
Deter Table	mine Stability Category using 1 and Steps 10) and 1q). Stability	g y Category	

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2.

3.



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4.	Deter Attac Categ (Step	mine th hment 1 ory (St 10).	e EAB dilution factor from using the Stability ep 3) and wind speed		
			Dilution Factor		_sec/m³ (STO 10)
5.	If th Shift of ho begin nated	e relea Superv urs the ning to , enter	se is continuing, consult with t isor and <u>estimate</u> the total numb release will continue (i.e., fr end). If the release have term 0.	the ber rom ni-	
	Preli	minary	estimate of release hours	hours.	(STO 12)
6.	Prepa	re the	TI-59 for data entry.		
	a)	Place	TI-59 in printer/security cradle	e.	
	b)	Plug i	n printer/security cradle.		
	c)	Turn o	n printer/security cradle and TI	1-59.	
	d)	Depres	s "TRACE" button on printer.		
	e)	Obtain Dose C	the magnetic card labeled "FSV alculation (RERP) - Monitored Re	Off-Site elease."	
	f)	Read m	agnetic card into TI-59.		
		1)	Depress $ \overline{1} $, $ \overline{INV} $, $ \overline{2nd} $,	WRITE keys	
		2)	Insert magnetic card into right Card should be right side up with the upper left-hand corner.	t side of TI ith the "1"	-59. in
		3)	"1" will be displayed if the caproperly -continue with Step 7, number is displayed, the card w properly. Obtain the other mag with the same title and repeat	ard was read . If a flas was not read gnetic card Step 6f).	hing
FORT ST. VRAIN NUCLEAR GENERATING STATION

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7.	Input	the n	ecessa	ry data	into	the	indicated	TI-59	storage	registers.
	a)	Step	lc) =	ISTO	11					
	Þ)	Step	1d) =	ISTOI	03					
	c)	Step	1e) =	1 <u>STO</u> 1	04					
	d)	Step	lf) =	ISTOI	05					
	e)	Step	lg) =	1 5101	06					
	f)	Step	lh) =	1 <u>STO</u> 1	01					
	g)	Step	11) =	ISTOI	02					
	h)	Step	1j) =	ISTOI	07					
	i)	Step	1k) =	ISTOI	08					
	j)	Step	ln) =	ISTOI	09					
	k)	Step	4) =	1 <u>STO</u> 1	10					
	1)	Step	5) =	ISTOI	12					
8.	Run De	ose As	sessme	nt Prog	ram					
	a)	Depre	ss <u>R/</u>	<u>s</u> key.						
	b)	Wait impro keys	until oper ex and re	a numbe ecution peat St	r is c of th eps 7	disp he p and	layed. A rogram. 1 8.	flashi Depress	ng number <u>CLR</u> an	r indicates nd <u>RST</u>
9.	Deter	mine t ation	the rec based	ommende on RERP	d prot -PAG.	tect	ive action	n for t	he gener	al



FORT ST. VRAIN NUCLEAR GENERATING STATION

	SUMMARY	
10. a)	The whole body gamma dose rate at the EAB is(RCL 19):	_Rem/hour
b)	The classification of the event based	
	 If Step 10a) ≥ 1 Rem/hour, GENERAL EMERGENCY. 	
	<pre>2) If RCL 17 ≥ 1.6.6E-2 µCi/cc (Step 1 1)1), SITE AREA EMERGENCY1.</pre>	
	3) If RCL 17 ≥ 1.2.5E-2 µCi/cc (Step 1m)1) and ≤ 6.6E-21. µCi/cc, RADIOLOGICAL ALERT.	
c)	The noble gas release rate is (RCL 18):	_Ci/sec
d)	The accumulated whole body gamma dose at the EAB is (RCL 21):	Rem
e)	The total number of curies of noble . gas released to the present time is (RCL 20):	_C1
f)	The projected whole body gamma dose at the EAB is (RCL 22):	Rem
g)	The thyroid dose rate at the EAB	_Rem/hour
*h)	The classification of the event based on radioiodines is:	
	 If Step 10g) ≥ 5 Rem/hour, GENERAL EMERGENCY. 	
	<pre>2) If RCL 23 ≥ 1.6.7E-5 µCi/cc (Step 1 1)2), SITE AREA EMERGENCY.1.</pre>	
	3) If RCL 23 \geq 1.7.0E-8 μ Ci/cc (Step 1m)2) and < 6.7E-51. μ Ci/cc, RADIOLOGICAL ALERT.	
i)	The radioiodine release rate is (RCL 26):	_Ci/sec



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Rem

Rem

hours

j) The accumulated thyroid dose at the EAB is (RCL 29):

- k) The total number of curies of radioiodine released to the present time is (RCL 28):
- The projected thyroid dose at the EAB is (RCL 30):

Based on projected release duration of (RCL 12):

*If this classification differs from the classification in Step 10b), the higher (i.e., more severe) classification is to be used to determine recommended protective actions.



FORT ST. VRAIN NUCLEAR GENERATING STATION

hours

CDM

Ci

Ci

SCC

uCi/cc/cpm

gas

WORKSHEET 3

ASSESSMENT OF RELEASE-UNMONITORED RELEASE

This attachment is to be used only if the TI-59 calculator program is not used. If the TI-59 program is used, Worksheet 4 is to be used.

This attachment is used to determine the following due to an unmonitored release via the Reactor Building Louvers or the PCRV Relief Valves:

- Estimated whole body and thyroid gamma dose and dose rate at the EAB;
- b) Classification of the release;
- c) Projected whole body and thyroid gamma dose at the EAB; and
- d) Recommended protective action for the general population.
- 1. Date/Time of beginning of release
- Date/Time of ending of release. If release is still occurring, enter the Date/Time of the calculation.
- 3. Hours between 1. and 2.
- Collect the following data:
 - a) Maximum CPM, RIS-9301: (RR-93256, Pt. 10)
 - b) Sensitivity RIS-9301:
 - c) Primary coolant ¹³¹I equivalent circulating inventory:
 - d) Primary coolant ¹³¹I equivalent plateout inventory:
 - e) Primary Coolant Volume:
 - f) Site Emergency Limit (as posted): 1) 6.6E-2 µCi/cc noble
 - g) Ten times Technical Specification Limits

 (as posted):
 2) <u>6.7E-5</u> µCi/cc¹³¹I
 2.5E-2 µCi/cc noble gas

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			2)	7.0E-8	_µC1/cc 131I
	h)	Average Wind Speed:			mph
	1)	Wind Direction	From		Degrees
		NOTE: North = 0° increasin	ig degrees -	c.w.	
	j)	(200 ft 20 ft.) Differential Temperature			•F
5.	Deter (Figi	rmine sectors affected using ure 2):	Site Sector Sector(s)	Мар	_
5.	Dete Step	rmine Stability Category usir 4i and Step 4j: Stabilit	ng Table 1, ny Category		_
	Calc	ulate the release noble gas o	concentration	n:	
		RIS-9301 concentration = (s	tep 4a) x (step 4b)	
		= () x ()	
		÷_	μ	Ci/cc	
3.	Calc	ulate the source term, Q _{ng}	(noble gas	release ra	ite):
	a)	Reactor Building Louvers			
		Q _{ng} = (step 7) x (5.8 E + = () x (5.8 E	-7)* x (1 E +7)* x (1 E	-6 Ci/uci) -6)	
		=Ci/sec			
		*Release rate (cc/sec) from	louvers (F	SAR, Secti	ion 14.11.2.6).
	b)	PCRV Safety Valves			
		$Q_{ng} = (step 7) \times (1.9 E +7)$)** x (1 E -	6)	
		= () x (1.9 E +7)	** x (1 E -	6)	
		=Ci/sec			
		**Release rate (cc/sec) fro	om both PCRV	safeties	



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Classification of Event

 Determine weighted noble gas dose conversion factor from Table 2:

7.5E+2 Rem/hour Ci/m³

 Determine the EAB atmospheric dilution factor from Attachment 1 using Steps 6 and 4h:

Dilution Factor sec/m³

General Emergency Determination

11. Determine the whole body dose rate at the EAB:

a) Reactor Building Louvers

Dose Rate = (step 8a) x (step 9) x (step 10)

= () x () x ()

= Rem/hour

b) PCRV Safety Valves

Dose Rate = (step 8b) (step 9) x (step 10)

= () x () x ()

= Rem/hour

12. If the resulting dose rate at the EAB is ≥ 1 Rem/hour, the classification of the event is GENERAL EMERGENCY. Inform the Shift Supervisor of the General Emergency Condition. Then go directly to Step 15.

Site 1. Areal. Emergency Determination

 If 1.Step 8a. or 8b. is greater than or equal to 9.6E-1 Ci/sec, the classification of event is SITE AREA EMERGENCY. Inform the Shift Supervisor of the Site Areal. Emergency Condition. Then go directly to Step 15.



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Radiological Alert Determination

14. If 1.Step 8a. or 8b. is greater than or equal to ten times the Technical Specification limit 3.7E-1 Ci/secl., the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 15.

Curies of Noble Gas Released

- 15. Calculate the curies of noble gas released to present time.
 - a) Reactor Building Louvers

Curies Released = (step 8a) x (step 3) x (3.6 E +3) = () x () x (3.6 E +3)

= Curies

b) PCRV Safety Valves

Curies Released = (step 8b) x (step 3) x (3.6 E +3) = () x () x (3.6 E +3) = _____Curies

Accumulated Whole Body Gamma Dose at EAB

16. Calculate the dose received at the EAB.

a) Reactor Building Louvers

Dose = (step 11a) x (step 3) = () x ()

=____Rem

b) PCRV Safety Valves

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Dose = (step 11b) x (step 3) = () x () = Rem NOTE: This calculation assumes the recipient was at the EAB for the entire duration of the release. Projections 17. If the release is continuing, consult with the Shift Supervisor and estimate the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter N/A. Preliminary estimate of release hours hour(s). 18. Project the total whole body gamma dose at the EAB. If the release has terminated, enter N/A. a) Reactor Building Louvers Projected Dose at EAB = (step 11a) x (step 17) = () x () = Rem b) PCRV Safety Valves Projected Dose at EAB = (step 11b) x (step 17) = () x () = Rem

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19.	Calculate the release ¹³¹ I equivalent concentration (Reactor Building Louvers or PCRV Safety Valves).
	1311 Equivalent Concentration =
	(step 4c) + (step 4d) x (5.7 E -3) *** + (step 4e)
	=() + () x (5.7 E -3) *** + ()
	=Ci/cc
	***Amount of plateout ¹³¹ I equivalent released (FSAR, Section 14.11.2.7.1).
20.	Calculate the source term, Q (^{131}I equivalent release rate).
	a) Reactor Building Louvers
	$Q = (step 19) \times (5.8 E +7)$
	= () x (5.8 E +7)
	=Ci/sec
	b) PCRV Safety Valves
	$Q = (step 19) \times (1.9 E + 7)$
	= () x (1.9 E +7)
	=Ci/sec
	Classification of Event
21.	Determine ¹³¹ I dose conversion factor from Attachment 8. <u>1.2E+6 Rem/hour</u> Ci/m ³
22.	Determine the thyroid dose rate at the EAB.
	a) Reactor Building Louvers
	Dose Rate = (step 20a) x (step 21) x (step 10)
	= () x () x ()
	= 1.Rem/hour1.

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b) PCRV Safety Valves

Dose Rate = (step 2Cb) x (step 21) x (step 10) = () x () x () = _____Rem/hour

General Emergency Determination

23. If the resulting dose rate at the EAB is ≥ 5 Rem/hour, the classification of the event is GENERAL EMERGENCY. Inform the Shift Supervisor of the General Emergency Condition. Then go directly to Step 26 of this attachment.

Site 1.Areal. Emergency Determination

24. If 1.Step 20a. or 20b. is greater than or equal to 9.8E-4 Ci/sec, the classification of the event is SITE AREA EMERGENCY. Inform the Shift Supervisor of the Site Areal. Emergency Condition. Then go directly to Step 26 of this attachment.

Radiological Alert Determination

25. If Step 19 is greater than or equal to ten times the Technical Specification limit 1.1.0E-7 Ci/sec,1. the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 26.

Curies of ¹³¹I Equivalent Released

- Calculate the curies of ¹³¹I equivalent released to present time.
 - a) Reactor Building Louvers

Curies Released = (step 20a) x (step 3) x (3.6 E + 3 s/hr)

 $= () \times () \times (3.6 E + 3)$

= Curies

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	b) PCRV Safety Valves
	Curies Released = (step 20b) x (step 3) x (3.6 E +3)
	= () x () x (3.6 E +3)
	=Curies
	Accumulated Thyroid Dose at EAB
27.	Calculate the dose received at the EAB.
	a) Reactor Building Louvers
	Dose =
	= (step 22a) x (step 3)
	b) DCDV Safety Values
	Dose = (sten 22b) x (sten 3)
	$= () \times ()$
	= Rem
	NOTE: This calculation assumes the recipient was at the EAB for the entire duration of the release.
	Projections
28.	If the release is continuing, consult with the Shift Supervisor and <u>estimate</u> the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter N/A.
	Preliminary estimate of release hourshour(s).

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29.	Project the total thyroid dose at the EAB. If the release has terminated, enter N/A.
	a) Reactor Building Louvers
	Projected Dose at EAB = (step 22a) x (step 28)
	= () × ()
	=Rem
	b) PCRV Safety Valves
	Projected Dose at EAB = (step 22b) x (step 28)
	= () × ()
	=Rem
30.	Determine the recommended protective action for the general population based on the results of Steps 18 and 29. Refer to RERP-PAG.
	Summary
31.	The whole body gamma dose rate at theRem/hr
32.	The classification of the event based on noble gases is (Step 12 or Step 13 or Step 14):
33.	The noble gas release rate is (Step 8a or 8b):
34.	The accumulated whole body gamma dose at
35.	The total number of curies of noble gas released to the present time is (Step 15a or 15b):Curies
36.	The projected whole body gamma dose at

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37. Based on projected release duration of (Scep 17): hours 38. The thyroid dose rate at the EAB is kem/hour (Step 22a or 22b): *The classification of the event based on 39. 131I equivalent is (Step 23 or Step 24 or Step 25): 40. The ¹³¹I equivalent release rate is (Step 20a or 20b): Ci/sec 41. The accumulated thyroid dose at the EAB Rem is (Step 27a or 27b): 42. The total number of curies of 1311 equivalent released to the present time is Curies (Step 26a or 26b): 43. The projected thyroid dose at the EAB is (Step 29a or 29b): Rem Based on projected release duration of hours (Step 28): ·

*If this classification differs from the classification in Step 31, the higher (i.e., more severe) classification is to be used to determine recommended protective action.

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hours

CDM

Ci

Ci

SCC

uCi/cc/cpm

gas

	-	*	20	~	6.8	-	*	*	-
ú	61	~	ĸ	~	ы	-	-	1	
٠	~	53	r_{λ}	-	11	1	-	1.0	~

ASSESSMENT OF RELEASE-UNMONITORED RELEASE

This attachment is to be used only if the TI-59 calculator program is not used. If the TI-59 program is used, Worksheet 4 is to be used.

This attachment is used to determine the following due to an unmonitored release via the Reactor Building Louvers or the PCRV Relief Valves:

- Estimated whole body and thyroid gamma dose and dose rate at the EAB;
- b) Classification of the release;
- c) Projected whole body and thyroid gamma dose at the EAB; and
- d) Recommended protective action for the general population.
- 1. Date/Time of beginning of release
- Date/Time of ending of release. If release is still occurring, enter the Date/Time of the calculation.
- 3. Hours between 1. and 2.
- 4. Collect the following data:
 - a) Maximum CPM, RIS-9301: (RR-93256, Pt. 10)
 - b) Sensitivity RIS-9301:
 - c) Primary coolant ¹³¹I equivalent circulating inventory:
 - d) Primary coolant ¹³¹I equivalent plateout inventory:
 - e) Primary Coolant Volume:
 - f) Sita Emergency Limit (as posted): 1) <u>6.6E-2</u> uCi/cc noble gas
 - g) Ten times Technical Specification Limits

 (as posted):
 2) <u>6.7E-5</u> uCi/cc¹³¹I
 1) <u>2.5E-2</u> uCi/cc noble

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			2) <u>7.0E-8</u>	_uCi/cc ¹³¹ I
	h)	Average Wind Speed:		mph
	i)	Wind Direction	From	Degrees
		NOTE: North = 0° increas	ing degrees - c.w.	
	j)	(200 ft 20 ft.) Differential Temperature		_°F
5.	Dete (Fig	rmine sectors affected usin ure 2):	g Site Sector Map	
			Sector(s)	
6.	Dete Step	rmine Stability Category us 4i and Step 4j: Stabil	ing Table 1, ity Category	
7	Calc	ulate the velesce poble car	concontration.	
/ .	Carc	urace the release house yas	concentración.	
		RIS-9301 concentration =	(step 4a) x (step 4b)	
		=	()×()	
		=	uCi/cc	
8.	Calc	ulate the source term, Q_{ng}	(noble gas release ra	ate):
	a)	Reactor Building Louvers		
		$Q_{ng} = (step 7) \times (5.8 E)$ = () x (5.8	E +7)* x (1 E -6 Ci/µci) E +7)* x (1 E -6))
		= Ci/se	c	
		*Release rate (cc/sec) fr	om louvers (FSAR, Sect	ion 14.11.2.6).
	b)	PCRV Safety Valves		
		Q _{ng} = (step 7) x (1.9 E -	←7)** × (1 E -6)	
		= () x (1.9 E -	-7)** x (1 E -6)	
		=Ci/sec		
		<pre>**Release rate (cc/sec) (FSAR, Section 6 .8).</pre>	from both PCRV safeties	

0	FORT ST. VRAIN NUCLEAR GENERATING STATION	Worksheet 3 Issue 14 Page 3 of 10
	Classification of Event	
).	Determine weighted noble gas dose conversion factor from Table 2: <u>7.5E+2</u>	Rem/hour Ci/m³
.0.	Determine the EAB atmospheric dilution factor from Attachment 1 using Steps 6 and 4h:	
	Dilution Factor	sec/m³
	General Emergency Determination	
1.	Determine the whole body dose rate at the EAB:	
	a) Reactor Building Louvers	
	Dose Rate = (step 8a) x (step 9) x (step 10)	
	= () x () x ()	
	=Rem/hour	
	b) PCRV Safety Valves	
	Dose Rate = (step 8b) (step 9) x (step 10)	
	= () x () x (_)	
	=Rem/hour	
12.	If the resulting dose rate at the EAB is \geq 1 Rem/h classification of the event is GENERAL EMERGENCY. Inf Shift Supervisor of the General Emergency Condition. directly to Step 15.	our, the orm the Then go
	Site 1. Areal. Emergency Determination	
13.	If 1.Step 8a. or 8b. is greater than or equal to 9.6E-1 the classification of event is SITE AREA EMERGENCY. Inf Shift Supervisor of the Site Areal. Emergency Condition	Ci/sec, form the m. Then

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Radiological Alert Determination

14. If 1.Step 8a. or 8b. is greater than or equal to ten times the Technical Specification limit 3.7E-1 Ci/secl., the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 15.

Curies of Noble Gas Released

- 15. Calculate the curies of noble gas released to present time.
 - a) Reactor Building Louvers

Curies Released = (step 8a) x (step 3) x (3.6 E +3) = () x () x (3.6 E +3)

= Curies

b) PCRV Safety Valves

Curies Released = (step 8b) x (step 3) x (3.6 E +3) = () x () x (3.6 E +3) = _____Curies

Accumulated Whole Body Gamma Dose at EAB

16. Calculate the dose received at the EAB.

a) Reactor Building Louvers

Dose = (step 11a) x (step 3) = () x () = _____Rem

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b) PCRV Safety Valves Dose = (step 11b) x (step 3) = () x () = Rem NOTE: This calculation assumes the recipient was at the EAB for the entire duration of the release. Projections 17. If the release is continuing, consult with the Shift Supervisor and estimate the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter N/A. Preliminary estimate of release hours hour(s). 18. Project the total whole body gamma dose at the EAB. If the release has terminated, enter N/A. a) Reactor Building Louvers Projected Dose at EAB = (step 11a) x (step 17) = () x () = Rem PCRV Safety Valves b) Projected Dose at EAB = (step 11b) x (step 17) = () x () = Rem

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19. Calculate the release 1311 equivalent concentration (Reactor Building Louvers or PCRV Safety Valves). 1311 Equivalent Concentration = (step 4c) + (step 4d) x (5.7 E -3) *** + (step 4e) $=() + () \times (5.7 \text{ E} - 3) + ()$ = Ci/cc ***Amount of plateout ¹³¹I equivalent released (FSAR, Section 14.11.2.7.1). 20. Calculate the source term, Q (131 I equivalent release rate). a) Reactor Building Louvers $Q = (step 19) \times (5.8 E +7)$ = () x (5.8 E +7) = Ci/sec PCRV Safety Valves b) $O = (step 19) \times (1.9 E + 7)$ $= () \times (1.9 \pm +7)$ = _____Ci/sec Classification of Event 21. Determine ¹³¹I dose conversion factor 1.2E+6 Rem/hour from Attachment 8. Ci/m³ 22. Determine the thyroid dose rate at the EAB. a) Reactor Building Louvers Dose Rate = (step 20a) x (step 21) x (step 10) = () x () x () = 1.Rem/hourl.

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b) PCRV Safety Valves

Dose Rate = (step 20b) x (step 21) x (step 10)

= () x () x ()

= Rem/hour

General Emergency Determination

23. If the resulting dose rate at the EAB is ≥ 5 Rem/hour, the classification of the event is GENERAL EMERGENCY. Inform the Shift Supervisor of the General Emergency Condition. Then go directly to Step 26 of this attachment.

Site 1. Areal. Emergency Determination

24. If 1.Step 20a. or 20b. is greater than or equal to 9.8E-4 Ci/sec, the classification of the event is SITE AREA EMERGENCY. Inform the Shift Supervisor of the Site Areal. Emergency Condition. Then go directly to Step 26 of this attachment.

Radiological Alert Determination

25. If Step 19 is greater than or equal to ten times the Technical Specification limit 1.1.0E-7 Ci/sec,1. the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 26.

Curies of ¹³¹I Equivalent Released

- Calculate the curies of ¹³¹I equivalent released to present time.
 - a) Reactor Building Louvers

Curies Released = $(step 20a) \times (step 3) \times (3.6 E + 3 s/hr)$

= () x () x (3.6 E +3)

= ____Curies

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9.	Proje termi	ect the total thyroid dose at the EAB. If the release has inated, enter N/A.
	a)	Reactor Building Louvers
		Projected Dose at EAB = (step 22a) x (step 28)
		= () x ()
		=Rem
	b)	PCRV Safety Valves
		Projected Dose at EAB = (step 22b) x (step 28)
		= () x ()
		=Rem
0.	Deter	rmine the recommended protective action for the general
	RERP-	-PAG.
	RERP-	-PAG.
1.	The EAB	-PAG.
1.	The t	-PAG. -PAG. whole body gamma dose rate at the is (Step 11a or 11b): classification of the event based oble gases is (Step 12 or Step 13 tep 14):
1. 2.	The P EAB The on no or St The r (Step	whole body gamma dose rate at the is (Step 11a or 11b): classification of the event based oble gases is (Step 12 or Step 13 tep 14): noble gas release rate is p 8a or 8b): Ci/sec
1. 2. 3.	The Con no or St The Co	whole body gamma dose rate at the is (Step 11a or 11b):
1. 2. 3. 4.	The relei (Step	whole body gamma dose rate at the is (Step 11a or 11b):

FORT ST. VRAIN NUCLEAR GENERATING STATION

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· 0*:

37.	Based on projected release duration of (Step 17):	nours
38.	The thyroid dose rate at the EAB is (Step 22a or 22b):	Rem/hour
39.	*The classification of the event based on ¹³¹ I equivalent is (Step 23 <u>or</u> Step 24 <u>or</u> Step 25):	
40.	The ¹³¹ I equivalent release rate is (Step 20a or 20b):	Ci/sec
41.	The accumulated thyroid dose at the EAB	Rem
42.	The total number of curies of ¹³¹ I equivalent released to the present time is (Step 26a or 26b):	Curies
43.	The projected thyroid dose at the EAB is (Step 29a or 29b):	Rem
	Based on projected release duration of(Step 28):	hours
	*If this classification differs from the classificat 31, the higher (i.e., more severe) classification is to determine recommended protective action.	tion in Step to be used



FORT ST. VRAIN NUCLEAR GENERATING STATION

C1 (STO 04)

cc (STO 05)

WORKSHEET 4

ASSESSMENT OF RELEASE USING TI-59 CALCULATOR PROGRAM-UNMONITORED RELEASE

This attachment is only to be used if the TI-59 calculator program is used. If the program is not used, use Worksheet 3.

This attachment is used to determine the following due to an unmonitored release via the Reactor Building Louvers or the PCRV Relief Valves:

- Estimated whole body and thyroid gamma dose and dose rates at the EAB;
- b) Classification of the release;
- Projected whole body and thyroid gamma dose at the EAB; and
- d) Recommended protective action for the general population.
- 1. Collect the following data:
 - a) Date/Time of beginning of release:
 - b) Date/Time of ending of release. If release is still occurring, enter the Date/Time of the calculation:
 - c) Hours between 1a) and 1b):
 _____hours (STO 07)

 d) Maximum CPM, RIS-9301: (RR-93256, Pt. 10)
 _____cpm (STO 01)

e) Sensitivity RIS-9301: _____uCi/cc/cpm (STO 02)

- f) Primary Coolant ¹³¹I equivalent circulating inventory: (posted)
 Ci (STO 03)
- g) Primary Coolant ¹³¹ equivalent plateout inventory: (posted)
- *h) Primary Coolant Volume: (posted)



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FORT ST. VRAIN NUCLEAR GENERATING STATION

1

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			And a second
	1)	Site Emergency Limit: (posted)1) 6.6E-2	uCi/cc noble gas
		<u>2)</u> 6.7E-5	µCi/cc 131I
	j)	Ten Times Technical Specification	
		1) 2.5E-2	uCi/cc noble gas
		2) 7.0E-8	uCi/cc 131I ·
	k)	Average Wind Speed:	mph
	1)	Wind Direction:	
	NOTE:	North = 0° increasing degrees-c.w. From	Degrees
	m)	(200 ft 20 ft.) Differential Temperature	°F
2.	Deter Secto	mine sectors affected using Site r Map (Figure 2):	
		Sector(s)	
3.	Deter Table	mine Stability Category using 1 and Steps 11) and 1m).	
		Stability Category	
4.	Deter Attac Categ (Ster	rmine the EAB dilution factor from chment 1 using the Stability gory (Step 3) and wind speed o 1k).	
		Dilution Factor	sec/m³ (STO 06)
5.	If th Shift of ho begin nated	he release is continuing, consult with the t Supervisor and <u>estimate</u> the total number burs the release will continue (i.e., from nning to end). If the release has termi-d, enter 0.	
	Prel	iminary estimate of release hours	hours.(STO 08)



FORT ST. VRAIN NUCLEAR GENERATING STATION

- 6. Prepare the TI-59 for data entry.
 - a) Place TI-59 in printer/security cradle.
 - b) Plug in printer/security cradle.
 - c) Turn on printer/security cradle and TI-59.
 - d) Depress "TRACE" button on printer.
 - e) Obtain the magnetic card labeled "FSV Off-Site Dose Calculation (RERP) - Unmonitored Release."
 - f) Read magnetic card into TI-59.
 - 1) Depress |1| , |INV| , |2nd| , |WRITE| keys.
 - Insert magnetic card into right side of TI-59. Card should be right side up with the "1" in the upper left-hand corner.
 - 3) "1" will be displayed if the card was read properly - continue with Step 6f)4). If a flashing number is displayed, the card was not read properly. Obtain the other magnetic card with the same title and repeat Step 6f).

4) Depress 2, INV, 2nd, WRITE keys.

- 5) Insert card into right side of TI-59. Card should be upside down with the "2" in the lower left-hand corner.
- 6) "2" will be displayed if the card was read properly - continue with Step 7. If a flashing number is displayed, the card was not read properly. Obtain the other magnetic card with the same title and repeat Step 6f).



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7.	Input	the	necessary	data	into	the	indicated	TI-59	storage	registers.
						10000		10 March 10		

- a) Step 1c) = $|\overline{STO}|$ 07
- b) Step 1d) = $|\overline{STO}|$ 01
- c) Step le) = $|\overline{STO}|$ 02
- d) Step 1f) = $|\overline{STO}|$ 03
- e) Step 1g) = $|\overline{STO}| = 04$
- f) Step 1h) = $|\overline{STO}|$ 05
- g) Step 4 = |STO| 06
- h) Step 5 = $|\overline{STO}|$ 08
- 8. Run Dose Assessment Program.
 - a) Depress |R/S| key.
 - b) Wait until a number is displayed. A flashing number indicates improper execution of the program. Depress |<u>CLR</u>| and |<u>RST</u>| keys and repeat Steps 7 and 8.
- Determine the recommended protective action for the general population. Refer to RERP-PAG.



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		SUMMARY	
).	a)	The release path is:	
		1) Reactor Building Louvers	
		2) PCRV Reliefs	
	b)	The whole body gamma dose at the EAB is (RCL 12 for louvers, RCL 13 for reliefs).	rem/hour
	c)	The classification of the event based on noble gases is:	
		 If Step 10b) ≥ 1 Rem/hour, GENERAL EMERGENCY. 	
		2) 1.If Step 10c) ≥ 9.6E-1 Ci/sec SITE AREA EMERGENCY1.	
		3) 1.If Step 10c) ≥ 3.7E-1 Ci/sec and ≤ 9.6E-1 Ci/sec,1. RADIOLOGICAL ALERT.	
		4) 1.If RCL 11 ≥ 9.6E-1 Ci/sec, SITE AREA EMERGENCY1.	
		5) 1.If RCL 11 > 3.7E-1 Ci/sec and < 9.6E-1 Ci/sec, RADIOLOGICAL ALERT1.	
	e)	The accumulated whole body gamma dose at the EAB is (RCL 16 for louvers, RCL 17 for reliefs):	Rem
*	f)	The total number of curies of noble gas released to the present time is (RCL 14 for louvers, RCL 15 for reliefs):	C1
	g)	The projected whole body gamma dose at the EAB is (RCL 18 for louvers, RCL 19 for reliefs):	Rem
		Based on a projected release duration of (RCL 08):	hours



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	is (RCL 24 for louvers, RCL 25 for reliefs):	Rem/hour
í)	The ¹³¹ equivalent release rate is (RCL 22 for louvers, RCL 23 for reliefs):	Ci/sec
*j)	The classification of the event based on ¹³¹ I equivalent is:	
	 If Step 10h) ≥ 5 Rem/hour, GENERAL EMERGENCY. 	
	2) 1.If Step 10i) ≥ 9.8E-4C Ci/sec SITE AREA EMERGENCY1.	
	3) 1.If Step 10i) ≥ 1.0E-7 Ci/sec and < 9.8E-4 Ci/sec1. RADIOLOGICAL ALERT.	
k)	The accumulated thyroid dose at the EAB is (RCL 28 for louvers, RCL 29 for reliefs):	Rem
1)	The total number of curies of ¹³¹ I equivalent released to the present time is (RCL 26 for louvers, RCL 27 for reliefs):	C1
m)	The projected thyroid dose at the EAB is (RCL 30 for louvers, RCL 31 for reliefs):	Rem
	Based on projected release duration of (RCL 08):	hours

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FORT ST. VRAIN NUCLEAR GENERATING STATION

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hours (STO 07)

µCi/cc/cpm

(STO 02)

(STO 03)

(STO 04)

Ci

Ci

cc (STO 05)

WORKSHEET 4

ASSESSMENT OF RELEASE USING TI-59 CALCULATOR PROGRAM-UNMONITORED RELEASE

This attachment is only to be used if the TI-59 calculator program is used. If the program is not used, use Worksheet 3.

This attachment is used to determine the following due to an unmonitored release via the Reactor Building Louvers or the PCRV Relief Valves:

- Estimated whole body and thyroid gamma dose and dose rates at the EAB;
- b) Classification of the release;
- Projected whole body and thyroid gamma dose at the EAB; and
- d) Recommended protective action for the general population.
- 1. Collect the following data:
 - a) Date/Time of beginning of release:
 - b) Date/Time of ending of release. If release is still occurring, enter the Date/Time of the calculation:
 - c) Hours between 1a) and 1b):
 - d) Maximum CPM, RIS-9301: _____cpm (RR-93256, Pt. 10) (STO 01)
 - e) Sensitivity RIS-9301:
 - Primary Coolant ¹³¹I equivalent circulating inventory: (posted)
 - g) Primary Coolant ¹³¹ equivalent plateout inventory: (posted)
 - *h) Primary Coolant Volume: (posted)



2

3

5

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FORT ST. VRAIN NUCLEAR GENERATING STATION

Worksheet 4 Issue 14 Page 2 of 6

i)	Site Emergency Limit: (posted) <u>1) 6.6E-2</u>	uCi/cc gas	noble
		2) 6.7E-5	uCi/cc	131I
j)	Ten Times Technical Specificat	ion		
	Limits (posted):	1) 2.5E-2	uCi/cc gas	noble
		2) 7.0E-8	uCi/cc	131I
k)	Average Wind Speed:	_	mph	
1)	Wind Direction:			
NOTE:	North = 0° increasing degrees-	c.w. From _	Degree	s
m)	(200 ft 20 ft.) Differentia Temperature	1	°F	
Deter Secto	mine sectors affected using Sit r Map (Figure 2):	e		
	Sector(s)	_		
Deter Table	mine Stability Category using 1 and Steps 11) and 1m).			
	Stability C	ategory		
Deter Attac Categ (Step	mine the EAB dilution factor fr hment 1 using the Stability ory (Step 3) and wind speed 1k).	om		
	Dilution Fa	ctor _	sec/m³ (STO	06)
T	e release is continuing, consul	t with the tal number		
Shift of ho begin nated	Supervisor and <u>estimate</u> the to urs the release will continue (ning to end). If the release h , enter 0.	i.e., from as termi-		



FORT ST. VRAIN NUCLEAR GENERATING STATION

CR-UE Worksheet 4 Issue 14 Page 3 of 6

- 6. Prepare the TI-59 for data entry.
 - a) Place TI-59 in printer/security cradle.
 - b) Plug in printer/security cradle.
 - c) Turn on printer/security cradle and TI-59.
 - d) Depress "TRACE" button on printer.
 - e) Obtain the magnetic card labeled "FSV Off-Site Dose Calculation (RERP) - Unmonitored Release."
 - f) Read magnetic card into TI-59.
 - 1) Depress |1| , |INV| , |2nd| , |WRITE| keys.
 - Insert magnetic card into right side of TI-59. Card should be right side up with the "1" in the upper left-hand corner.
 - 3) "1" will be displayed if the card was read properly - continue with Step 6f)4). If a flashing number is displayed, the card was not read properly. Obtain the other magnetic card with the same title and repeat Step 6f).
 - 4) Depress |2| , |INV| , |2nd| , |WRITE| keys.
 - Insert card into right side of TI-59. Card should be <u>upside down</u> with the "2" in the lower left-hand corner.
 - 6) "2" will be displayed if the card was read properly - continue with Step 7. If a flashing number is displayed, the card was not read properly. Obtain the other magnetic card with the same title and repeat Step 6f).

b)

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Worksheet 4 Issue 14 Page 4 of 6

Input the necessary data into the indicated TI-59 storage registers. 7.

- Step 1c) = $|\overline{STO}|$ 07 a) Step 1d) = $|\overline{STO}|$ 01
- Step 1e) = $|\overline{STO}|$ 02 c)
- Step 1f) = $|\overline{STO}|$ 03 d)
- Step 1g) = $|\overline{STO}|$ 04 e)
- f) Step 1h) = $|\overline{STO}|$ 05
- Step 4 = $|\overline{STO}|$ 06 g)
- h) Step 5 = $|\overline{STO}|$ 08
- 8. Run Dose Assessment Program.
 - Depress |R/S| key. a)
 - Wait until a number is displayed. A flashing number indicates b) improper execution of the program. Depress [CLR] and [RST] keys and repeat Steps 7 and 8.
- Determine the recommended protective action for the general 9. population. Refer to RERP-PAG.



FORT ST. VRAIN NUCLEAR GENERATING STATION

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		ISUMMARY_I	
0.	a)	The release path is:	
		1) Reactor Building Louvers	
		2) PCRV Reliefs	
	b)	The whole body gamma dose at the EAB is (RCL 12 for louvers, RCL 13 for reliefs).	rem/hour
	c)	The classification of the event based on noble gases is:	
		 If Step 10b) ≥ 1 Rem/hour, GENERAL EMERGENCY. 	
		<pre>2) 1.If Step 10c) ≥ 9.6E-1 Ci/sec SITE AREA EMERGENCY1.</pre>	
		3) 1.If Step 10c) ≥ 3.7E-1 Ci/sec and ≤ 9.6E-1 Ci/sec,1. RADIOLOGICAL ALERT.	
		4) 1.If RCL 11 ≥ 9.6E-1 Ci/sec, SITE AREA EMERGENCY1.	
		5) 1.If RCL 11 > 3.7E-1 Ci/sec and < 9.6E-1 Ci/sec, RADIOLOGICAL ALERT1.	
	e)	The accumulated whole body gamma dose at the EAB is (RCL 16 for louvers, RCL 17 for reliefs):	Rem
	f)	The total number of curies of noble gas released to the present time is (RCL 14 for louvers, RCL 15 for reliefs):	C1
	g)	The <u>projected</u> whole body gamma dose at the EAB is (RCL 18 for louvers, RCL 19 for reliefs):	Rem
		Based on a projected release duration of (RCL 08):	hours



FORT ST. VRAIN NUCLEAR GENERATING STATION

h)	The thyroid dose rate at the EAB is (RCL 24 for louvers, RCL 25 for reliefs):	Rem/hour
i)	The ¹³¹ equivalent release rate is (RCL 22 for louvers, RCL 23 for reliefs):	Ci/sec
*j)	The classification of the event based on ¹³¹ I equivalent is:	
	 If Step 10h) ≥ 5 Rem/hour, GENERAL EMERGENCY. 	
	<pre>2) 1.If Step 10i) ≥ 9.8E-4C Ci/sec SITE AREA EMERGENCY1.</pre>	
	3) 1.If Step 10i) ≥ 1.0E-7 Ci/sec and < 9.8E-4 Ci/sec1. RADIOLOGICAL ALERT.	
k)	The accumulated thyroid dose at the EAB is (RCL 28 for louvers, RCL 29 for reliefs):	Rem
1)	The total number of curies of ¹³¹ I equivalent released to the present time is (RCL 26 for louvers, RCL 27 for reliefs):	C1
m)	The projected thyroid dose at the EAB is (RCL 30 for louvers, RCL 31 for reliefs):	Rem
	Based on projected release duration of (RCL 08):	hours
*If this c the higher determine	lassification differs from the classifica (i.e., more severe) classification is recommended protective actions.	tion in Step 10b), to be used to

FORT ST. VRAIN NUCLEAH GENERATING STATION

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	Da	tasheet 1 - Data Logger (or IBM) Monitore	d Release				
Α.	Projection - Option 2						
	1.	Current and release start date and time:					
			a)/_	_/			
			b):				
	2.	Projected end of release date and time:					
			a)/_	_/			
			b):				
	3.	Radiation Monitor Values, Noble Gas					
		a) RT-7324, 1		_cpm			
		b) RT-7324. 2		_cpm			
		If one of the above is offscale or inoperative:					
		a) E-500 or Cutie Pie?		_			
		b) Instrument Reading		_mR/hr			
	4.	Exhaust Stack Flow Rate		_cfm			
	5.	Radioiodine Monitor Values; RT-73437, 1					
		a) Initial Reading from chart		_cpm			
		b) Intermediate Reading from chart		_cpm			
		c) Peak or Current Reading from chart		_cpm			
		d) Time between a and b		_minutes			
		e) Time between b and c		_minutes			
	6.	Wind Direction (preferred sampling point is 10 meter instrument on 60 meter meteorological tower)					
				0			

0


FORT ST. VRAIN NUCLEAR GENERATING STATION

Datasheet 1 Issue 14 Page 2 of 2

mph

meters

or

- Wind Speed (Preferred sampling point is 10 meter instrument on 60 meter meteorological tower)
- Distance between upper and lower temperature instruments
- 9. Delta Temperature between temperature instruments
- Standard Deviation (Sigma Theta) of Wind Direction - 15 min. average
- B. Puff Option 2
 - Current and release start date and time:
 - End of Puff date and time (not to exceed 15 minutes after B.1)
- a) __/__/__ b) __:___

a) / /

b) : ____

C. Total for All Puffs - Option 3 Change option and execute DF 41-0-0.



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CR-UE Datasheet 1 Issue 14 Page 1 of 2

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Datasheet 1 - Data Logger (or IBM) Monitored Release Projection - Option 2 Α. Current and release start date and 1. time: a) /_/___ b) ___: ___ Projected end of release date and 2. time: a) / / b) ____: ___ 3. Radiation Monitor Values, Noble Gas a) RT-7324, 1 Cpm b) RT-7324. 2 cpm If one of the above is offscale or inoperative: a) E-500 or Cutie Pie? mR/hr b) Instrument Reading cfm Exhaust Stack Flow Rate 4. Radioiodine Monitor Values; RT-73437, 1 5. cpm a) Initial Reading from chart b) Intermediate Reading from chart Cpm c) Peak or Current Reading from chart cpm d) Time between a and b minutes ____minutes e) Time between b and c Wind Direction (preferred sampling 6. point is 10 meter instrument on 60 meter meteorological tower)

X.

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FORT ST. VRAIN NUCLEAR GENERATING STATION

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mph

meters

or

a) _/_/__

b) ___: ____

a) _/_/__

b) ___: ___

 Wind Speed (Preferred sampling point is 10 meter instrument on 60 meter meteorological tower)

 Distance between upper and lower temperature instruments

Delta Temperature between temperature instruments

 Standard Deviation (Sigma Theta) of Wind Direction - 15 min. average

B. Puff - Option 2

9.

 Current and release start date and time:

 End of Puff date and time (not to exceed 15 minutes after B.1)

C. Total for All Puffs - Option 3

Change option and execute DF 41-0-0.

FORT ST. VRAIN NUCLEAR GENERATING STATION

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D	atasheet 1 - Data Logger (or IBM) Monitore	d Re	lease	
Proj	ection - Option 2			
1.	Current and release start date and time:			
		a)	_/_	_/
		b)	:	
2.	Projected end of release date and time:			
		a)	_/_	_/
		b)		
3.	Radiation Monitor Values, Noble Gas			
	a) RT-7324, 1	10 - Sec.	1.15	_cpm
	b) RT-7324. 2			cpm
	If one of the above is offscale or inoperative:			
	a) E-500 or Cutie Pie?	·	- <u>6</u>	<u>-</u> 24 96
	b) Instrument Reading		1	_mR/hr
4.	Exhaust Stack Flow Rate			cfm
5.	Radioiodine Monitor Values; RT-73437, 1			
	a) Initial Reading from chart	_	<u> </u>	cpm
	b) Intermediate Reading from chart		1	cpm
	c) Peak or Current Reading from chart	2	2.23	cpm
	d) Time between a and b			minutes
	e) Time between b and c			minutes
6.	Wind Direction (preferred sampling point is 10 meter instrument on 60			

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3



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FORT ST. VRAIN NUCLEAR GENERATING STATION

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mph

meters

or

- Wind Speed (Preferred sampling point is 10 meter instrument on 60 meter meteorological tower)
 - Bistance between upper and lower temperature instruments
 - 9. Delta Temperature between temperature instruments
- Standard Deviation (Sigma Theta) of Wind Direction = 15 min. average

B. Puff - Option 2

- Current and release start date and time:
- End of Puff date and time (not to exceed 15 minutes after B.1)

a) _/_/__ b) ___: ___

a) __/__/__

b) ____: ____

C. Total for All Puffs - Option 3

Change option and execute DF 41-0-0.

PUBLIC SERVICE COMPANY OF COLORADO CR-UE FORT ST. VRAIN NUCLEAR GENERATING STATION Datasheet 1 Issue 14 Page 1 of 2 Datasheet 1 - Data Logger (or IBM) Monitored Release Projection - Option 2 A. 1. Current and release start date and time: a) / / b) ___: ___ Projected end of release date and 2. time: a) _/_/__ b) Radiation Monitor Values, Noble Gas 3. a) RT-7324, 1 cpm b) RT-7324. 2 Cpm If one of the above is offscale or inoperative: a) E-500 or Cutie Pie? mR/hr b) Instrument Reading cfm Exhaust Stack Flow Rate 4. 5. Radioiodine Monitor Values; RT-73437, 1 a) Initial Reading from chart CDM b) Intermediate Reading from chart cpm c) Peak or Current Reading from chart cpm minutes d) Time between a and b minutes e) Time between b and c Wind Direction (preferred sampling 6. point is 10 meter instrument on 60 meter meteorological tower) 0

X

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mph

meters

20

- Wind Speed (Preferred sampling point is 10 meter instrument on 60 meter meteorological tower)
- Distance between upper and lower temperature instruments
- 9. Delta Temperature between temperature instruments

 Standard Deviation (Sigma Theta) of Wind Direction - 15 min. average

B. Puff - Option 2

- Current and release start date and time:
- a) __/__/__ b) __: ___

 End of Puff date and time (not to exceed 15 minutes after B.1)

a) /_/__ b) ___: ___

C. Total for All Puffs - Option 3

Change option and execute DF 41-0-0.

ð		FORT ST. VRAIN NUCLEAR GENERATING STAT	NON	Datasheet 1 Issue 14 Page 1 of 2
	D	atasheet 1 - Data Logger (or IBM) Monitore	d Release	
Α.	Proj	ection - Option 2		
	1.	Current and release start date and time:		
			a)/_	_/
			b):	<u> </u>
	2.	Projected end of release date and time:		
			a) _/_	_/
			b):	
	3.	Radiation Monitor Values, Noble Gas		
		a) RT-7324, 1		_cpm
		b) RT-7324. 2		_cpm
		If one of the above is cffscale or inoperative:		
		a) E-500 or Cutie Pie?		
		b) Instrument Reading		_mR/hr
	4.	Exhaust Stack Flow Rate		_cfm
	5.	Radioiodine Monitor Values; RT-73437, 1		
		a) Initial Reading from chart		_cpm
	ina i	b) Intermediate Reading from chart		_cpm
		c) Peak or Current Reading from chart		_cpm
		d) Time between a and b		_minutes
		e) Time between b and c		minutes
	6.	Wind Direction (preferred sampling point is 10 meter instrument on 60 meter meteorological tower)		
				0

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FORT ST. VRAIN NUCLEAR GENERATING STATION

CR-UE Datasheet 1 Issue 14 Page 2 of 2

mph

meters

OF

- Wind Speed (Preferred sampling point is 10 meter instrument on 60 meter meteorological tower)
- Distance between upper and lower temperature instruments
- 9. Delta Temperature between temperature instruments

Standard Deviation (Sigma Theta) of
 Wind Direction - 15 min. average

B. Puff - Option 2

- Current and release start date and time:
- a) __/__/__ b) __: ___

 End of Puff date and time (not to exceed 15 minutes after 8.1)

a) /_/__ b) ___: ___

C. Total for All Puffs - Option 3

Change option and execute DF 41-0-0.

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		10	1	ŀ
				ŀ
		2.19	200	ŧ

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PUBLIC SERVICE COMPANY OF COLORADO CR-UE

FORT ST. VRAIN NUCLEAR GENERATING STATION

	Datasheet 2 - Data Logger (or IBM) Unmonit	ored Release)
1.	Date and Time of beginning of release	
		a)//
		b) :
2	Time of Louvers closed	이 귀구 가 나 가 다 가 다 가 다 가 다 다 다 다 다 다 다 다 다 다 다
1		· · · · · · · · · · · · · · · · · · ·
3.	Maximum CPM, RIS-9301	
		cpm
4.	 a) Primary coolant I-131 equivalent circulating inventory 	
		C1
	b) Primary coolant I-131 equivalent plateout inventory	
		Ci
	5. Primary Coolant Volume	
		scc
6.	a) PCRV Pressure Before Release	
		psig
	b) PCRV Pressure After Release	
	철로 가지 않는 것이 같은 것이 같다.	psig
7.	Wind Direction (prefererd sampling point is 10 meter instrumentation on 60 meter meteorological tower)	
		•
8.	Wind speed (preferred sampling point is 10 meter instrumenation on 60 meter meteorological tower)	
		mph



FORT ST. VRAIN NUCLEAR GENERATING STATION

CR-UE Datasheet 2 Issue 14 Page 2 of 2

9. Distance between upper and lower temperature instruments

meters

10. Delta Temperature between temperature instruments

or

 Standard Deviation (Sigma Theta) of wind Direction - 15 min. average



PUBLIC SERVICE COMPANY OF COLORADO CR-UE FORT ST. VRAIN NUCLEAR GENERATING STATION Datash

Datasheet 2 Issue 14 Page 1 of 2

	Dat	asheet 2 - Data Logger (or IBM) Unmonito	red Release)
1.	Date	and Time of beginning of release	그는 것 같은 바람이 없다.
			a)//
			b):
2.	Time	of Louvers closed	이 같아. 영화 남북
			14 14 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
3.	Maxim	um CPM, RIS-9301	and the second states
			cpm
4.	a)	Primary coolant I-131 equivalent circulating inventory	
			C1
	b)	Primary coolant I-131 equivalent plateout inventory	이 집에 가지 않았다.
			C1
	5.	Primary Coolant Volume	
			scc
6.	a)	PCRV Pressure Before Release	그는 것 같은 것 같아?
			psig
	D)	PCRV Pressure After Release	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
			psig
7.	Wind is 10 meteo	Direction (preferero sampling point meter instrumentation on 60 meter prological tower)	
			0
2	Wind	speed (proformed sampling print is 10	
0.	meter	instrumenation on 60 meter prological tower)	
			mph



FORT ST. VRAIN NUCLEAR GENERATING STATION

CR-UE Datasheet 2 Issue 14 Page 2 of 2

9. Distance between upper and lower temperature instruments

meters

0F

- 10. Delta Temperature between temperature instruments
- Standard Deviation (Sigma Theta) of wind Direction - 15 min. average



FORT ST. VRAIN NUCLEAR GENERATING STATION

Datasheet 3 Issue 14 Page 1 of 3

PRELIMINARY	ASSESSMENT	OF PLANT	CONDITIONS
	TECHNICAL	ADVISOR	

- 1. Brief description of event _____
- 2. Date/Time of event _____
- Date/Time of assessment
- If the data logger is operating, obtain the Demand Function Printout (or print specified displays):
 - NOTE: All screens accessible on Display 900
 - Helium Inventory_____
 - DF 69-0-0_____
 - DF 76-0-0
 - DF 77-1-0_____

Post Trip Review_____

PRIMARY SYSTEM

5.	Current Reactor P	ower	
6.	Rod Runback Occur	(Y/N)	
	If yes, 2B	record 4A	positions
7.	<pre>If shutdown, ar (Y/N)</pre>	re all rods	fully inserted
8.	Circulators Opera Steam Feedwater (ating A l Cond. Firew	B C D MODE: ater



FORT ST. VRAIN NUCLEAR GENERATING STATION

CR-UE Datasheet 3 Issue 14 Page 2 of 3

- 9. Purification Train A B To: Storage, PCRV, or Ventilation
- 10. Is heat removal capability adequate at this time (Y/N)



FORT ST. VRAIN NUCLEAR GENERATING STATION

Datasheet 3 Issue 14 Page 3 of 3

SECONDARY SYSTEM

- 11. Loops Operating I II
- 12. Feed to S/G's: Norm FW____Emer. FW____ Emer. Cond.____Firewater____
- 13. Status of Aux. Boilers _____

Remarks

Time Description



FORT ST. VRAIN NUCLEAR GENERATING STATION

CR-UE Datasheet 3 Issue 14 Page 1 of 3

PRELIMINARY	ASSESSMENT	OF PLANT	CONDITIONS
	TECHNICAL	ADVISOR	

- 1. Brief description of event
- 2. Date/Time of event
- Date/Time of assessment
- If the data logger is operating, obtain the Demand Function Printout (or print specified displays):
 - NOTE: All screens accessible on Display 900
 - Helium Inventory_____
 - DF 69-0-0
 - DF 76-0-0
 - DF 77-1-0

Post Trip Review

PRIMARY SYSTEM

5.	Current Reactor Po	wer	
6.	Rod Runback Occur	(Y/N)	
	lf yes, 2B	record 4A	positions
7.	If shutdown, are (Y/N)	all rods	fully inserted
8.	Circulators Operat Steam Feedwater Co	ing A B nd. Firewa	C D MODE: ter

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FORT ST. VRAIN NUCLEAR GENERATING STATION

CR-UE Datasheet 3 Issue 14 Page 2 of 3

- 9. Purification Train A B To: Storage, PCRV, or Ventilation
- 10. Is heat removal capability adequate at this time (Y/N)

X

FORT ST. VRAIN NUCLEAR GENERATING STATION

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SECONDARY SYSTEM

14.14	A commence	Concerned and	* *
11.	LOOPS	Uperating	 11

12. Feed to S/G's: Norm FW____ Emer. FW____ Emer. Cond.____ Firewater____

13. Status of Aux. Boilers

Remarks

Time

Description





Checklist 1 Issue 14 Page 1 of 1

	EMERGENCY COORDINATOR'S CHECKLIST	
1.	Initiate Emergency Procedure actions.	
2.	Technical Advisor notified.	
3.	Obtain preliminary assessment of release.	<u></u>
4.	Obtain meteorological data.	
5.	Initiate protective actions for station personnel.	
6.	Contact management and confirm classification.	
7.	Complete Notifications Form.	a land
	NOTIFICATION OF UNUSUAL EVENT - Attachment 1	<u>i sana</u> ti k
8.	Make Notifications (Attachment 2, Page 2)	
	NOTIFICATION OF UNUSUAL EVENT	
	State EOC	Same State
	Governor's Office or Mansion	and the second
	NRC's Operations Center	<u></u>



FORT ST. VRAIN NUCLEAR GENERATING STATION

	EMERGENCY COORDINATOR'S CHECKLIST
1.	Initiate Emergency Procedure actions.
2.	Technical Advisor notified.
3.	Obtain preliminary assessment of release.
4.	Obtain meteorological data.
5.	Initiate protective actions for station personnel.
6.	Contact management and confirm classification.
7.	Complete Notifications Form.
	NOTIFICATION OF UNUSUAL EVENT - Attachment 1
8.	Make Notifications (Attachment 2, Page 2)
	NOTIFICATION OF UNUSUAL EVENT
	State EOC
	Governor's Office or Mansion
	NRC's Operations Center

FORT ST. VRAIN NUCLEAR GENERATING STATION



Checklist 2 Issue 14 Page 1 of 2

Checklist 2 - Data Logger Monitored Release

NOTE:

Initialize the summing screen by entering option 4 and running DF 41-0-0. This should be done for the first calculation only.

- "DEMAND FUNCTION OVERVIEW" key, located cursor on DF 41-0-0 and "XMIT CURSOR."
- 2. Step 1 brings up display 941. Follow steps on this display. They lead the user from screen to screen through the basic program steps. Always utilize program "OPTICN 2" when performing calculations for record keeping or dose reporting purposes. This "OPTION" reverts to a "1" after the Demand Function is run and must be reset to a "2" each time.
- Perform a "duration of release" calculation utilizing the projected or estimated end of release time. Utilize 2 hours from current as a default value whenever this value isn't known.
- 4. Print displays from this calculation.
- 5. Display results and print

*NOTE:

Be certain to reset option to "2" after performance of a calculation.



Checklist 2 Issue 14 Page 2 of 2

6.	Perform a "puff" calculation utilizing a projected ending time 15 minutes from the current time shown on step 3 of this checklist. Release start time should be the same as current time.	
7.	Print displays from step 6.	
1		1.01.23
	- in the second s	
8.	Display results and print	
		-
9.	Set "OPTION" to "3" and rerun DF 41-0-0	
		<u></u>
10.	Print Display 951 which tabulates the results	
	SUMMARY OF DISPLAYS TO PRINT	
Step	No. Displays Verifica	tion
4	4. 944, 942, 948, 951	
5	5. 945, 947	<u></u>
7	7. 944, 942	
8	945.947	
10	940	
10	J. 343	

FORT ST. VRAIN NUCLEAR GENERATING STATION



Checklist 2 Issue 14 Page 1 of 2

Checklist 2 - Data Logger Monitored Release

NOTE:

Initialize the summing screen by entering option 4 and running DF 41-0-0. This should be done for the first calculation only.

- "DEMAND FUNCTION OVERVIEW" key, located cursor on DF 41-0-0 and "XMIT CURSOR."
- 2. Step 1 brings up display 941. Follow steps on this display. They lead the user from screen to screen through the basic program steps. Always utilize program "OPTION 2" when performing calculations for record keeping or dose reporting purposes. This "OPTION" reverts to a "1" after the bemand Function is run and must be reset to a "2" each time.
- 3. Perform a "duration of release" calculation utilizing the projected or estimated end of release time. Utilize 2 hours from current as a default value whenever this value isn't known.
- 4. Print displays from this calculation.
- 5. Display results and print

*NOTE:

Be certain to reset option to "2" after performance of a calculation.



PUBLIC SERVICE COMPANY OF COLORADO CR-UE FORT ST. VRAIN NUCLEAR GENERATING STATION Check

CR-UE Checklist 2 Issue 14 Page 2 of 2

6. Pe pr ch th	erform a "puff" calculation utilizing a rojected ending time 15 minutes from the urrent time shown on step 3 of this necklist. Release start time should be ne same as current time.	•
7. Pr	int displays from step 6.	
8. Di	splay results and print	
9. Se	et "OPTION" to "3" and rerun DF 41-0-0	
10. Pr re	int Display 951 which tabulates the esults	
	SUMMARY OF DISPLAYS TO PRINT	
Step No	Displays	Verification
4.	944, 942, 948, 951	Section 2
5.	945, 947	
7.	944, 942	
8.	945, 947	
10.	949	



FORT ST. VRAIN NUCLEAR GENERATING STATION

CR-UE Checklist 2 Issue 14 Page 1 of 2

Checklist 2 - Data Logger Monitored Release

NOTE:

Initialize the summing screen by entering option 4 and running DF 41-0-0. This should be done for the first calculation only.

- "DEMAND FUNCTION OVERVIEW" key, located cursor on DF 41-0-0 and "XMIT CURSOR."
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- 3. Perform a "duration of release" calculation utilizing the projected or estimated end of release time. Utilize 2 hours from current as a default value whenever this value isn't known.
- 4. Print displays from this calculation.
- 5. Display results and print

*NOTE:

Be certain to reset option to "2" after performance of a calculation.

CR-UE Checklist 2 Issue 14 Page 2 of 2

6.	Perform a "puff" calculation utilizing a	
	current time shown on step 3 of this	
	checklist. Release start time should be the same as current time.	
11		
1.	Print displays from step 6.	
		<u> </u>
8.	Display results and print	
		1
9.	Set "OPTION" to "3" and rerun DF 41-0-0	
10	Print Dicolay 951 which tabulator the	
10.	results	
		Statistics of the
	SUMMARY OF DISPLAYS TO PRINT	
Step	p Nc. Displays	Verification
4	4. 944, 942, 948, 951	
5	5. 945, 947	and the second s
7	7. 944, 942	a sector and the sector of the
8	8. 945, 947	
10	0. 949	· · · · · · · · · · · · · · · · · · ·

FORT ST. VRAIN NUCLEAR GENERATING STATION



Checklist 2 Issue 14 Page 1 of 2

Checklist 2 - Data Logger Monitored Release

NOTE:

Initialize the summing screen by entering option 4 and running DF 41-0-0. This should be done for the first calculation only.

- "DEMAND FUNCTION OVERVIEW" key, located cursor on DF 41-0-0 and "XMIT CURSOR."
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- Perform a "duration of release" calculation utilizing the projected or estimated end of release time. Utilize 2 hours from current as a default value whenever this value isn't known.
- 4. Print displays from this calculation.
- 5. Display results and print

*NOTE: Be certain to reset option to "2" after performance of a calculation.



FORT ST. VRAIN NUCLEAR GENERATING STATION

Checklist 2 Issue 14 Page 2 of 2

*

6.	Perform a "puff"	calculation	utilizing a
	projected ending ti	me 15 minute	s from the
	current time show	n on step	3 of this
	checklist. Release	start time	should be
	the same as current	time.	

- 7. Print displays from step 6.
- 8. Display results and print
- 9. Set "OPTION" to "3" and rerun DF 41-0-0
- Print Display 951 which tabulates the results

SUMMARY OF DISPLAYS TO PRINT

Step No.	Displays	Verification
4.	944, 942, 948, 951	
5.	945, 947	
7.	944, 942	
8.	945, 947	
10.	949	



FORT ST. VRAIN NUCLEAR GENERATING STATION

CR-UE Checklist 2 Issue 14 Page 1 of 2

Checklist 2 - Data Logger Monitored Release

NOTE:

Initialize the summing screen by entering option 4 and running DF 41-0-0. This should be done for the first calculation only.

- "DEMAND FUNCTION OVERVIEW" key, located cursor on DF 41-0-0 and "XMIT CURSOR."
- 2. Step 1 brings up display 941. Follow steps on this display. They lead the user from screen to screen through the basic program steps. Always utilize program "OPTION 2" when performing calculations for record keeping or dose reporting purposes. This "OPTION" reverts to a "1" after the Demand Function is run and must be reset to a "2" each time.
- Perform a "duration of release" calculation utilizing the projected or estimated end of release time. Utilize 2 hours from current as a default value whenever this value isn't known.
- 4. Print displays from this calculation.
- 5. Display results and print

*NOTE:

Ee certain to reset option to "2" after performance of a calculation.

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Checklist 2 Issue 14 Page 2 of 2

- Perform a "puff" calculation utilizing a projected ending time 15 minutes from the current time shown on step 3 of this checklist. Release start time should be the same as current time.
- 7. Print displays from step 6.
- 8. Display results and print
- 9. Set "OPTION" to "3" and rerun DF 41-0-0
- Print Display 951 which tabulates the results

SUMMARY OF DISPLAYS TO PRINT

Step No.	Displays	Verification
4.	944, 942, 948, 951	
5.	945, 947	
7.	944, 942	
8.	945, 947	1
10.	949	



Attach, 1 Issue 14 Page 1 of 3

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NG 1 1			1.010	1.1.84	11001	151.14	B 1	- 17	14 N. I
110	4.1	1 10 1	1011	100	CONT.	1-5-151	The .	- ¥	

Α.	The	Emer	genc	y	Coordi	nator	and	f	irst	management	contact	will	
	compl	ete	the	fol	lowing	infor	mation	١.	joint	y:			

1. Name and identity of caller

2. Date of Event Time of Event

3. General Category of Event

Unplanned Radiological Release to Reactor Building

Fuel Failure

Fire

Natural Phenomenon (circle one)

Earthquake Flood Tornado Winds

Unusual Hazards (circle one)

Aircraft Explosion Toxic Material

Other (Specify)

Spent Fuel Incident

4. Description of Event

5. Actions Taken

6. Status:

Under control by onsite staff, no offsite assistance anticipated.

Under control by onsite staff. Will keep State and NRC advised.

 At the present time, the event does not involve offsite release or the potential for offsite releases that would affect the general health and safety of the public.



FORT ST. VRAIN NUCLEAR GENERATING STATION

Attach. 1 Issue 14 Page 2 of 3

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B. The Emergency Coordinator will make notifications as follows: Contact with State EOC . and Governor's Office or Mansion 1. READ the following statement verbatim: "THIS IS A NOTIFICATION OF AN UNUSUAL EVENT AT THE FORT ST. VRAIN NUCLEAR GENERATING STATION. THIS NOTIFICATION DOES NOT REQUIRE ACTIVATION OF EMERGENCY RESPONSE CENTERS. THIS NOTIFICATION REQUIRES VERIFICATION OF RECEIPT BY THE STATE. VERIFY BY CALLING 2. READ all the information recorded in Step A (Page 1 of this ATTACHMENT). 3. RECORD the following information: Name of State EOC contact Date/Time Name of Governor's Office/Mansion Contact Date/Time Call back verification from State EOC, Date/Time Call back verification from Governor's Office/Mansion Date/iime Contact with NRC Operations Center (Hot Line or _ (If NRC Hot Line and Land Line are incperative, use HP Network line.) 1. READ the following statement verbatim: "THIS IS NOTIFICATION OF A SIGNIFICANT EVENT AT THE FORT ST. VRAIN NUCLEAR GENERATING STATION AT PLATTEVILLE, COLORADO. THIS NOTIFICATION APPEARS TO BE REQUIRED PURSUANT TO 10CFR50.72, ITEM NUMBER 1. THIS NOTIFICATION DOES NOT REQUIRE ACTIVATION OF FEDERAL OR STATE EMERGENCY RESPONSE ORGANIZATIONS."



FORT ST. VRAIN NUCLEAR GENERATING STATION

Attach. 1 Issue 14 Page 3 of 3

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- READ the NRC Operations Center all of the information recorded in Step A (Page 1 of this Attachement).
- 3. RECORD the following information:

Name of NRC Contact_____Date/Time_____

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3

4

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PUBLIC SERVICE COMPANY OF COLORADO CR-UE FORT ST. VRAIN NUCLEAR GENERATING STATION Attact

Attach. 1 Issue 14 Page 1 of 3

NOTIFICATION OF UNUSUAL EVENT

com	plete the following information jointly:
1.	Name and identity of caller
2.	Date of Event Time of Event
3.	General Category of Event
	Unplanned Radiological Release to Reactor Building
	Fuel Failure
	Fire
	Natural Phenomenon (circle one)
	Earthquake Flood Tornado Winds
	Unusual Hazards (circle one)
	Aircraft Explosion Toxic Material
	Other (Specify)
	Spent Fuel Incident
4.	Description of Event
5.	Actions Taken
6.	Status:
	Under control by onsite staff, no offsite assistanc anticipated.
	Under control by onsite staff. Will keep State an NRC advised

7. At the present time, the event does not involve offsite release or the potential for offsite releases that would affect the general health and safety of the public.



FORT ST. VRAIN NUCLEAR GENERATING STATION

intact	with State EOC Governor's Office
1.	READ the following statement verbatim:
	"THIS IS A NOTIFICATION OF AN UNUSUAL EVENT AT THE FORT ST. VRAIN NUCLEAR GENERATING STATION. THIS NOTIFICATION DOES NOT REQUIRE ACTIVATION OF EMERGENCY RESPONSE CENTERS. THIS NOTIFICATION REQUIRES VERIFICATION OF RECEIPT BY THE STATE. VERIFY BY CALLING
2.	READ all the information recorded in Step A (Page 1 of this ATTACHMENT).
3.	RECORD the following information:
	Name of State EOC contactDate/Time
	Name of Governor's Office/Mansion Contact
	Date/Time
	Call back verification from State EOC, Date/Time
	Call back verification from Governor's Office/Mansion
	Date/Time
Conta	ct with NRC Operations Center (Hot Line or
NRC H	ot Line and Land Line are inoperative, use HP Network line.)
1.	READ the following statement verbatim:
	"THIS IS NOTIFICATION OF A SIGNIFICANT EVENT AT THE FORT ST. VRAIN NUCLEAR GENERATING STATION AT PLATTEVILLE, COLORADO. THIS NOTIFICATION APPEARS TO BE REQUIRED PURSUANT TO 10CFR50.72, ITEM NUMBER 1.


PUBLIC SERVICE COMPANY OF COLORADO CR-UE FORT ST. VRAIN NUCLEAR GENERATING STATION Attach Issue

Attach. 1 Issue 14 Page 3 of 3

- READ the NRC Operations Center all of the information recorded in Step A (Page 1 of this Attachement).
- 3. RECORD the following information:

Name of NRC Contact Date/Time