FLORIDA POWER & LIGHT COMPANY ST. LUCIE UNITS 1 AND 2 ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT JANUARY 1, 2013 THROUGH DECEMBER 31, 2013

L-2014-053

ENCLOSURE 2 C-200, OFFSITE DOSE CALCULATION MANUAL REVISION 41 (231 PAGES)

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FPL

ST. LUCIE PLANT

CHEMISTRY OPERATING PROCEDURE

SAFETY RELATED



Title:

OFFSITE DOSE CALCULATION MANUAL (ODCM)

Responsible Department: CHEMISTRY

REVISION SUMMARY:

Revision 41 - Incorporated PCR 1839250 to update procedure number reference. (Author: E. Young)

Revision 40 - Incorporated PCR 1791994 to update procedure number reference. (Author: P. Otis)

Revision 39 - Incorporated PCR 1842056 to line up sample collected with Sample Collection frequency for Crustacea, Fish, and Broad leaf Vegetation. (Author: B. Wooldridge)

Revision 38 - Incorporated PCR 1792615 to update Rated Thermal Power in Section 1.25 from 2700 MWt to 3020 MWt for Unit 2 as modified for EPU conditions per EC 249985 and the Unit 2 EPUI LAR. (Author: Don Pendagast)

Revision 37 - Incorporated PCR 1747213 for EC 246569. Changed Rated Thermal Power in Section 1.25 from 2700 MWt to 3020 MWt for Unit 1. (Author: J. Fiori)

Revision 36 - Incorporated PCR 1744039 to change procedure reference number from NPSS-HP-WP-002 to new procedure number EV-SR-104-1001. (Author: B. Wooldridge)

Revision 35 - Incorporated PCR 563880 to update procedure references. (Author: P. Otis)

Revision 34 - Incorporated PCR 1609718 to add C-14 dose factors to comply with Rev 2 of Reg guide 1.21. (Author: B. Vogel)

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			SYS	
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FOR INFORMATION ONLY 3efore use, verify revision and change documentation (if applicable) with a controlled index or document. DATE VERIFIED INITIAL

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INTRODUCTION

The ODCM consists of the Controls Section followed by the Methodology Section.

The Controls Section provides the Control Statements, Limits, ACTION Statements, Surveillance Requirements and BASES for ensuring that Radioactive Liquid and Gaseous Effluents released to UNRESTRICTED AREAS and/or the SITE BOUNDARY will be maintained within the requirements of 10 CFR Part 20, 40 CFR Part 190, 10 CFR Part 72, 10 CFR 50.36.a and 10 CFR Part 50 Appendix-I radioactive release criteria. All Control Statements and most Administrative Control Statements in the ODCM are directly tied to and reference the Plant Technical Specification (TS) Administrative Section. The Administrative Control for Major Changes to Radioactive Liquid, Gaseous and Solid Treatment Systems is as per the guidance of NUREG-1301, April 1991, Supplement No. 1 to NRC Generic Letter 89-01. The numbering sequences of Control Statements also follow the guidance of NUREG-1301 as applicable, to minimize differences. Regulatory Guide 4.15, Quality Assurance for Radiological Monitoring Programs (Normal Operations) -Effluent Streams and the Environment, 6.3.1 and 6.3.2, provide the background for the need to maintain Quality Assurance programs for effluent releases and radiological environmental monitoring.

The Methodology Section uses the models suggested by NUREG-0133, November, 1978 and Regulatory Guide 1.109 to provide calculation methods and parameters for determining results in compliance with the Controls Section of the ODCM. Simplifying assumptions have been applied where applicable to provide a more workable document for implementing the Control requirements. Alternate calculation methods may be used from those presented as long as the overall methodology does not change or as long as most up-to-date revisions of the Regulatory Guide 1.109 dose conversion factors and environmental transfer factors are substituted for those currently included and used in this document.

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RECORDS AND NOTIFICATIONS

All records of reviews performed for changes to the ODCM shall be maintained in accordance with RM-AA-100-1000, Processing Quality Assurance Records. All ORG approved changes to the ODCM, with required documentation of the changes per TS 6.14, shall be submitted to the NRC in the Annual Effluent Release Report. Procedures that directly implement, administer or supplement the requirements of the ODCM Controls and Surveillances are:

- CY-SL-102-0104, Processing Aerated Liquid Waste
- CY-SL-102-0105, Processing Gaseous Wastes
- 0-CPP-28.20, Met Tower Data Processing
- COP-05.04, Chemistry Department Surveillances and Parameters
- CY-SL-104-0112, Determination of Process Radiation Monitor Setpoints
- The Radiological Environmental Monitoring Program is performed by the State of Florida as per FPL Juno Nuclear Plant Services Corporate Environmental Procedure Number EV-SR-104-1001.
- The licensee also performs environmental monitoring per EV-AA-01, Fleet Groundwater Protection Program, in order to meet the objectives of the Nuclear Energy Institute's Industry Initiative (NEI 07-07).

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	CONTROLS	
	AND	
	SURVEILLANCE REQUIREMENTS	
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1.0	DEFINITION	S for CONTROLS SECTION OF ODCM	

The defined terms of this section appear in capitalized type and are applicable throughout these Controls.

<u>ACTION</u>

1.1 ACTION shall be that part of a Control that prescribes remedial measures required under designated conditions.

CHANNEL CALIBRATION

1.4 CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel output such that it responds with the necessary range and accuracy to known values of the parameter which the channel monitors. The CHANNEL CALIBRATION shall encompass the entire channel including the sensor and alarm and/or trip functions and shall include the CHANNEL FUNCTIONAL TEST. The CHANNEL CALIBRATION may be performed by any series of sequential, overlapping or total channel steps such that the entire channel is calibrated.

CHANNEL CHECK

1.5 CHANNEL CHECK shall be the qualitative assessment of channel behavior during operation by observation. This determination shall include, where possible, comparison of the channel indication and/or status with other indications and/or status derived from independent instrument channels measuring the same parameter.

CHANNEL FUNCTIONAL TEST

1.6 A CHANNEL FUNCTIONAL TEST shall be the injection of a simulated signal into the channel as close to the primary sensor as practicable to verify OPERABILITY including alarm and / or trip functions.

DOSE EQUIVALENT I-131

1.10 DOSE EQUIVALENT I-131 shall be that concentration of I-131 (microCurie/gram) which alone would produce the same thyroid dose as the quantity and isotopic mixture of I-131, I-132, I-133, I-134 and I-135 actually present. The thyroid dose conversion factors used for this calculation shall be the thyroid dose conversion factors listed in Federal Guidance Report 11, Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion.

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1.0	DEFINITION	S for CONTROLS SECTION OF ODCM (continued)				
FREC		ATION				
1.13	The FREQUE	ENCY NOTATION specified for the performance of Sur s shall correspond to the intervals defined in Table 1.1.	veillance			
INDU	STRY INITIAT	<u>IVE</u>				
1.14	Nuclear Ener Inadvertent R been adopted Protection Pr	gy Institute Initiative (NEI 07-07) on Managing Situation adiological Releases into Groundwater (The industry in through FPL Nuclear Policy EV-AA-01, Fleet Groundv ogram).	ns Involving nitiative has water			
MEM	<u>BER (S) OF TI</u>	HE PUBLIC				
1.17	MEMBER OF THE PUBLIC means an individual in a controlled or unrestricted area. However, an individual is not a member of the public during any period in which the individual receives an occupational dose.					
<u>OFFS</u>	SITE DOSE CA	LCULATION MANUAL				
1.18	The OFFSITE methodology radioactive ga effluent monif Radiological Radioactive E Programs red should be inco Annual Radio	E DOSE CALCULATION MANUAL (ODCM) shall conta and parameters used in the calculation of offsite doses aseous and liquid effluents, in the calculation of gaseou toring Alarm/Trip Setpoints and in the conduct of the En Monitoring Program. The ODCM shall also contain (1) Effluent Controls and Radiological Environmental Monit quired by TS section 6.8.4 and (2) descriptions of the in cluded in the Annual Radiological Environmental Opera bactive Effluent Release Reports required by TS 6.9.1.7	ain the s resulting from us and liquid nvironmental the oring formation that ting and 7 and 6.9.1.8.			
OPE	RABLE - OPEF	RABILITY				
1.19	A system, sul OPERABILIT all necessary water, lubrica subsystem, tr of performing	bsystem, train, component or device shall be OPERAB Y when it is capable of performing its specified function attendant instrumentation, controls, electrical power, c atton or other auxiliary equipment that are required for the rain, component or device to perform its function(s) are their related support function(s).	LE or have n(s) and when cooling or seal he system, also capable			
OPE	RATIONAL MC	DE - MODE				
1.20	An OPERATI combination temperature	ONAL MODE (i.e., MODE) shall correspond to any one of core reactivity condition, power level and average re specified in Table 1.2 of the St. Lucie Plant TS.	e inclusive actor coolant			

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1.0	DEFINITION	S for CONTROLS SECTION OF ODCM (continued)				
PURC	BE - PURGING	2				
1.24	PURGE or Pl from a confine other operatin to purify the c	URGING shall be any controlled process of discharging ement to maintain temperature, pressure, humidity, con ng condition, in such a manner that replacement air or confinement.	air or gas ncentration or gas is required			
RATE	DTHERMAL	POWER				
1.25	RATED THE	RMAL POWER shall be a total reactor core heat transf nt of 3020 MWt.	er rate to the			
REPC	ORTABLE EVE	<u>NT</u>				
1.27	A REPORTA 50.73 of 10 C	BLE EVENT shall be any of those conditions specified FR Part 50.	in Section			
<u>SITE</u>	SITE BOUNDARY					
1.30	SITE BOUNDARY means that line beyond which the land or property is not owned, leased or otherwise controlled by the licensee.					
SOUF	RCE CHECK					
1.31	A SOURCE CHECK shall be the qualitative assessment of channel response when the channel sensor is exposed to a radioactive source.					
THER	MAL POWER					
1.33	THERMAL Pecoolant.	OWER shall be the total reactor core heat transfer rate	to the reactor			
UNPL	ANNED RELE	ASE				
1.34	UNPLANNEL airborne radio classify differ considered as	D RELEASE is the unintended discharge of a volume of bactivity to the environment. The following guidance is ences between unplanned releases and other releases s an UNPLANNED RELEASE :	of liquid or presented to that are not			
	ls an UNPLA	NNED RELEASE if:				
	1. The work off site	rong waste gas decay tank or liquid radwaste release t	ank is released			

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1.0	DEFINITIONS		S for CONTROLS SECTION OF ODCM (continued)			
1.34	(continued) 2. Failure radioa at the discha					
			e of process system to automatically divert a process st ctive treatment system upon radioactivity being present detection level or at a certain level of activity, and the re rge off site occurs.	ream to a t in the process esult is a		
-	 Large losses from unexpected pipe or valve leaks where the resulting los of radioactive material to off site such that a 10 CFR Part 50.72 or 10 CFR Part 50.73 report is required. For Gas Decay Tank, if a Gas Decay Tank loses greater than 2 psig per 8 hours for 9 consecutive shifts, or 18 psig in 72 hours, AND the losses were determined to be to the Reactor Auxiliary Building Atmosphere, the declare the losses as an UNPLANNED RELEASE (reference CR 00-203) Is not an UNPLANNED RELEASE if: 					
	 It cannot be shown that the release went off site, i.e., gas went to anothe part of the system(s) that contained the loss. 					
	2.	Norma purgin	mal losses through the Plant Vent due to valve and pipe leakage and ging activities to make the system safe for maintenance activities.			
UNRI	ESTRIC	CTED A	REA			
1.35	5 UNRESTRICTED AREA means an area, access to which is neither limited nor controlled by the licensee.			limited nor		
VENT	<u> ILATIC</u>	<u>ON EXH</u>	AUST TREATMENT SYSTEM			
1.39	A VENTILATION EXHAUST TREATMENT SYSTEM shall be any sy and installed to reduce gaseous radioiodine or radioactive material is form in effluents by passing ventilation or vent exhaust gases throug absorbers and/or HEPA filters for the purpose of removing iodines of from the gaseous exhaust stream prior to the release to the environ system is not considered to have any effect on noble gas effluents. Safety Features Atmospheric Cleanup Systems are not considered VENTILATION EXHAUST TREATMENT SYSTEM components.			vstem designed n particulate h charcoal r particulates ment. Such a Engineered to be		

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1.0 DEFINITIONS for CONTROLS SECTION OF ODCM (continued)

<u>VENTING</u>

1.40 VENTING shall be the controlled process of discharging air or gas from a confinement to maintain temperature, pressure, humidity, concentration or other operating condition, in such a manner that replacement air or gas is not provided or required during VENTING. Vent, used in system names, does not imply a VENTING process.

WASTE GAS HOLDUP SYSTEM

1.41 A WASTE GAS HOLDUP SYSTEM shall be any system designed and installed to reduce radioactive gaseous effluents by collecting Reactor Coolant System offgases from the Reactor Coolant System and providing for delay or holdup for the purpose of reducing the total radioactivity prior to release to the environment.

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	TABLE 1.1 FREQUENCY NOTATION (Page 1 of 1)
<u>NOTATION</u>	FREQUENCY
S	At least once per 12 hours.
D	At least once per 24 hours.
W	At least once per 7 days.
4/M*	At least 4 per month at intervals of no greater than 9 days and minimum of 48 per year.
м	At least once per 31 days.
Q	At lease once per 92 days.
SA	At least once per 184 days.
R	At least once per 18 months.
S/U	Prior to each reactor startup.
N.A.	Not Applicable.
P**	Completed prior to each release
1/DSC	Once per Dry Shielded Canister (DSC) loading and unloading operation when DSC is in the Cask Handling Facility (CHF) and DSC is loaded with Spent Fuel.
* For Radioactiv ** For Radioactiv	re Effluent Sampling re Batch Releases Only

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<u>3/4</u>	CONTROLS	AND SURVEILLANCE REQUIREMENTS	
3/4.0	APPLI	CABILITY	
	ROLS		
3.0.1	Compliance v during the co Control, the a	with the Controls contained in the succeeding controls i nditions specified therein; except that upon failure to m associated ACTION requirements shall be met.	s required eet the
3.0.2	Noncomplian associated A the Control is of the ACTIO	ce with a Control shall exist when the requirements of to CTION requirements are not met within the specified time restored prior to expiration of the specified time interva N requirements is not required.	the Control and me intervals. If als, completion
SUR∖ 4.0.1	/EILLANCE RI Surveillance individual Co	EQUIREMENTS Requirements shall be met during the conditions specif ntrols unless otherwise stated in an individual Surveilla	fied for nce
102	Requirement	ance Requirement shall be performed within the specif	ied time
4.0.2	interval with:	ance Requirement shall be performed within the specific	
	a. A max interva	imum allowable extension not to exceed 25% of the su al.	rveillance
:			

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INSTRUMEN	NTATIO	<u>N</u>			
RADIOACTI	VE LIQI	JID EFFLUENT MONITORING INSTRUMENTATION			
CONTROLS					
3.3.3.9 In ma OF Ca sh pa	accorda onitoring PERABI ontrol 3. all be de rameter	ance with St. Lucie Plant TS 6.8.4.f.1), the radioactive lig instrumentation channels shown in Table 3.3-12 shall LE with their Alarm/Trip Setpoints set to ensure that the 11.1.1 are not exceeded. The Alarm/Trip Setpoints of the etermined and adjusted in accordance with the method rs in the OFFSITE DOSE CALCULATION MANUAL (O	quid effluent be limits of these channels ology and DCM).		
APPLICABIL	<u>.ITY:</u>	At all times.			
<u>ACTION:</u>					
a. With a Setpo suspe chann accep	With a radioactive liquid effluent monitoring instrumentation channel Alarm/Trip Setpoint less conservative than required by the above control, immediately suspend the release of radioactive liquid effluents monitored by the affected channel or declare the channel inoperable or change the setpoint so it is acceptably conservative.				
b. With I instrui Resto unsuc this in	ess thai mentatio ore the ir ccessful ioperabi	n the minimum number of radioactive liquid effluent mo on channels OPERABLE, take the ACTION shown in T noperable instrumentation to OPERABLE status within explain in the next Annual Radioactive Effluent Releas lity was not corrected in a timely manner.	nitoring able 3.3-12. 30 days and, if se Report why		
c. Report	t all devi	ations in the Annual Radioactive Effluent Release Rep	ort.		
SURVEILLA	NCE RE	EQUIREMENTS			
4.3.3.9 Ea de SC TE	ach radio monstra DURCE EST at ti	pactive liquid effluent monitoring instrumentation chann ated OPERABLE by performance of the CHANNEL CH CHECK, CHANNEL CALIBRATION and CHANNEL FU ne frequencies shown in Table 4.3-8.	el shall be ECK, JNCTIONAL		

^{M)} 20 [°] of 231 ENTATION
ENTATION
IELS ACTION
35
36, 37
38
38
38

SG - Denotes Steam Generator

ACTION STATEMENTS

ACTION 35 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases may continue provided that prior to initiating a release:

a. At least two independent samples are analyzed in accordance with the Surveillance Requirement for concentration limit of Control 4.11.1.1.

AND

b. At least two technically qualified members of the Facility Staff independently verify the release rate calculations and discharge line valving.

Otherwise, suspend release of radioactive effluents via this pathway.

ACTION 36 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue for up to 30 days provided grab samples are analyzed for gross radioactivity (beta or gamma) at a limit of detection of at least 2.E-07 micro-Curie/ml:

a. At least once per 8 hours⁽¹⁾ when the specific activity of the secondary coolant is greater than 0.01 micro-Curies/gram DOSE EQUIVALENT I-131

OR

b. At least once per 24 hours⁽¹⁾ when the specific activity of the secondary coolant is less than or equal to 0.01 micro-Curies/gram DOSE EQUIVALENT I-131.

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TABLE 3.3-12 RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION (Page 2 of 2)								
	ACTION STATEMENTS (continued)							
ACTION 37 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, isotopic grab samples shall be obtained and analyzed at a Lower Limit of Detection for I-131, Co-58, Co-60, Cs-134, and Cs-137 to achieve detection sensitivity capable of detecting a primary-to-secondary leak rate of 5 gallons per day, provided that the Reactor Coolant System has sufficient activity present.								
The applicable frequ	uency shall be:							
In MODES 1, 2, 3, 4	ļ							
a. At least once provided that	At least once per day ⁽¹⁾ for isotopic activity on the affected Steam Generator, provided that the Air Ejector Gas Activity Monitor is OPERABLE,							
b. At least every Air Ejector G	At least every 8 hours ⁽¹⁾ for isotopic activity on the affected Steam Generator, if the Air Ejector Gas Activity Monitor is INOPERABLE.							
This requirement is (TR-104788-R2) pe	intended to meet EPRI PWR Primary-to-Secondary Lea r reference PMAI 00-08-109.	ak Guidelines						
ACTION 38 - Minimum system design flow of required running pumps shall be utilized for ECL calculations for discharge canal flow and maximum system design flow be utilized for ECL calculations for effluent line flow.								
TABLE 3.3-12 Nota	tion							
(1) - The initial sat Subsequent s per ODCM si to exceed 25	 The initial sample shall be completed prior to the frequency interval specified. Subsequent samples (of the same INOPERABLE condition) may be performed per ODCM surveillance requirement 4.0.2 (a maximum allowable extension not to exceed 25% of the surveillance interval). 							
	to exceed 25% of the surveillance interval).							

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				· _ · _ ·				
				LE 4.3-8			TION	
	<u>-</u>	RADIOACI	SURVEILLANCE	REQUIRE	MENTS ($\frac{51 \text{ ROWENTA}}{4}$	TION	
	(Page 1 of 1)							
		INST	RUMENT	SOURCE CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST		
1.	Radio Auton	activity Monit	ors Providing Alarm and tion of Release					
	a) L	iquid Radwa	ste Effluent Line	D	Р	R (2)	Q (1)	
	b) S	Steam Genera ₋ine	ator Blowdown Effluent	D	м	R (2)	Q (1)	
2.	Flow I	Rate Measure	ement Devices					
	a) L	iquid Radwa	ste Effluent Line	D (3)	N.A.	R	Q	
	b) [Discharge Ca	nal	D (3)	N.A.	R .	Q	
	c) 5 L	Steam Genera _ine	ator Blowdown Effluent	D (3)	N.A.	R	Q	
			TABLE	ΝΟΤΑΤΙΟΙ	<u> NS</u>		,	
(1)	Th pa	e CHANNEL thway and c	- FUNCTIONAL TEST sha ontrol room alarm annund	all also derr iation occu	nonstrate a r if any of t	utomatic isolati he following co	ion of this nditions exist:	
	1. Instrument indicates measured levels above the alarm/trip setpoint or							
	2. Circuit failure or							
	3.	Instrum	ent indicates a downscale	e failure or				
	4.	Instrum	ent controls not set in ope	erate mode.				
(2)	The initial CHANNEL CALIBRATION shall be performed using one or more of the reference standards traceable to the National Institute of Standards & Technology (NIST) or using standards that have been calibrated against standards certified by the NIST. These standards should permit calibrating the system over its intended range of energy and rate capabilities that are typical of normal plant operation. For subsequent CHANNEL CALIBRATION, button sources that have been related to the initial calibration may be used.							
(3)	CH CH CO	HANNEL CH HANNEL CH ntinuous, pe	ECK shall consist of verify ECK shall be made at lea riodic or batch releases a	ying indicati st once per re made.	on of flow 24 hours	during periods on days on whi	of release. ch	
(4)	Th IN CF	ie requireme STRUMENT R 99-0361, P	nts to perform the surveill MINIMUM CHANNELS C MAI 99-04-106).	ances is no DPERABLE	t applicabl as not app	e, if Table 3.3- [.] olicable (N.A.).	12 list the (Reference	

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-200		23 01 23 1	
	ST. LUCIE PLANT		
MENTATIO	<u>N</u>		
CTIVE GAS	EOUS EFFLUENT MONITORING INSTRUMENTATIO	<u>NN</u>	
OLS			
In accorda effluent m OPERABI Control 3. shall be de parameter	ance with St. Lucie Plant TS 6.8.4.f.1), the radioactive g onitoring instrumentation channels shown in Table 3.3- LE with their Alarm/Trip Setpoints set to ensure that the 11.2.1.are not exceeded. The Alarm/Trip Setpoints of t etermined and adjusted in accordance with the method rs in the ODCM.	aseous 13 shall be limits of hese channels ology and	
ABILITY:	As shown in Table 3.3-13		
<u>.</u>			
/ith a radioa etpoint less uspend the r nannel or de cceptably co	ctive gaseous effluent monitoring instrumentation chan conservative than required by the above control, imme release of radioactive gaseous effluents monitored by the clare the channel inoperable or change the setpoint so onservative.	nel Alarm/Trip diately he affected it is	
With less than the minimum number of radioactive gaseous effluent monitoring instrumentation channels OPERABLE, take the ACTION shown in Table 3.3-13. Restore the inoperable instrumentation to OPERABLE status within 30 days and, if unsuccessful, explain in the next Annual Radioactive Effluent Release Report why this inoperability was not corrected in a timely manner.			
eport all dev	viations in the Annual Radioactive Effluent Release Rep	port.	
LLANCE RE	EQUIREMENTS		
Each radio demonstra SOURCE TEST at tl	pactive gaseous effluent monitoring instrumentation chated OPERABLE by performance of the CHANNEL CH CHECK, CHANNEL CALIBRATION and CHANNEL FU he frequencies shown in Table 4.3-9.	annel shall be ECK, JNCTIONAL	
	CTIVE GAS	CTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION DLS In accordance with St. Lucie Plant TS 6.8.4.f.1), the radioactive g effluent monitoring instrumentation channels shown in Table 3.3- OPERABLE with their Alarm/Trip Setpoints set to ensure that the Control 3.11.2.1.are not exceeded. The Alarm/Trip Setpoints of t shall be determined and adjusted in accordance with the method parameters in the ODCM. ABILITY: As shown in Table 3.3-13 i //////////////////////////////////	

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		TABLE 3 3-13	Å	
RADIOACTI	/E GASEOUS EF	FLUENT MONITORING		TION
		(Page 1 of 3)		
		(
		MINIMUM CHANNELS		ACTION
		OPERABLE		
1. Waste Gas Holdu	p System			
a) Noble Gas A	ctivity Monitor -	11.00	.	45
Providing Ala	arm and Automatic	1/ KX		45
2 Condenser Evacu	ation System			<u> </u>
a) Noble Gas A	ctivity Monitor	1/ Rx	**	47
			Modes 1, 2, 3, 4	48
3. Plant Vent System	n			
a) Noble Gas A	ctivity Monitor	1/ Rx	*	47
(Low Range))			
b) Iodine Samp		1/ Rx	· · · · · · · · · · · · · · · · · · ·	51
c) Particulate S	ampier	1/ RX	*	51
a) Flow Rate IVI	v Poto Monitor	1/ Px	*	46
A Fuel Storage Area	Ventilation	1/ 1/		
System				
a) Noble Gas A	ctivity Monitor	4/ Du	*	47
(Low Range))	1/ RX		47
 b) Iodine Samp 	ler	1/ Rx	*	51
c) Particulate S	ampler	1/ Rx	*	51
d) Flow Rate M	onitor	N.A. (3)	*	53
e) Sampler Flow	w Rate Monitor	1/ Rx	*	46
5. Steam Generator	Blowdown Building			
	ctivity Monitor	l		<u>+</u>
(Low Range)		1	*	47
b) Iodine Samp	,, ller	1	*	51
c) Particulate S	Sampler	1	*	51
d) Flow Rate M	lonitor	N.A. (3)	*	53
e) Sampler Flor	w Rate Monitor	1	*	46

At all times while making releases via this pathway
At all times when air ejector exhaust is not directed to plant vent.

Rx - Denotes reactor

ACTION STATEMENTS

ACTION 45 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, the contents of the tank(s) may be released to the environment provided that prior to initiating a release:

At least two independent samples of the tank's contents are analyzed and a.

b. At least two technically qualified members of the facility staff independently verify the release rate calculations and discharge valve lineup.

Otherwise, suspend release of radioactive effluents via this pathway.

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	TABLE 3.3-13 RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION (Page 2 of 3)							
			ACTION STATEMENTS (continued)					
ACTIC Chanr to 30 d	DN 46 - nels OP days pr	With th ERABI ovided	ne number of channels OPERABLE less than required l LE requirement, effluent releases via this pathway may the flow rate is estimated at least once per 4 hours.	by the Minimum continue for up				
ACTIC Minim 30 day	ON 47 - um Cha ys provi	With t annels ided:	he number of channels OPERABLE less than required OPERABLE, effluent releases via this pathway may con	by the ntinue for up to				
a.	<u>If</u> chan taken a activity	nel ino at least v within	perability is due to loss of activity indication, <u>Then</u> grab t once per 8 hours ⁽¹⁾ and these samples are analyzed fo 24 hours.	samples are or isotopic				
			OR					
b.	<u>If</u> chan discov followi verify r	nel ino ered du ng reas normal	perability is due to loss of Control Room alarm annunci uring a channel functional test because of any one or m sons listed, <u>Then</u> channel checks are performed once p indication and current assigned setpoints are NOT exc	ation lore of the er hour ⁽¹⁾ to eeded.				
	1.	Failure	e to annunciate when testing alarm/trip setpoints.					
	2.	Circuit	failure.					
	3.	Downs	scale failure.					
	4.	Contro	ols NOT set in OPERATE mode.					
ACTIC Chanr analyz achiev 5 gallo	ON 48 - nels OP zed at a ve deteo ons per	With th ERABI Lower ction se day, pi	ne number of channels OPERABLE less than required l LE requirement, noble gas isotopic grab samples shall l Limit of Detection for Ar-41, Kr-88, Xe-133, Xe-133m, ensitivity capable of detecting a primary-to-secondary le rovided that the Reactor Coolant System has sufficient	by the Minimum be obtained and and Xe-135 to ak rate of activity present.				
The a	pplicabl	le frequ	uency shall be:					
a.	At leas Exhau OPER	st once st prov ABLE,	per 12 hours ^{(1),(2)} for noble gas isotopic activity on the <i>l</i> ided that <u>each</u> affected Unit's Steam Generator Blowdo	Air Ejector wn Monitor is				
			OR					
b.	At leas Exhau INOPE	st once st if <u>eitl</u> ERABLI	per 8 hours ^{(1),(2)} for noble gas isotopic activity on the Ai <u>her</u> of the affected Unit's Steam Generator Blowdown N E.	r Ejector Ionitors is				

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TABLE 3.3-13 RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION (Page 3 of 3)							
	ACTION STATEMENTS (continued)						
ACTION 48 (cor	tinued)						
This requiremen (TR-104788-R2) Air Ejector Exha	t is intended to meet EPRI PWR Primary-to-Secondary Lea , therefore grab samples shall be taken regardless of the A ust while in Modes 1, 2, 3, 4. (Reference PMAI 00-08-109	ak Guidelines Alignment of the .)					
ACTION 51 - Wi Channels OPER continue for up t sampling equipn	th the number of channels OPERABLE less than required ABLE requirement, effluent releases via the affected pathy o 30 days provided samples are continuously collected wit ment as required in Table 4.11-2.	by the Minimum way may h auxiliary					
ACTION 53 - Ma instantaneous re	eximum system flows shall be utilized in the determination elease monitor alarm setpoint.	of the					
TABLE 3.13-13	NOTATION						
(1) - The initial Subseque ODCM su exceed 2	sample shall be completed prior to the frequency interval ent samples (of the same INOPERABLE condition) may be rveillance requirement 4.0.2 (a maximum allowable extens 5 percent of the surveillance interval).	specified. performed per sion not to					
(2) - <u>If</u> there is <u>Then</u> the ejector sh the air eje	no steam flow to the air ejector nozzles while the Reactor sample may be omitted, but the steam flow condition (state all be reverified once per 8 hours to initiate grab samples i ector nozzles is established.	is in Mode 4, us) to the air if steam flow to					
(3) - The flow documen	rate monitors are not functional. Vent flow is based on des ts and values in the UFSAR. EPIP-09 contains the correct	sign engineering flow values.					
		,					

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			BLE 3.3-14			
<u>RA</u>	DIOACTIVE	<u>EFFLUEI (D</u>	$\frac{\text{NI} \text{ MONITOR}}{200 1 \text{ of } 4}$	SETPOINT BAS	<u>515</u> .	
		(F d	age i ol 4)			
ODCM Effluent Gas	Channels	CHANNEL	BASIS	ALERT	HIGH	
	<u></u>	01_05	DOCUMENT	5 x Bkg 9	Allotted % Of Site	
	5	01-03	0-200	J X DKy.	Limit ⁹	
1FHB LOW RANGE G	AS	04-05	C-200 ^ª	5 x Bkg. ^q	Allotted % Of Site	
· · · · · · · · · · · · · · · · · · ·					Limit ^g	
2A PV PIG LOW RANG	SE GAS	423	C-200 ^a	5 x Bkg. ^q	Allotted % Of Site	
2B PV PIG LOW RANG	SE GAS	433	C-200 ^ª	5 x Bkg.	Vent #2	
2FHB LOW RANGE G	AS	413	C-200 ^ª	5 x Bkg.	Allotted % Of Site	
SGBDB LOW RANGE	GAS	45-6	C-200 ^a	5 x Bkg.	Allotted % Of Site	
1 CONDENSER AIR E	JECTOR	35	C-200	2 x Bkg ^b	3 x Bkg	
2 CONDENSER AIR E	JECTOR	403	C-200	2 x Bkg. ^b	3 x Bkg.	
1 BATCH GAS EFFLU	ENT	42	C-200 ^a	As Per CY-SI -102-0105	As Per CY-SI -102-0105 ^{a,h}	
2 BATCH GAS EFFLU	ENT	203	C-200 ^a	As Per CY-SL-102-0105	As Per CY-SL-102-0105 ^{a,h}	
2PV WRGM	Chan					
Low Range Gas	621	on t ^p			Allotted % Of Site	
Mid Range Gas	622	624	C-200*	5 x Bkg.' uCi/sec	Limit ^P uCi/sec	
High Range Gas	623					
2A ECCS WRGM	<u>Chan</u>					
Low Range Gas	601	604P	C 200ª	0.75 x High ^P	Allotted % Of Site	
Mid Range Gas	602	004	C-200	uCi/sec	Limit ^P uCi/sec	
High Range Gas	603					
2B ECCS WRGM	<u>Chan</u>					
Low Range Gas	611	614 ^P	C 200ª	0.75 x High ^P	Allotted % Of Site	
Mid Range Gas	612	014	C-200	uCi/sec	Limit ^P uCi/sec	
High Range Gas	613					
·			BACIC		шоц	
ODCM Related Particu	ate Channels		DOCUMENT	ALERT SETPOINT [®]		
1PV PARTICULATE		01-01	FUSAR	5000 CPM	10,000 CPM ^c	
1FHB PARTICULATE		04-01	FUSAR & TS ^d	5000 CPM	10,000 CPM ^c	
2A PV PIG PARTICULAT	E	421	FUSAR	5000 CPM	10,000 CPM ^c	
2B PV PIG PARTICULAT	E	431	FUSAR	5000 CPM	10,000 CPM ^c	
2FHB PARTICULATE		411	FUSAR & TS ^d	5000 CPM	10,000 CPM ^c	
SGBDB PARTICULATE		45-4	FUSAR	5000 CPM	10,000 CPM ^c	

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		(P	age 2 of 4)		210
ODCM Related loding	e Channels	CHANNEL ID	BASIS DOCUMENT	ALERT SETPOINT [®]	HIGH SETPOINT [®]
1PV IODINE		01-03	FUSAR	5000 CPM	10,000 CPM ^c
1FHB IODINE		04-03	FUSAR	5000 CPM	10,000 CPM ^c
2A PV PIG IODINE		422	FUSAR	5000 CPM	10,000 CPM ^c
2B PV PIG IODINE		432	FUSAR	5000 CPM	10,000 CPM ^c
2FHB IODINE		412	FUSAR	5000 CPM	10,000 CPM ^c
SGBDB IODINE		45-5	FUSAR	5000 CPM	10,000 CPM ^c
ODCM Related Liquid	d Channels	CHANNEL ID	BASIS DOCUMENT	ALERT SETPOINT [®]	HIGH SETPOINT ^e
1A S/G BLOWDOWN		44	C-200	2 x Bkg.	2.E-04 uCi/ml ^{f,m}
1B S/G BLOWDOWN		45	C-200	2 x Bkg.	2.E-04 uCi/ml ^{f,m}
2A S/G BLOWDOWN		121	C-200	2 x Bkg.	2.E-04 uCi/ml ^m
2B S/G BLOWDOWN		122	C-200	2 x Bkg.	2.E-04 uCi/ml ^m
1 BATCH LIQUID EFFLUENT		R6627	C-200	As Per CY-SL-102- 0104	As Per CY-SL-102- 0104 ⁿ
2 BATCH LIQUID EFFL	UENT	301	C-200	As Per CY-SL-102- 0104	As Per CY-SL-102- 0104 ⁿ

Monitor channels not listed are covered per CY-SL-104-0112, Determination of Process Radiation Monitor Setpoints

TABLE NOTATIONS

- a ODCM Control 3.11.2.1a
- b ODCM Table 4.11-1 Note (7)
- c ODCM Control 3.11.2.1.b
- d TS Table 3.3-6 required instrument 2.a.ii with setpoint per ODCM
- e Setpoints may be rounded for analog and digital display input limitations.
- f The channel setpoint to be in cpm equivalent to this activity
- g per ODCM Methodology Step 2.2.2
- h Batch Gaseous Release Rate and Maximum activity limits shall be used such that Plant Vent (PV) Release HIGH setpoints should not be exceeded.
- i, j, k, and I not used in notation for clarity

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<u> </u>	ST. LOCIE FLANT							
RA	TABLE 3.3-14 RADIOACTIVE EFFLUENT MONITOR SETPOINT BASIS (Page 3 of 4)							
TABLE NOTATION	<u>S</u> (continued)							
m - Continuous Liq	uid setpoint methodology per ODCM 1.3.2							
n - Batch liquid se	point methodology per ODCM 1.3.1							
o - Note "oscar" is	not used in this table notation							
p - The individual	Channel 621, 622 and 623 (Plant Vent No. 2)							
	Channel 601, 602 and 603 (ECCS 2A)							
and	Channel 611, 612 and 613 (ECCS 2B)							
After the first A locked in if the internal control will not reset a respective Skic Alarm" and "Hi information on Channel ID for	lert and High Effluent Channel Alarms are received the release is increasing to higher activity levels. Transfer to Effluent Channel input from the Mid or High Range C n alarm, nor provide additional alarms. The Effluent Ch has to be reset to new Setpoints by I&C. References gh Alarm" settings for the Low Mid and High Channels a y. This is why Table 3.3-14 only list Channel 624, 604 Alarm Setpoints. These are the respective Skid's Alarr	y will stay of Skid Gas Channels annel on the to "Alert are for display and 614 as the n Channel.						
Channel ID nu channels for E each have a si ft3/minute exh set to zero sind uCi/sec value i Accident condi	mber 604 and 614 are the uCi/sec indication and ALER CCS 2A and ECCS 2B respectively. The ECCS exhaus ngle fan. Their Skid's Monitor Item #059 will be set per aust rate. Their Skid's Monitor Item #060 (Accident Flow there is only one flow rate possible for these ECCS p ndicated on ECCS skids should be valid regardless of N tions.	T/HIGH Alarm st pathways the measured w rate) will be athways. The Normal or						
Accident conditions. The Channel ID number 624 (generically called the Plant Vent 2 Skid's Channel 4) is the uCi/sec and Control Room active ALERT/HIGH Alarm that is Common (shared by) to the Low (621), Mid (622), and High (623) Range Gas Channels. The Plant Vent 2's skid Monitor Item #059 will be set for the maximum ft3/minute flow rate that could occur under all circumstances. The Plant Vent 2 Channel 624's actual uCi/sec is dependent what is set in Monitor Item #059 and Monitor Item #060 as follows:								

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<u> </u>	
F	TABLE 3.3-14 ADIOACTIVE EFFLUENT MONITOR SETPOINT BASIS
-	(Page 4 of 4)
TABLE NOTATIO	<u>NS</u> (continued)
p - (continued)	
The NORMA ALERT/High CY-SL-104-(the Low Ran process ft3/r	L value for the Common Channel 624 uCi/sec indication and Alarms should be based on the equivalent uCi/sec of the 5 x Bkg (use 0112, Determination of Process Radiation Monitor Setpoints) uCi/cc of ge Channel #621 and RIM 26-90 Monitor Item #059 (the MAXIMUM ninute flow rate that could occur in the Unit 2 Plant Vent.
The ACCIDE switching (at display a uC Range Chan Item #060 6, Radiation Me Injection sec	INT value for the Common Channel 624's uCi/sec is based on the Skid a preset activity value) input from the Low Range Channel to calculate / i/sec value based on receiving activity uCi/cc input from either the Mid nel 622 (OR from the High Range Channel 623) and RIM 26-90 Monitor 600 ft3/minute (use CY-SL-104-0112, Determination of Process pointor Setpoints) flow rate that is expected during a LOCA Safety uence.
During an Ad 2-HVE-6B, 2 2-HVE-10B flow rate tha new Setpoin actual Plant the Effluent Setpoints wi not utilize Ch	CCIDENT you have to access the running status of 2-HVE-6A, -HVE-7A, 2-HVE-7B, 2-HVE-8A, 2-HVE-8B, 2-HVE-10A and o determine actual Plant Vent exhaust flow rate ft3/minute. This is the t should be inserted into Plant Vent #2 Skid's Monitor Item #060 with ts for Alert and High Alarms in units of uCi/sec calculated by using the Vent exhaust flow during the Accident. If fan operating status changes, Channel 624 uCi/sec indication and existing Alert and High Alarm I not be valid for a new flow rate. This is the reason that EPIP-09 does nannel 624 indication for calculating off-site dose.
q - During an ou slightly abov less than the Containment	tage, the Low Range gas activity ALERT Alarm Setpoint may be set to e outage anticipated activity levels, but shall always be set to a value High Alarm Setpoint. Examples of outage activities are initiating a Main Purge and venting the S/G primary side bowls.
FUSAR - Channe The set 3.11.2. does no noted.	I listed FUSAR, but not required by ODCM Control 3.3.10 Table 3.3-13. points are used to provide alarm well before exceeding ODCM Control I.b Site Dose Rate Limit. The inoperability of a FUSAR channel above of involve an ACTION statement unless TS (Technical Specification) is
2 x Bkg., 3 x Bkg. is the a evaluat Determ	, 5 x Bkg. etc., denotes the number of times the normal channel reading ppropriate Alarm Setting. These type of setpoints should be periodically ed to insure alarm sensitivity is maintained as per CY-SL-104-0112, ination of Process Radiation Monitor Setpoints.

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	TABLE 4.3-9 RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS (4)							
			(P	age 1 of 2	2)	,		
	INSTRUME	NT	CHANNEL CHECK	SOURCE CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	Modes in which surveillance required	
1.	Waste Gas Holdup	System						
	a) Noble Gas Act Providing Alan Automatic Ten Release	tivity Monitor - m and mination of	Р	Р	R (3)	Q (1)	*	
2.	Condenser Evacuat	tion System						
	a) Noble Gas Act	tivity Monitor	D	М	R (3)	Q (2)	**	
3.	Plant Vent System							
	a) Noble Gas Act	tivity Monitor	D	М	R (3)	Q (2)	*	
	b) Iodine Sample	r	W	N.A.	N.A.	N.A.	*	
	c) Particulate Sar	mpler		N.A.	N.A.	N.A.	*	
	e) Sampler Flow	Rate	D	N.A.	R	N.A.	*	
4.	Fuel Storage Area \ System	Ventilation						
	a) Noble Gas Act	tivity Monitor	D	M	R (3)	Q (2)	*	
	b) Iodine Sample	r	W	N.A.	N.A.	N.A.	*	
	c) Particulate Sar	mpler	W	N.A.	N.A.	N.A.	*	
	e) Sampler Flow	Rate Monitor	D	N.A.	R	N.A.	*	
5.	Steam Generator B Building Vent	lowdown						
	a) Noble Gas Act	tivity Monitor	D	M	R (3)	Q (2)	*	
	b) Iodine Sample	r	W	N.A.	N.A.	N.A.	*	
	c) Particulate Sar	mpler	W	N.A.	N.A.	N.A.	*	
	e) Sampler Flow	Rate Monitor	D	N.A.	R	N.A.	*	
6.	Cask Handling Fac	ility (CHF)						
	a) Sampler Flow	Rate Monitor	D	N.A.	Annual	N.A	***	

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	TABLE 4.3-9 RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS (4) (Page 2 of 2)							
			TABLE NOTATIONS					
* _	- At	all times w	hen making releases via this pathway.					
** _	- At	all times w	hen air ejector exhaust is not directed to plant vent.					
*** -	- At	all times w	hen Cask Handling Vent (CHF) is operative.					
(1)	Th thi co	e CHANNI s pathway nditions ex	EL FUNCTIONAL TEST shall also demonstrate automa and control room alarm annunciation occurs if any of th ist:	itic isolation of le following				
	1.	Instrur	nent indicates measured levels above the alarm/trip se	tpoint or				
	2.	Circuit	failure or					
	3.	3. Instrument indicates a downscale failure or						
	4.	Instrur	nent controls not set in operate mode.					
(2)	Tł ar	e CHANNI	EL FUNCTIONAL TEST shall also demonstrate that cor occurs if any of the following conditions exist:	ntrol room alarm				
	1.	Instrur	ment indicates measured levels above the alarm/trip se	tpoint or				
	2.	Circuit	failure or					
	3.	Instrur	nent indicates a downscale failure or					
	4.	Instrur	ment controls not set in operate mode.					
(3)	Tr re (N th ra su ini	ne initial CH ference sta IST) or usi e NIST. Th nge of ener bsequent (tial calibrat	IANNEL CALIBRATION shall be performed using one of indards traceable to the National Institute of Standards ing standards that have been calibrated against standar bese standards should permit calibrating the system over rgy and rate capabilities that are typical of normal plant CHANNEL CALIBRATION, button sources that have be ion may be used.	or more of the & Technology ds certified by er its intended operation. For en related to the				
(4)	Th th (R	ne requirem e INSTRUN eference C	nents to perform the surveillances is not applicable, if Ta MENT MINIMUM CHANNELS OPERABLE as not applic CR 99-0361, PMAI 99-04-106).	able 3.3-13 list cable (N.A.).				

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<u>3/4.11 RADI</u>	DACTIVE EFFLUENTS	
<u>3/4.11.1 LIQUIE</u>	EFFLUENTS	
CONCENTRATION	<u>l</u>	
CONTROLS		
3.11.1.1 In accord radioactiv (see TS I in 10 CFI radionucl entrainec micro-Cu	ance with the St. Lucie Plant TS 6.8.4.f.2) and 3), the c re material released in liquid effluents to UNRESTRICT Figure 5.1-1) shall be limited to ten times the concentrat R Part 20.1001-20.2401, Appendix B, Table 2, Column ides other than dissolved or entrained noble gases. Fo noble gases, the concentration shall be limited to 2.E-0 rie/ml total activity.	oncentration of ED AREAS ions specified 2 for r dissolved or 04
<u>APPLICABILITY:</u>	At all times.	
ACTION:		
a. With the con UNRESTRIC concentratio	centration of radioactive material released in liquid efflu TED AREAS exceeding the above limits, immediately n n to within the above limits.	ents to restore the
SURVEILLANCE R	EQUIREMENTS	
4.11.1.1.1 Radic samp	active liquid wastes shall be sampled and analyzed acc ling and analysis program of Table 4.11-1.	cording to the
4.11.1.1.2 The re the m conce Contr	esults of the radioactivity analyses shall be used in acco ethodology and parameters in the ODCM to assure that entrations at the point of release are maintained within the ol 3.11.1.1.	ordance with t the he limits of
4.11.1.1.3 Post-i perfor post-r ODCI maint	release analyses of samples composited from batch release analyses of samples composited from batch release elease analyses shall be used with the calculational me If to assure that the concentrations at the point of release ained within the limits of Control 3.11.1.1.	eases shall be previous athods in the se were

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RADIOACT	IVE LIQUI	TAB <u>D WASTE S</u> (Pa	LE 4.11-1 AMPLING AI ge 1 of 4)	ND ANALYSIS PF	ROGRAM
Liquid Release	Туре	Sampling Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection LLD (1) (µCi/ml)
A. Batch Waste Release Tanks (2)		P	Each Batch	P.G.E. (3)	5.E-07
	, <i>,</i> ,	Each Batch		I-131	1.E-06
		P One Batch/M	Μ	Dissolved and Entrained Gases (Gamma Emitters)	1.E-05
		P	М	H-3	1.E-05
		Each Batch	Composite (4)	Gross Alpha	1.E-07
		P	Q	Sr-89, Sr-90	5.E-08
		Each Batch	Composite (4)	C-14, Fe-55, Ni-63	1.E-06
B. Continuous Release	es (5, 6)	Daily	4/M	P.G.E.(3)	5.E-07
			Composite	I-131	1.E-06
		Daily Grab Sample	4/M Composite	Dissolved and Entrained Gases (Gamma Emitters)	1.E-05
		Deily	М	H-3	1.E-05
			Composite	Gross Alpha	1.E-07
		Daily	Q	Sr-89, Sr-90	5.E-08
		Daily	Composite	C-14, Fe-55, Ni-63	1.E-06
C. East/West Settling E	3asins (7)	W	10/	P.G.E. (3)	5.E-07
		Grab Sample	VV	I-131	1.E-06
D. Settling Basin as a l	Batch	!		P.G.E. (3)	5.E-07
Release Pathway. (9)	P		I-131	1.E-06
(Reference CR 99-1 99-08-084 PMAI-01 (12) CR 2010-296.	165 PMAI -04-115	Each Batch (8)	Each Batch	Dissolved and Entrained Gases (Gamma Emitters)	1.E-05
		1		H-3	1.E-05
		Each Batch	Each Ratch	Gross Alpha	1.E-07
		Each Dalun	Each baich	Sr-89, Sr-90	5.E-08
				C-14, Fe-55, Ni-63	1.E-06
E. Groundwater Dewa	tering	M(11)	14/ (11)	H-3	1E-05
Batch Releases (10))	VV(11)	VV(11)	P.G.E. (3)	5.E-07
				H-3	1E-05
				P.G.E. (3)	5.E-07
		Each Batch	Each Batch	Gross Alpha	1.E-07
				Sr-89, Sr-90	5.E-08
	,		1		

P.G.E. - Denotes Principal Gamma Emitter

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				1 1				
	TABLE 4.11-1 RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM							
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			TABLE NOTATIONS					
(1)	The LLD is radioactive backgroun falsely con	de ma d, ti clue	efined for purposes of these controls, as the smallest concentration aterial in a sample that will yield a net count, above system hat will be detected with 95% probability with only 5% probability ding that a blank observation represents a real signal.	on of / of				
	For a partie	cula	ar measurement system, which may include radiochemical separ	ration:				
			4.66 S _b					
			$E \bullet V \bullet 2.22E + 06 \bullet Y \bullet \exp(-\lambda \bullet \Delta T)$					
	Where:							
	LLD	=	the a priori lower limit of detection (micro-Curie per unit mass volume),	or				
	S _b	=	the standard deviation of the background counting rate or of th counting rate of a blank sample as appropriate (counts per minute),	he				
	E	=	the counting efficiency (counts per disintegration),					
	V	=	the sample size (units of mass or volume),					
	2.22E+06	=	the number of disintegrations per minute per micro-Curie.,					
	Y	=	the fractional radiochemical yield, when applicable,	:				
:	λ	=	the radioactive decay constant for the particular radionuclide (and	(sec ⁻¹)				
	ΔΤ	=	the elapsed time between the midpoint of sample collection an the time of counting (sec).	nd				
	Typical val	ues	s of E, V, Y and ΔT should be used in the calculation.	:				
	It should be representir (after the fa	e re ng t act)	ecognized that the LLD is defined as an <u>a priori</u> (before the fact) the capability of a measurement system and not as an <u>a posteric</u>) limit for a particular measurement.	limit <u>pri</u>				
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	TABLE 4.11-1 RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM (Page 3 of 4)							
		TABLE NOTATIONS (continued)						
(2)	A batch relea sampling for a a method des	se is the discharge of liquid wastes of a discrete volume analyses, each batch shall be isolated and then thoroug scribed in the ODCM to assure representative sampling	e. Prior to ghly mixed by					
(3)	The principal following radi Cs-137 and C are to be con those of the a Radioactive E outlined in Re	gamma emitters for which the LLD control applies inclu onuclides: Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99 Ce-141 and Ce-144. This list does not mean that only t sidered. Other gamma peaks that are identifiable, toge above nuclides, shall also be analyzed and reported in t Effluent Release Report pursuant to Control 3.11.2.6 in egulatory Guide 1.21, Appendix B, Revision 1, June 197	ide the , Cs-134, hese nuclides ether with he Annual the format 74.					
(4)	A composite sample is one in which the quantity of liquid sampled is proportional to the quantity of liquid waste discharged and in which the method of sampling employed results in a specimen that is representative of the liquids released.							
(5)	A continuous e.g., from a v release.	release is the discharge of liquid wastes of a nondiscre olume of a system that has an input flow during the cor	ete volume, ntinuous					
(6)	If Component activity on the less than or e analysis in ac	t Cooling Water activity is > 1.E-5 μ Ci/ml, perform a we e Intake Cooling Water System outlet to ensure the acti equal to 2.E-07 μ Ci/ml LLD limit. If ICW is >2.E-07 μ Ci/ coordance with a Plant Continuous Release on this Tab	ekly gross vity level is ml, perform le.					
(7)	Grab sample leakage indic background.	s to be taken when there is confirmed primary to secon ated by the air ejector monitor indicating greater than o	dary system r equal to 2x					
(8)	At least two in requirement t qualified men calculations.	ndependent samples are analyzed in accordance with t for concentration limit of control 4.11.1.1.1 and at least nbers of the facility staff independently verify the releas	he surveillance two technically e rate					
(9)	The settling b CY-SL-102-0 absence of a basin does n pathway). Th FL002208) to from the Eas	pasin(s) may receive low level activity per the guidance 104, therefore these samples shall be taken regardless primary-to-secondary leak (note (7) on liquid release ty ot apply to liquid release type [D] settling basin as a bat ne South Basin (pond) is a permitted outfall (per FDEP of the intake canal. An authorized "bypass" is required to t or West Basins.	of of the ype [C] settling tch release Permit pump directly					

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	TABLE 4.11-1 RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM (Page 4 of 4)							
		TABLE NOTATIONS (continued)						
(10)	Applies to gro Protected Are levels. This e samples that in the dewate dewatering p groundwater (e.g., IVW pe for these rele established in shall be recon analysis of th	bundwater dewatering discharges from locations outside a where radiological contamination is not expected at a expectation may be a judgment based on local and peri indicate radiological contaminant levels below the LLD ring pump's zone of influence. These samples may inclu- ump well samples (taken by small-volume sample pump samples, and upgradient samples taken from surface we ercolation basins) within the zone of influence. The sam ases shall be precautionary in nature. A conservative we the discharge permit for the effluent activity; however, nciled with actual activity concentrations ascertained from e actual effluent.	e the Plant significant pheral from sources clude ps), upgradient vaters npling protocol value shall be the permit om sample					
(11)	Each outfall s frequency de has not yet a reached its st wells of an ou be extended	hall be sampled at some point in the discharge header scribed herein. Any outfall that includes a well (or well chieved its steady state flow rate (indicating that it has r eady state zone of influence) shall be sampled weekly. Itfall reaches steady state, the sampling and analysis fr to monthly.	at the point) that not yet After the equency may					
(12)	CR 2010-296 Basins to the tritium release releases) rep points and the	; Radiological Impact Evaluation of Effluent Releases fr East Settling Pond (Dec. 2009). It was determined that es via evaporation from the East Settling Pond alone (i. resents <1.0% of the total activity released via all gase erefore, does not qualify as significant release point.	rom Catch it potential e. gaseous ous release					

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RADIOACTI	<u>VE EFF</u>	LUENTS				
DOSE						
CONTROLS						
3.11.1.2 In co liq Fiç	accorda mmitme uid efflu gure 5.1	ance with St. Lucie Plant TS 6.8.4.f.4) and 6.8.4.f.5), the ent to a MEMBER OF THE PUBLIC from radioactive ma ents released, from each unit, to UNRESTRICTED AR -1) shall be limited:	e dose or dose aterials in EAS (see TS			
a.	wh	ole body and to less than or equal to 5 mrems to any or	rems to the rgan and			
b.	Du boo	ring any calendar year to less than or equal to 3 mrems dy and to less than or equal to 10 mrems to any organ.	to the whole			
APPLICABIL	<u>.ITY:</u>	At all times.				
ACTION:		· · · ·				
a. With t excee days, excee reduc subse	a. With the calculated dose from the release of radioactive materials in liquid effluents exceeding any of the above limits, prepare and submit to the Commission within 30 days, pursuant to Plant TS 6.9.2, a Special Report that identifies the cause(s) for exceeding the limit(s) and defines the corrective actions that have been taken to reduce the releases and the proposed corrective actions to be taken to assure that subsequent releases will be in compliance with the above limits.					
SURVEILLA		EQUIREMENTS				
4.11.1.2 Cu qu the	umulativ arter ar e metho	e dose contributions from liquid effluents for the curren ad the current calendar year shall be determined in acco dology and parameters in the ODCM at least once per	t calendar ordance with 31 days.			

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RADIO	DACTI	<u>VE EFF</u>	LUENTS	
LIQUI	D RAE	OWASTE	E TREATMENT SYSTEM	
CONT	ROLS			
3.11.1	.3 In Tr sh to Fig or	accorda eatment all be us the liqui gure 5.1 gan in a	ance with St. Lucie Plant TS 6.8.4.f.6), the Liquid Radw t System shall be OPERABLE and appropriate portions sed to reduce releases of radioactivity when the project id effluent, from each unit, to UNRESTRICTED AREAS -1) would exceed 0.06 mrem to the whole body or 0.2 31-day period.	aste of the system ed doses due (see TS mrem to any
APPLI	CABIL	<u>_ITY:</u>	At all times.	
ACTIC	<u>DN:</u>			
a.	With i the at opera TS 6.	With radioactive liquid waste being discharged without treatment and in exc the above limits and any portion of the Liquid Radwaste Treatment System operation, prepare and submit to the Commission within 30 days, pursuant TS 6.9.2, a Special Report that includes the following information:		
	1.	Explan identifi the ino	nation of why liquid radwaste was being discharged with cation of any inoperable equipment or subsystems and perability,	nout treatment, the reason for
	2.	Action and	(s) taken to restore the inoperable equipment to OPER.	ABLE status
	3.	Summ	ary description of action(s) taken to prevent a recurren	ce.
SURV	EILLA		EQUIREMENTS	
4.11.1	.3.1	Doses shall b metho Treatm	due to liquid releases from each unit to UNRESTRICT e projected at least once per 31 days in accordance wi dology and parameters in the ODCM when Liquid Rady nent Systems are not being fully utilized.	ED AREAS th the waste
4.11.1	.3.2	The in: OPER for at le system previou	stalled Liquid Radwaste Treatment System shall be de ABLE by operating the liquid radwaste treatment syste east 30 minutes at least once per 92 days unless the liq has been utilized to process radioactive liquid effluent us 92 days.	monstrated m equipment quid radwaste ts during the

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RADIOA			
<u>3/4.11.2</u>	GASE	OUS EFFLUENTS	
DOSE RA	<u>ATE</u>		
)LS		
3.11.2.1	In accorda from radio the SITE I	ance with St. Lucie Plant TS 6.8.4.f.3) and 7), the dose active materials released in gaseous effluents to areas 3OUNDARY (see TS Figure 5.1-1) shall be limited to th	rate resulting at or beyond le following:
	a. For and	noble gases: Less than or equal to 500 mrems/yr to the less than or equal to 3000 mrems/yr to the skin and	ne total body
	b. For par 150	⁻ lodine-131, for lodine-133, for tritium and for all radion ticulate form with half-lives greater than 8 days: Less t 00 mrems/yr to any organ	uclides in han or equal to
APPLICA	BILITY:	At all times.	
ACTION:			
a. Wi rat	th the dose te to within	e rate(s) exceeding the above limits, immediately restor the above limit(s).	e the release
SURVEIL	LANCE RE	EQUIREMENTS	
4.11.2.1.	1 The do to be v param	ose rate due to noble gases in gaseous effluents shall b vithin the above limits in accordance with the methodolo eters in the ODCM.	be determined ogy and
4.11.2.1.2	2 The do particu be det metho sample analys	ose rate due to lodine-131, lodine-133, tritium and all ra late form with half-lives greater than 8 days in gaseous ermined to be within the above limits in accordance with dology and parameters in the ODCM by obtaining repre- es and performing analyses in accordance with the sam is program specified in Table 4.11-2.	idionuclides in effluents shall h the esentative ppling and

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RADIOACTIVE	GASEC	TABL	.E 4.11-2 SAMPLING A e 1 of 3)	ND ANALYSIS P	ROGRAM
		.			
Gaseous Release	Гуре	Sampling Frequency	Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection LLD (1) (µCi/ml)
1. Waste Gas Storage T	ank	P Each Tank Grab Sample	P Each Tank	Noble Gas P.G.E. (2)	1.E-04
2. Containment Purge		P Each Purge (6)	P Each Purge (6)	Noble Gas P.G.E. (2)	1.E-04
		Grab Sample	(7)	H-3	1.E-06
3. Vents:		4/M Grab Sample	4/M (7)	Noble Gas P.G.E. (2)	1.E-04
a. Plant b. Fuel Bldg (5) c. S/G Blowdown I	3ldg.	(0)		H-3	1.E-06
 All Release Types as above 	listed in 3.	Continuous (3) (8)	4/M Charcoal Sample (4)	I-131	1.E-12
			4/M Particulate Sample (4)	P.G.E.	1.E-11
			4/M Particulate Sample	Gross Alpha	1.E-11
			Q Composite Particulate Sample	Sr-89, Sr-90	1.E-11
			Noble Gas Monitor	Noble Gases Gross Beta or Gamma	1.E-06
5. Cask Handling Facilit	y Vent (8)	W Grab Sample	w	Noble Gas P.G.E. (2)	1. E-04
		(8)		H-3	1.E-06
			W Charcoal Sample	I-131	1.E-12
			W Particulate Sample	P.G.E.	1.E-11
		Continuous (8)	W Particulate Sample	Gross Alpha	1.E-11
			Q Composite Particulate Sample	Sr-89, Sr-90	1.E-11

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	TABLE 4.11-2 RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM								
			(Page 2 of 3)						
			TABLE NOTATIONS						
(1)	The LLD is radioactive background falsely con	de ma d, tl cluo	fined for purposes of these controls, as the smallest c aterial in a sample that will yield a net count, above sy hat will be detected with 95% probability with only 5% ding that a blank observation represents a real signal.	oncentration of stem probability of					
	For a partic	cula	ar measurement system, which may include radiochen	nical separation:					
			4.66 S₀						
			$E \bullet V \bullet 2.22E + 06 \bullet Y \bullet \exp(-\lambda \bullet \Delta T)$						
	Where:								
	LLD	=	the a priori lower limit of detection (micro-Curie per volume),	unit mass or					
	LLD	Ξ	the a priori lower limit of detection (micro-Curie per volume),	unit mass or					
	S _b	=	the standard deviation of the background counting r counting rate of a blank sample as appropriate (cou	ate or of the nts per minute),					
	Е	=	the counting efficiency (counts per disintegration),						
	V	=	the sample size (units of mass or volume),						
	2.22E+06	=	the number of disintegrations per minute per micro-	Curie.,					
	Y	=	the fractional radiochemical yield, when applicable,						
	λ	=	the radioactive decay constant for the particular rad and	ionuclide (sec⁻¹)					
	ΔΤ	=	the elapsed time between the midpoint of sample co the time of counting (sec)	ollection and					
	Typical val	ues	s of E, V, Y and ΔT should be used in the calculation.						
	It should be representir (after the fa	e re ng t act)	ecognized that the LLD is defined as an <u>a priori</u> (before he capability of a measurement system and not as an I limit for a particular measurement.	e the fact) limit <u>a posteriori</u>					

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	C-200	ST. LUCIE PLANT						
	TABLE 4.11-2 RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM (Page 3 of 3)							
		TABLE NOTATIONS (continued)						
(2)	The principal following radii noble gas rele Cs-137, Ce-1 mean that on identifiable, to reported in th Control 3.11.2 Revision 1, Ju	gamma emitters for which the LLD control applies inclu onuclides: Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135 and eases and Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, 41 and Ce-144 in lodine and particulate releases. This ly these nuclides are to be considered. Other gamma p ogether with those of the above nuclides, shall also be e Annual Radioactive Effluent Release Report pursuan 2.6 in the format outlined in Regulatory Guide 1.21, App une 1974.	ude the d Xe-138 in I-131, Cs-134, is list does not peaks that are analyzed and it to pendix B,					
(3)	The ratio of the for the time period accordance w	ne sample flow rate to the sampled stream flow rate sha eriod covered by each dose or dose rate calculation ma vith Controls 3.11.2.1, 3.11.2.2 and 3.11.2.3.	all be known ade in					
(4)	Samples shall completed wir Sampling sha following each of RATED TH completed wir are analyzed, requirement of I-131 concent 3; and (2) the more than a f	Il be changed at least four times per month and analyse thin 48 hours after changing or after removal from sam all also be performed at least once per 24 hours for at le h shutdown, startup or THERMAL POWER change exc IERMAL POWER within a 1-hour period and analyses thin 48 hours of changing. When samples collected for the corresponding LLDs may be increased by a factor does not apply if: (1) analysis shows that the DOSE EC tration in the reactor coolant has not increased more th e noble gas monitor shows that effluent activity has not factor of 3.	es shall be pler. east 7 days ceeding 15% shall be r 24 hours of 10. This QUIVALENT an a factor of increased by					
(5)	Tritium grab s the spent fuel	samples shall be taken at least 4/M from the ventilation I pool area, whenever spent fuel is in the spent fuel poo	exhaust from bl.					
(6)	Sampling and THERMAL Po 1 hour unless in the primary gas activity m factor of 3.	analysis shall also be performed following shutdown, OWER change exceeding 15% of RATED THERMAL F (1) analysis shows that the DOSE EQUIVALENT I-13 coolant has not increased more than a factor of 3; and nonitor shows that effluent activity has not increased by	startup or a POWER within 1 concentration d (2) the noble more than a					
(7)	Tritium analys	sis may be delayed for up to 14 days if the LLD is still a time.	ttainable at the					
(8)	Frequencies	applicable only when the ventilation system is operating	g.					

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RADIOACTIVE EFFLUENTS						
DOSE - N	NOBLE GA	<u>SES</u>				
	DLS					
3.11.2.2	In accorda noble gas beyond th following:	ance with St. Lucie Plant TS 6.8.4.f.5) and 8), the air do es released in gaseous effluents, from each unit, to are le SITE BOUNDARY (see TS Figure 5.1-1) shall be lim	ese due to eas at and ited to the			
	a. Du rac	ring any calendar quarter: Less than or equal to 5 mradiation and less than or equal to 10 mrads for beta radia	ds for gamma ition and			
	b. Du rac	ring any calendar year: Less than or equal to 10 mrads liation and less than or equal to 20 mrads for beta radia	s for gamma Ition.			
APPLICA	BILITY:	At all times.				
ACTION:						
a. Wi ex da ex as	ith the calc ceeding ar ys, pursua ceeding the sure that s	ulated air dose from radioactive noble gases in gaseou by of the above limits, prepare and submit to the Comm nt to Plant TS 6.9.2, a Special Report that identifies the e limit(s) and defines the corrective actions that have be ubsequent releases will be in compliance with the abov	s effluents ission within 30 cause(s) for een taken to re limits.			
SURVEIL	LANCE R	EQUIREMENTS				
4.11.2.2	Cumulativ calendar methodolo	ve dose contributions for the current calendar quarter ar year for noble gases shall be determined in accordance ogy and parameters in the ODCM at least once per 31	nd current with the days.			

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RADIOAC		- FLUENTS	
DOSE - I	ODINE-13	1, IODINE-133, TRITIUM AND RADIOACTIVE MATER	IAL IN
F	PARTICUL	ATE FORM	
CONTRC	DLS		
3.11.2.3	In accord OF THE particulat released, TS Figure	ance with St. Lucie Plant TS 6.8.4.f.5) and 9), the dose PUBLIC from lodine-131, lodine-133, tritium and all radi e form with half-lives greater than 8 days in gaseous eff from each unit, to areas at and beyond the SITE BOUN e 5.1-1) shall be limited to the following:	to a MEMBER onuclides in luents IDARY (see
	a. Du orę	uring any calendar quarter: Less than or equal to 7.5 mi gan and,	ems to any
	b. Du	ring any calendar year: Less than or equal to 15 mrem	s to any organ.
APPLICA	BILITY:	At all times.	
ACTION:			
a. Wi rac eff wit ca be ab	th the calc dionuclides duents exc thin 30 day use(s) for en taken t ove limits.	culated dose from the release of Iodine-131, Iodine-133, s in particulate form with half-lives greater than 8 days, i beeding any of the above limits, prepare and submit to th ys, pursuant to Plant TS 6.9.2, a Special Report that ide exceeding the limit(s) and defines the corrective actions o assure that subsequent releases will be in compliance	tritium and n gaseous ne Commission ntifies the that have with the
SURVEIL	LANCE R	EQUIREMENTS	
4.11.2.3	Cumulation calendar form with the metho	ve dose contributions for the current calendar quarter ar year for lodine-131, lodine-133, tritium and radionuclide half-lives greater than 8 days shall be determined in ac odology and parameters in the ODCM at least once per	nd current es in particulate cordance with 31 days.

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RADIOA			
GASEOL	JS RADWA	ASTE TREATMENT SYSTEM	
CONTRO	DLS		
3.11.2.4	In accorda Treatmen OPERAB releases o effluent re (see TS F	ance with St. Lucie Plant TS 6.8.4.f.6), the VENTILATIC t System and the WASTE GAS HOLDUP SYSTEM sha LE and appropriate portions of the system shall be used of radioactivity when the projected doses in 31 days due eleases, from each unit, to areas at and beyond the SIT Figure 5.1-1) would exceed:	ON EXHAUST all be d to reduce e to gaseous E BOUNDARY
	a. 0.2	2 mrad to air from gamma radiation or	
	b. 0.4	mrad to air from beta radiation or	
	c. 0.3	B mrem to any organ.	
APPLICA	BILITY:	At all times.	
ACTION:			
a. W of pu inf	ith radioact the above irsuant to F formation:	tive gaseous waste being discharged without treatment limits, prepare and submit to the Commission within 30 Plant TS 6.9.2, a Special Report that includes the follow	and in excess days, ing
1.	Identif the inc	ication of any inoperable equipment or subsystems and operability,	I the reason for
2.	Action and	(s) taken to restore the inoperable equipment to OPER	ABLE status
3.	Summ	nary description of action(s) taken to prevent a recurren	ce.

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RADIOA	RADIOACTIVE EFFLUENTS						
GASEO	US RADWA	STE TREATMENT SYSTEM (continued)					
SURVEI	LLANCE R	EQUIREMENTS					
4.11.2.4	1 Doses SITE I accord Gased	due to gaseous releases from each unit to areas at an 3OUNDARY shall be projected at least once per 31 day lance with the methodology and parameters in the ODC ous Radwaste Treatment Systems are not being fully uti	d beyond the 's in CM when ilized.				
4.11.2.4	.2 The in WAST operat VENT minute utilized days.	stalled VENTILATION EXHAUST TREATMENT SYSTE E GAS HOLDUP SYSTEM* shall be demonstrated OP ing the WASTE GAS HOLDUP SYSTEM equipment an ILATION EXHAUST TREATMENT SYSTEM equipment es, at least once per 92 days unless the appropriate sys d to process radioactive gaseous effluents during the pr	EM and ERABLE by Id t for at least 30 tem has been revious 92				
* - If F p(the WASTE UNCTIONA erformed (ir nce per 92 o	E GAS HOLDUP SYSTEM is not being fully utilized, an L TEST on the WASTE GAS HOLDUP SYSTEM shall a addition to the requirements of 4.11.2.4.2's "at least 30 days, by performing the following:	Administrative also be) minutes'')				
1)) Place	a Gas Decay Tank (containing less than 30 psi) in serv	ice.				
2)) With a 150 ps	Waste Gas Compressor, charge the Gas Decay Tank	to at least				
3)) Follow Decay Activit	ring appropriate holdup decay time, sample and release Tank with an OPERABLE Waste Gas Holdup System y Monitor (per TABLE 3.3-13).	the Gas Noble Gas				
4)) If disc SYST compl	repancies exist, repairs shall be made and the WASTE EM Administrative FUNCTIONAL TEST shall be repeat eted successfully.	GAS HOLDUP ed until				

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RADIOACTIVE EFF	LUENTS	
<u>3/4.11.4 TOTAL</u>	<u>. DOSE</u>	Providence C
CONTROLS		
3.11.4 In accorda dose or do radioactivi less than o thyroid, wh	nce with St. Lucie Plant TS 6.8.4.f.10), the annual (cal ose commitment to any MEMBER OF THE PUBLIC du ty and to radiation from uranium fuel cycle sources sha or equal to 25 mrems to the whole body or any organ, e nich shall be limited to less than or equal to 75 mrems. At all times	endar year) e to releases of all be limited to except the
ACTION:		
a. With the calcu gaseous efflu 3.11.2.2.a, 3. including direct tanks etc.) to exceeded. If days, pursuar action to be ta exceeding the with the above 20, shall inclu MEMBER OF pathways and covered by th of radioactive concentration release condit corrected, the with the provisi timely request complete.	alated doses from the release of radioactive materials i ents exceeding twice the limits of Control 3.11.1.2.a, 3 11.2.2.b, 3.11.2.3.a or 3.11.2.3.b, calculations shall be ct radiation contributions from the units (including outsi determine whether the above limits of Control 3.11.4 h such is the case, prepare and submit to the Commission to Plant TS 6.9.2, a Special Report that defines the c aken to reduce subsequent releases to prevent recurre e above limits and includes the schedule for achieving e e limits. This Special Report, as defined in Subpart M de an analysis that estimates the radiation exposure (or THE PUBLIC from uranium fuel cycle sources, includi direct radiation, for the calendar year that includes the is report. It shall also describe levels of radiation and or material involved and the cause of the exposure levels s. If the estimated dose(s) exceeds the above limits and tion resulting in violation of 40 Part 190 has not already especial Report shall include a request for a variance is sions of 40 CFR Part 190. Submittal of the report is co t and a variance is granted until staff action on the requ	n liquid or .11.1.2.b, made de storage ave been on within 30 corrective nce of conformance of 10 CFR Part dose) to a ng all effluent e release(s) concentrations s or nd if the y been n accordance onsidered a uest is

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RADIOA	CTIVE EFF	LUENTS	
<u>3/4.11.4</u>	ΤΟΤΑΙ	<u>_ DOSE</u> (continued)	
SURVEIL		EQUIREMENTS	
4.11.4.1	Cumulativ determine accordanc	e dose contributions from liquid and gaseous effluents d in accordance with Controls 4.11.1.2, 4.11.2.2 and 4. ce with the methodology and parameters in the ODCM.	shall be 11.2.3 and in
4.11.4.2	Cumulativ outside st (ISFSI) sh parameter set forth ir	e dose contributions from direct radiation from the units orage tanks etc.) and Independent Spent Fuel Storage hall be determined in accordance with the methodology rs in the ODCM. This requirement is applicable only un ACTION a. of Control 3.11.4.	s (including Installation and der conditions
	·		

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RADIOACTIVE EFFLUENTS							
<u>3/4.11.5</u>	3/4.11.5 MAJOR CHANGES TO RADIOACTIVE LIQUID, GASEOUS AND SOLID WASTE TREATMENT SYSTEMS*						
ADMINIS	TRATI	/E (CONTROLS				
3.11.2.5	Licens gaseou	ee i us a	nitiated major changes to the radioactive waste system nd solid):	ns (liquid,			
	1)	Sha Rel the	all be reported to the Commission in the Annual Radioa ease Report for the period in which the evaluation was On-Site Review Group (ORG). The discussion of eacl	active Effluent reviewed by n shall contain:			
		a)	A summary of the evaluation that led to the determi change could be made in accordance with 10 CFR	nation that the 50.59.			
		b)	Sufficient detailed information to totally support the change without benefit of additional or supplementation	reason for the al information;			
	 A detailed description of the equipment, components and processes involved and the interfaces with other plant sys 						
		d)	An evaluation of the change which shows the predi of radioactive materials in liquid and gaseous efflue quantity of solid waste that differ from those previou in the license application and amendments thereto;	cted releases ints and/or usly predicted			
		e)	An evaluation of the change which shows the expension exposure to individuals in the UNRESTRICTED AR general population that differ from those previously the license application and amendments thereto;	cted maximum EA and to the estimated in			
		f)	A comparison of the predicted releases of radioacti in liquid and gaseous effluents and in solid waste, t releases for the period when the changes are to be	ve materials, o the actual made;			
		g)	An estimate of the exposure to plant operating pers result of the change; and	onnel as a			
		h)	Documentation of the fact that the change was revi found acceptable by the ORG.	ewed and			
	2)	Sha	all become effective upon review and acceptance by th	e ORG.			
* Lic Cc	* Licensees may choose to submit the information called for in this Administrative Control as part of the annual FUSAR update.						

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RADIOA	CTIVE EFF	<u>ELUENTS</u>				
3/4.11.6	3/4.11.6 ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT TO THE					
	COM	<u>/IISSION*</u>				
	STRATIVE	CONTROLS				
3.11.2.6	As per Te Report co operation report sha gaseous o provided through f) conforma Part 50.	echnical Specification 6.9.1.7, a Annual Radioactive Efflu overing the operation of each unit during the previous 12 shall be submitted within 60 days after January 1 of ea all include a summary of the quantities of radioactive lique effluents and solid waste released from each unit. The shall be (1) consistent with the objectives outlined in by below, using the example report format in the ODCM a nce with 10 CFR 50.36a and Section IV.B.1 of Appendix	uent Release 2 months of ch year. The uid and material items a) ind (2) be in x I to 10 CFR			
	a. Th the rel Ev Ra Co su	e Radioactive Effluent Release Reports shall include a e quantities of radioactive liquid and gaseous effluents a eased from the unit as outlined in Regulatory Guide 1.2 aluating and Reporting Radioactivity in Solid Wastes an dioactive Materials in Liquid and Gaseous Effluents from oled Nuclear Power Plants, Revision 1, June 1974, with mmarized on a quarterly basis following the format of Appereof.	summary of nd solid waste 1, Measuring, nd Releases of n Light-Water- n data opendix B			
	b. Th aft me su ma pre of rep rac du	e Radioactive Effluent Release Report to be submitted ver January 1 of each year shall include an annual summeteorological data collected over the previous year. This mmary may be either in the form of an hour-by-hour listing agnetic tape of wind speed, wind direction, atmospheric ecipitation (if measured) or in the form of joint frequency wind speed, wind direction and atmospheric stability.** bort shall include an assessment of the radiation doses dioactive liquid and gaseous effluents released from the ring the previous calendar year.	within 60 days nary of hourly s annual ing on stability and distributions This same due to the unit or station			
* - /	A single su combine th units with s radioactive	bmittal may be made for a multiple unit station. The sul ose sections that are common to all units at the station; eparate radwaste systems, the submittal shall specify th material from each unit.	bmittal should however, for ne releases of			
** _ 	In lieu of su has the opt in a file tha	ubmission with the Radioactive Effluent Release Report, ion of retaining this summary of required meteorologica t shall be provided to the NRC upon request.	, the licensee I data on site			
l						

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RADIOACTIVE EFF							
<u>3/4.11.6 ANNU</u>	3/4.11.6 ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT TO THE						
<u>COMN</u>	<u>(ISSION*</u> (continued)						
ADMINISTRATIVE	CONTROLS	<u> </u>					
3.11.2.6 (continue	(t						
b. (cc	ntinued)						
Th fro PL Fig the sha col eff be an me in a c. Ev de usi ou	s same report shall also include an assessment of the r m radioactive liquid and gaseous effluents to MEMBER BLIC due to their activities inside the SITE BOUNDARY ure 5.1-1) during the report period. All assumptions use se assessments, i.e., specific activity, exposure time ar all be included in these reports. The meteorological con neurrent with the time of release of radioactive materials uents, as determined by sampling frequency and meas used for determining the gaseous pathway doses, or an d conservative method used in lieu of actual meteorological asurements. The assessment of radiation doses shall accordance with the methodology and parameters in the ery 2 years using the previous 6 months release history termine the controlling age group for liquid pathways. E ng the previous 1 year or longer interval (to include a re tage) and historical meteorological data determine the con-	radiation doses S OF THE Y (see TS ed in making nd location, nditions s in gaseous urement, shall n approximate gical be performed e ODCM. Y for isotopes, Every 2 years efueling controlling age					
gro OE sul	oup for gaseous pathways. If changed from current sub CM to reflect new tables for these groups and use the psequent dose calculations.	mit change to new groups in					
d. Th Jai do rea cal giv	Performance Provide a submitted and a submitted a set of the likely most exposed MEMBER OF THE PUBL and a submitted a subm	60 days after of radiation LIC from ole methods for effluents are					

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<u>3/4.11.6</u>	ANI CO	<u>NU</u> MM	AL RADIOACTIVE EFFLUENT RELEASE REPORT TO ISSION* (continued)	<u>D THE</u>
ADMINIST	RATIV	ΈC	CONTROLS	
3.11.2.6	(contini	ued)	
	e. ⁻ i	The info ship	e Radioactive Effluent Release Reports shall include the rmation for each class of solid waste (as defined by 10 oped offsite during the report period:	e following CFR Part 61)
		1.	Volume	
	2	2.	Total Curie quantity (specify whether determined by measurement or estimate)	/
		3.	Principal radionuclides (specify whether determined measurement or estimate)	d by
	4	4.	Type of waste (e.g., dewatered spent resin, compace evaporator bottoms)	cted dry waste,
	:	5.	Type of container (e.g., LSA, Type A, Type B, Large and	e Quantity)
	(6.	Solidification agent or absorbent (e.g., cement, urea formaldehyde).	a
	f	The des ARI duri	e Radioactive Effluent Release Reports shall include a cription of unplanned releases from the site to UNRES EAS of radioactive materials in gaseous and liquid effluing the reporting period.	list and TRICTED Jents made
	g	The mac PR(MAI calc Cer	e Radioactive Effluent Release Reports shall include and de during the reporting period to the PROCESS CONT OGRAM (PCP) and to the OFFSITE DOSE CALCULA NUAL (ODCM), as well as a listing of new locations for culations and/or environmental monitoring identified by insus of ODCM Control 3.12.2.	ny changes ROL TION dose the Land Use
	h. i	The prov in a sinc met Cor	e format for an Annual Radioactive Effluent Release Revided in ODCM Methodology Section 4.0. The information annual report shall not apply to any ODCM Control E the methodology for the annual report is based on a teorological data, instead of historical conditions that the thotols and Control required calculations are based on.	eport is ition contained Dose Limit(s) ctual le ODCM

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3/4.11.6	<u>AN</u> <u>C</u> (<u>INU</u> DMN	AL RADIOACTIVE EFFLUENT RELEASE REPORT TO IISSION* (continued)	<u>THE</u>
ADMINIS	STRATI	VE	CONTROLS	
3.11.2.6	(conti	nued)	
	i.	Beg Rac info	jinning with the report due within 60 days after January 1 dioactive Effluent Release Report shall include the follow rmation for the previous year:	l, 2007, the ^r ing
		a.	A listing with descriptions of any leaks or spills that h communicated to State and Local officials in accorda Groundwater Protection INITIATIVE (NEI 07-07).	ave been nce with the
		b.	Groundwater sample results that have been taken in the Groundwater Protection INITIATIVE (NEI 07-07), are from locations that are described in the Radiologi Environmental Monitoring Program and will therefore in the Annual Radiological Environmental Operating (AREOR).	support of unless they ical be reported Report

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RADIOLOGICAL EN	VIRONMENTAL MONITORING	$\mathbf{N}_{\mathbf{N}}$
<u>3/4.12.1 MONI⁻</u>	TORING PROGRAM	
CONTROLS		
3.12.1 In accorda Monitoring	ance with St. Lucie Plant TS 6.8.4.g.1), the Radiologica g Program shall be conducted as specified in Table 3.1:	l Environmental 2-1.
APPLICABILITY:	At all times.	
ACTION:		

- a. With the Radiological Environmental Monitoring Program not being conducted as specified in Table 3.12-1, prepare and submit to the Commission, in the Annual Radiological Environmental Operating Report required by Control 3.12.4, a description of the reasons for not conducting the program as required and the plans for preventing a recurrence.
- b. With the confirmed* level of radioactivity as the result of plant effluents in an environmental sampling medium at a location specified in Appendix B-1 exceeding the reporting levels of Table 3.12-2 when averaged over any calendar quarter, prepare and submit to the Commission within 30 days, pursuant to Plant TS 6.9.2, a Special Report*** that identifies the cause(s) for exceeding the limit(s) and defines the corrective actions to be taken to reduce radioactive effluents so that the potential annual dose** to a MEMBER OF THE PUBLIC is less than the calendar year limit of Controls 3.11.1.2, 3.11.2.2 or 3.11.2.3. When more than one of the radionuclides in Table 3.12-2 are detected in the sampling medium, this report shall be submitted if:

 $\frac{\text{concentration (1)}}{\text{reporting level (1)}} + \frac{\text{concentration (2)}}{\text{reporting level (2)}} + > \text{ or } = 1.0 \text{ 1}$

** The methodology and parameters used to estimate the potential annual dose to a MEMBER OF THE PUBLIC shall be indicated in this report.

*** A copy of the 30-day Special Report shall be provided to the Radiation Protection Manager (or designee) so that it can be sent to State and Local Officials in TABLE-1 of HPP-101 concurrent with its submittal to the commission.

^{*} A confirmatory reanalysis of the original, a duplicate or a new sample may be desirable, as appropriate. The results of the confirmatory analysis shall be completed at the earliest time consistent with the analysis but in any case within 30 days.

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RADIOLOG	ICAL EN	IVIRONMENTAL MONITORING	
3/4.12.1	MONI	TORING PROGRAM	
Controls (co	ontinued)		
ACTION:			
b. (cont	inued)		
Wher result to a N the ca requi howe Annu	n radion t of plant MEMBEF alendar red if the ever, in s al Radio	uclides other than those in Table 3.12-2 are detected at effluents, this report shall be submitted if the potential R OF THE PUBLIC from all radionuclides is equal to or year limits of Control 3.11.1.2, 3.11.2.2 or 3.11.2.3. Th e measured level of radioactivity was not the result of p uch an event, the condition shall be reported and desc logical Environmental Operating Report required by Co	nd are the annual dose, greater than is report is not lant effluents; ribed in the pontrol 3.12.4.
c. With samp replac Envir from progr Efflue revise suppo justify	milk or b ble locati cement conmenta which sa cam. Pu ent Relea ed figure orting inf ying the	proad leaf vegetation samples unavailable from one or a ons required by Table 3.12-1, identify specific locations samples and add them within 30 days to the Radiologic al Monitoring Program given in the ODCM. The specific amples were unavailable may then be deleted from the rsuant to Control 3.11.2.6, submit in the next Annual Ra ase Report documentation for a change in the ODCM in (s) and table for the ODCM reflecting the new location formation identifying the cause of the unavailability of s selection of the new location(s) for obtaining samples.	more of the s for obtaining cal c locations monitoring adioactive ncluding a (s) with amples and
SURVEILLA	NCE RI	EQUIREMENTS	
4.12.1 Th to O th	e radiolo Table 3 DCM an e detect	ogical environmental monitoring samples shall be colled 0.12-1 from the specific locations given in the table and d shall be analyzed pursuant to the requirements of Ta ion capabilities required by Table 4.12-1.	cted pursuant figure(s) in the ble 3.12-1 and

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TABLE 3.12-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ^{a)} (Page 1 of 3)					
EXPOSURE PATHWAY and/or SAMPLENUMBER OF REPRESENTATIVE SAMPLES AND SAMPLESAMPLING AND COLLECTION FREQUENCY DCATIONS b) c)TYPE AND FREQUENCY OF ANALYSI					
1. Direct Radiation ^{e)}	27 Monitoring Locations	Continuous monitoring with sample collection quarterly ^{f)}	Gamma exposure rate - quarterly		
2. Airborne Radioiodir and Particulates	ne 5 Locations	Continuous sampler operation with sample collection weekly or more frequently if required by dust loading	Radioiodine filter: I-131 analysis weekly Particulate Filter: Gross beta radioactivity analysis ≥24 hours following a filter change ⁹⁾ Gamma isotopic ^{h)} analysis of composite ⁹⁾ (by location) quarterly		
3. Waterborne	4 L = = = (1 = = m)		O		
a. Surface ^v	1 Location"	VVeekiy	tritium analyses weekly		
	1 Location ⁿ⁾	Monthly	Gamma isotopic ^{h)} & tritium analyses monthly		
b. Sediment from shoreline	2 Locations	Semiannually	Gamma isotopic ^{h)} analyses semiannually		
4. Ingestion					
a. Fish and Invertebrates					
1. Crustacea	2 Locations	Semiannually	Gamma isotopic ^{h)} analyses semiannually		
2. Fish	2 Locations	Semiannually	Gamma isotopic ^{h)} analyses semiannually		
b. Food Products					
1. Broad leaf vegetation	3 Locations ^{p)}	Monthly when available	Gamma isotopic ^{h)} and I-131 analyses monthly		

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	TABLE 3.12-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ^{a)} (Page 2 of 3)					
			TABLE NOTATIONS			
a.	Deviations are permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal unavailability, malfunction of automatic sampling equipment or other legitimate reasons. If specimens are unobtainable due to sampling equipment malfunction, corrective action shall be taken prior to the end of the next sampling period. All deviations from the sampling schedule shall be documented in the Annual Radiological Environmental Operating Report pursuant to Control 3.12.4.					
b.	Specific parar reactor and a sample location	met ddit on r	ers of distance and direction sector from the center ional description where pertinent, shall be provided equired by Table 3.12-1, in Appendix-B and applica	line of one for each able figures.		
C.	At times, it may not be possible or practicable to continue to obtain samples of the media of choice at the most desired location or time. In these instances suitable alternative media and locations may be chosen for the particular pathway in question and appropriate substitutions made within 30 days in the radiological environmental monitoring program.					
d.	The following	def	finition of frequencies shall apply to Table 3.12-1 on	ıly:		
	Weekly	-	Not less than once per calendar week. A maximum 11 days is allowed between the collection of any two consecutive samples.	m interval of wo		
	Semi-Monthly	/ -	Not less than 2 times per calendar month with an interval of 24 days is allowed between collection of consecutive samples.	nterval of A maximum f any two		
	Monthly	-	Not less than once per calendar month with an inte less than 10 days between sample collections.	erval of not		
	Quarterly	-	Not less than once per calendar quarter.			
	Semiannually	' _	One sample each between calendar dates (Janua and (July 1 - December 31). An interval of not less will be provided between sample collections.	ry 1 - June 30) s than 30 days		
	The frequenc	y of	analyses is to be consistent with the sample collec	tion frequency.		

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	TABLE 3.12-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ^{a)} (Page 3 of 3)						
		TABLE NOTATIONS (continued)					
e.	e. One or more instruments, such as a pressurized ion chamber, for measuring and recording dose rate continuously may be used in place of or in addition to, integrating dosimeters. For purposes of this table, a thermoluminescent dosimeter (TLD) is considered to be one phosphor; two or more phosphors in a packet are considered as two or more dosimeters.						
f.	Refers to nor when condition	mal collection frequency. More frequent sample collec	tion is permitted				
g.	Airborne part or more after the requirement also required per cubic met sample.	iculate sample filters are analyzed for gross beta radioa sampling to allow for radon and thoron daughter decay ent for a gamma isotopic on a composite sample a gam for each sample having a gross beta radioactivity whic ters and which is also >10 times that of the most recen	activity 24 hours /. In addition to ma isotopic is h is >1.0 pCi t control				
h.	Gamma isoto emitting radio	pic analysis means the identification and quantification nuclides that may be attributable to the effluents from t	of gamma- the facility.				
k.	Discharges fr pathways.	rom the St. Lucie Plant do not influence drinking water of	or ground water				
m.	Atlantic Ocea Hutchinson Is	n, in the vicinity of the public beaches along the easter sland near the St. Lucie Plant (grab sample)	n shore of				
n.	Atlantic Ocea	n, at a location beyond influence from plant effluents (grab sample).				
p.	Samples of b locations of h similar broad least prevaler	road leaf vegetation grown nearest each of two differer ighest predicted annual average ground level D/Q and leaf vegetation at an available location 15-30 kilometer nt wind direction based upon historical data in the ODC	nt offsite one sample of rs distant in the M.				
[i, j, l	(lower case) ar	nd o are not used on notation for clarity reasons]					

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TABLE 3.12-2 REPORTING LEVELS FOR RADIOACTIVITY CONCENTRATIONS IN ENVIRONMENTAL SAMPLES (Page 1 of 1)					
		REPORTIN	<u>G LEVELS</u>		
ANALYSIS	WATER pCi/l	AIRBORNE PARTICULATE OR GASES pCi/m ³	FISH pCi/kg, wet	MILK pCi/l	FOOD PRODUCTS pCi/kg, wet
H-3	30,000*				
Mn-54	1,000		30,000		
Fe-59	400		10,000		
Co-58	1,000		30,000		
Co-60	300		10,000		
Zn-65	300		20,000		
Zr- Nb-95***	400				
I-131	2**	0.9		3	100
Cs-134	30	10	1,000	60	1,000
Cs-137	50	20	2,000	70	2,000
Ba- La-140***	200			300	

I - as in pCi/I denotes liter

 Since no drinking water pathway exists, a value of 30,000 pCi/l is used. For drinking water samples, a value of 20,000 pCi/l is used; this is 40 CFR Part 141 value.

** - Applies to drinking water pathway exists, 2 pCi/l is the limit for drinking water.

*** - An equilibrium mixture of the parent daughter isotopes which corresponds to the reporting value of the parent isotope.

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DETECT	TABLE 4.12-1 DETECTION CAPABILITIES FOR ENVIRONMENTAL SAMPLE ANALYSIS (1)(2)						
				(Page 1 of 2)			
		L	OWER LIMIT	OF DETEC	TION (LLD)	(3)	
ANALYSIS	WATI pCi	ER /I	AIRBORNE PARTICULATE OR GASES pCi/m ³	FISH pCi/kg, wet	MILK pCi/l	FOOD PRODUCTS pCi/kg, wet	SEDIMENT pCi/kg, dry
Gross Beta	4		0.01				
H-3	3000	0*					
Mn-54	15			130			
Fe-59	30			260			
Co-58, Co-60	15			130			
Zn-65	30			260			
Zr-95, Nb-95 ⁽⁴⁾	15						
I-131	1**	*	0.07		1	60	
Cs-134	15		0.05	130	15	60	150
Cs-137	18		0.06	150	18	80	180
Ba-140, La-140 ⁽⁴⁾	15				15		

No drinking water pathway exists, a value of 2000 pCi/l is for drinking water.

* LLD for drinking water samples. If no drinking water pathway exists, a value of 15 pCi/l may be used.

TABLE NOTATIONS

(1) This list does not mean that only these nuclides are to be considered. Other peaks that are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Annual Radiological Environmental Operating Report pursuant to Control 3.12.4.

(2) Required detection capabilities for thermoluminescent dosimeters used for environmental measurements are given in Regulatory Guide 4.13.

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			TABLE 4.12-1	(1)(2)
	DETEC		A CAPABILITIES FOR ENVIRONMENTAL SAMPLE ANA (Page 2 of 2)	
			TABLE NOTATIONS (continued)	
(3)	The L radioa backo falsel	LD is active ground y con	defined for purposes of these controls, as the smallest co material in a sample that will yield a net count, above sys d, that will be detected with 95% probability with only 5% cluding that a blank observation represents a real signal.	oncentration o stem probability of
	For a	partic	cular measurement system, which may include radiochem	ical separatio
			4.66 S _b	
			$E \bullet V \bullet 2.22 \bullet Y \bullet \exp(-\lambda \bullet \Delta T)$	
١	Where:			
	LLD	= t	the a priori lower limit of detection (pico-Curie per unit mat	ss or volume),
	Sb	= t r	the standard deviation of the background counting rate or rate of a blank sample as appropriate (counts per minute)	of the countin
	E	= t	the counting efficiency (counts per disintegration),	
	V	= t	the sample size (units of mass or volume),	
	2.22	= t	the number of disintegrations per minute per pico-Curie,	
	Y	= t	the fractional radiochemical yield, when applicable,	
	λ	= t	the radioactive decay constant for the particular radionucli	ide (sec ⁻¹) and
	ΔТ	= t	the elapsed time between the midpoint of sample collection of counting (sec).	n and the time
-	Typical [•]	value	s of E, V, Y and ΔT should be used in the calculation.	
	It sho repre (after such Occa prese these identi Repo	build be sentir the fa a main siona ence co the LLDs ified a port pur	e recognized that the LLD is defined as an <u>a priori</u> (before ng the capability of a measurement system and not as an act) limit for a particular measurement. Analyses shall be nner that the stated LLDs will be achieved under routine of lly background fluctuations, unavoidable small sample siz of interfering nuclides or other uncontrollable circumstance s unachievable. In such cases, the contributing factors shand described in the Annual Radiological Environmental C rsuant to Control 3.12.4.	the fact) limit <u>a posteriori</u> performed in conditions. es, the es may render nall be operating
(4)	An eo 15 pC	quilibr Ci/Lite	rium mixture of the parent and daughter isotopes which co er of the parent isotope.	prresponds to

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RADIOLOGICAL EN	VIRONMENTAL MONITORING	
3/4.12.2 LAND	<u>USE CENSUS</u>	
CONTROLS		
3.12.2 In accorda conducted each of th residence square fee	ance with St. Lucie Plant TS 6.8.4.g.2), a Land Use Cer I and shall identify within a distance of 8 km (5 miles) th e 16 meteorological sectors of the nearest milk animal, and the nearest garden* of greater than 50 square me et) producing broad leaf vegetation.	nsus shall be ne location in the nearest ters (500
<u>APPLICABILITY:</u>	At all times.	
ACTION:		
a. With a Land & dose commitr 4.11.2.3, purs Annual Radio	Use Census identifying a location(s) that yields a calcul ment greater than the values currently being calculated suant to Control 3.11.2.6, identify the new location(s) in pactive Effluent Release Report.	ated dose or in Control the next
b. With a Land U dose commitr from which sa 3.12.1, add th Monitoring Pr control statior via the same after October Pursuant to T Report docun table(s) for th change in sar	Use Census identifying a location(s) that yields a calcul ment (via the same exposure pathway) 20% greater that amples are currently being obtained in accordance with the new location(s) within 30 days to the Radiological Errogram given in the ODCM. The sampling location(s), on a location, having the lowest calculated dose or dose can exposure pathway, may be deleted from this monitorin 31 of the year in which this Land Use Census was cor TS 6.14, submit in the next Annual Radioactive Effluent mentation for a change in the ODCM including a revised e ODCM reflecting the new location(s) with information mpling locations.	ated dose or an at a location Control vironmental excluding the ommitment(s), g program iducted. Release d figure(s) and supporting the
 Broad leaf vege of two different census. Contro be followed, inc 	etation sampling may be performed at the SITE BOUN direction sectors with the highest predicted D/Qs in lie ols for broad leaf vegetation sampling in Table 3.12-1, i cluding analysis of control samples.	DARY in each u of the garden Part 4.b., shall

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RADIOLOGICAL EI	VIRONMENTAL MONITORING	
<u>3/4.12.2 LAND</u>	<u>USE CENSUS</u> (continued)	
SURVEILLANCE R	EQUIREMENTS	
4.12.2 The Land once per	Use Census shall be conducted during the growing sea 12 months using that information that will provide the be	ason at least est results.

once per 12 months using that information that will provide the best results, such as by a door-to-door survey, aerial survey or by consulting local agriculture authorities. The results of the Land Use Census shall be included in the Annual Radiological Environmental Operating Report pursuant to Control 3.12.4.

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RADIOL	OGICAL EN	IVIRONMENTAL MONITORING		
<u>3/4.12.3</u>	INTER	LABORATORY COMPARISON PROGRAM		
CONTRO	DLS			
3.12.3 In accordance with St. Lucie Plant TS 6.8.4.g.3), analyses shall be performed on all radioactive materials, supplied as part of an Interlaboratory Comparison Program that correspond to samples required by Table 3.12-1.				
APPLICA	BILITY:	At all times.		
ACTION:				
a. W tal Er	ith analyses ken to preven vironmenta	s not being performed as required above, report the content a recurrence to the Commission in the Annual Radi al Operating Report pursuant to Control 3.12.4.	rrective action ological	
SURVEII	LANCE RE	EQUIREMENTS		
4.12.3	A summar Comparise Environme	y of the results obtained as part of the above required on Program shall be included in the Annual Radiologica ental Operating Report pursuant to Control 3.12.4. If th	Interlaboratory al ne	

Interlaboratory Comparison Program is other than the program conducted by the DOE Mixed Analyte Performance Evaluation Program (MAPEP), then the Interlaboratory Comparison Program shall be described in the ODCM.

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<u>3/4.12.4 ANNU</u>	AL RADIOLOGICAL ENVIRONMENTAL OPERATING	REPORT
ADMINISTRATIVE (CONTROLS	
3.12.4 In accorda Environme previous of shall inclu of the resu reporting p the object Appendix	ance with St. Lucie Plant TS 6.9.1.8, an Annual Radiolo ental Operating Report covering the operation of the un calendar year shall be submitted before May 1 of each y de summaries, interpretations and information based o ults of the Radiological Environmental Monitoring Progra period. The material provided in the AREOR shall be c ives outlined below and with Sections IV.B.2, IV.B.3 an I to 10 CFR Part 50.	gical it during the /ear. The report n trend analysis am for the onsistent with d IV.C of
interpretations and in environmental surve appropriate, with pre environmental surve plant operation on the census required by the	gical Environmental Operating Reports shall include su information based on trend analysis of the results of the illance activities for the report period, including a comp eoperational studies, with operational controls and with illance reports and an assessment of the observed imp ne environment. The reports shall also include the resu Control 3.12.2.	mmaries, radiological arison, as previous acts of the Its of land use
The Annual Radiolog analysis of all radiolog measurements taken and Figures in the C and measurements Technical Position, I are not available for explaining the reaso soon as possible in a	gical Environmental Operating Reports shall include the ogical environmental samples and of all environmental in during the period pursuant to the locations specified in DCM, as well as summarized and tabulated results of t in the format of the table in the Radiological Assessmen Revision 1, November 1979. In the event that some inc inclusion with the report, the report shall be submitted ins for the missing results. The missing data shall be su a supplementary report.	e results of radiation In the Table these analyses It Branch lividual results noting and ubmitted as
The Annual Radiolog the analyses for all s Monitoring Program Appendix B-2.	gical Environmental Operating Report shall also include samples that have been added to the Radiological Envi in support of the Groundwater Protection INITIATIVE (e the results of ronmental NEI 07-07) -
* - A single subn	nittal may be made for multiple unit station.	

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3/4.12.4 ANNU	AL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT
(AREC	<u>(continued)</u>
ADMINISTRATIVE (CONTROLS
The reports shall als environmental monit locations keyed to a the results of the Inte discussion of all dev all analyses in which	to include the following: a summary description of the radiological toring program; at least two legible maps** covering all sampling table giving distances and directions from the centerline of one reacter erlaboratory Comparison Program, required by Control 3.12.3; inations from the sampling schedule of Table 3.12-1; and discussion of the LLD required by Table 4.12-1 was not achievable.
 * - A single subn ** One map sha more distant s 	nittal may be made for multiple unit station. Il cover stations near the SITE BOUNDARY; a second shall include th stations.

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	BASES	
	FOR THE	
	CONTROLS	
		I
	SURVEILLANCE REQUIREMENTS	
	NOTE	
The BASES	contained in succeeding pages summarize the reasons	for the
Controls in S	ection 3.0 and 4.0, but are not part of these Controls.	

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INSTRUMENTATIO	<u>N</u>	
BASES		
<u>3.3.3.9 RADIC</u>	DACTIVE LIQUID EFFLUENT MONITORING INSTRUM	IENTATION
The radioactive liqui	d effluent instrumentation is provided to monitor and co	ontrol as
applicable, the relea	ises of radioactive materials in liquid effluent during act	ual or potential
releases of liquid eff	luents. The Alarm/Trip Setpoints for these instruments	shall be
calculated and adjus	sted in accordance with the methodology and paramete	ers in the
	at the alarm/trip will occur prior to exceeding the limits of ITV and use of this instrumentation is consistent with the	of 10 CFR Part
requirements of Ger	neral Design Criteria 60, 63 and 64 of Appendix A to 10	CFR Part 50.
<u>3.3.3.10 RADIC</u>	DACTIVE GASEOUS EFFLUENT MONITORING INST	RUMENTATION
The radioactive gas	eous effluent instrumentation is provided to monitor and	d control, as
applicable, the relea	ses of radioactive materials in gaseous effluent during	actual or
potential releases of	f gaseous effluents. The Alarm/Trip Setpoints for these	instruments
shall be calculated a	and adjusted in accordance with the methodology and p	barameters in
10 CER Part 20 Th	e that the alarm/thp will occur phor to exceeding the lim on OPERABILITY and use of this instrumentation is con	ils of sistent with the
requirements of Ger	neral Design Criteria 60, 63 and 64 of Appendix A to 10	CFR Part 50.
	3	

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3/4.11 RADIO	ACTIVE EFFLUENTS	
BASES		
3/4.11.1 LIQUIE	DEFFLUENTS	
<u>3/4.11.1.1 CONC</u>	ENTRATION	
in liquid waste efflue levels specified in 10 provides additional a UNRESTRICTED AI objectives of Append limits of 10 CFR Par based upon the assu (submersion) was co described in Internat	nts to UNRESTRICTED AREAS will be less than the c O CFR Part 20, Appendix B, Table 2, Column 2. This lines assurance that the levels of radioactive materials in boo REAS will result in exposures within: (1) the Section II. dix I, 10 CFR Part 50, to a MEMBER OF THE PUBLIC t 20. The concentration limit for dissolved or entrained umption that Xe-135 is the controlling radioisotope and onverted to an equivalent concentration in water using the cional Commission on Radiological Protection (ICRP) P	oncentration mitation lies of water in A design and (2) the noble gases is its ECL in air the methods publication 2.
This control applies t at the site.	to the release of radioactive materials in liquid effluents	s from all units
The required detection tabulated in terms of and other detection I Definition and Elabo Environmental Meas Procedures Manual,	on capabilities for radioactive materials in liquid wastes the lower limits of detection (LLDs). Detailed discussi limits can be found in Currie, L.A., Lower Limit of Detect ration of a Proposed Position for Radiological Effluent surements, NUREG/CR-4007 (September 1984) and in <u>HASL-300</u> .	samples are on of the LLD ction: and the HASL
<u>3/4.11.1.2</u> DOSE		
This control is provide Appendix I, 10 CFR of Appendix I. The A the same time imple the releases of radio kept as low as is rea supplies that can be assurance that the o the finished drinking The dose calculation requirements in Sec be shown by calcula exposure of a MEME substantially undere	ed to implement the requirements of Sections II.A, III.A Part 50. The Control implements the guides set forth in ACTION statements provide the required operating flex ment the guides set forth in Section IV.A of Appendix I pactive material in liquid effluents to UNRESTRICTED A isonably achievable. Also, for fresh water sites with dri potentially affected by plant operations, there is reason operation of the facility will not result in radionuclide cor water that are in excess of the requirements of 40 CFF methodology and parameters in the ODCM implement tion III.A of Appendix I that conformance with the guide tional procedures based on models and data, such tha BER OF THE PUBLIC through appropriate pathways is stimated.	and IV.A of n Section II.A ibility and at to assure that AREAS will be nking water nable centrations in R Part 141. It the es of Appendix I t the actual unlikely to be

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BASES		
<u>3/4.11.1 LIQUI</u>	D_EFFLUENTS (Continued)	
<u>3/4.11.1.2 DOSE</u>	(Continued)	
The equations spec rates of radioactive provided in Regulate Releases of Reacto Part 50, Appendix I, Aquatic Dispersion Purpose of Impleme	ified in the ODCM for calculating the doses due to the a materials in liquid effluents are consistent with the meth ory Guide 1.109, Calculation of Annual Doses to Man fr r Effluents for the Purpose of Evaluating Compliance wi Revision 1, October 1977 and Regulatory Guide 1.113 of Effluents from Accidental and Routine Reactor Relea enting Appendix I, April 1977.	ictual release odology om Routine th 10 CFR , Estimating ses for the
This control applies unit at the site. For shared system are t	to the release of radioactive materials in liquid effluents units with shared Radwaste Systems, the liquid effluent to be proportioned among the units sharing that system	from each ts from the
<u>3/4.11.1.3 LIQUI</u>	D RADWASTE TREATMENT SYSTEM	
The OPERABILITY will be available for environment. The r specified provides a will be kept as low a requirements of 10 Part 50 and the des The specified limits Treatment System v forth in Section II.A	of the Liquid Radwaste Treatment System ensures that use whenever liquid effluents require treatment prior to equirement that the appropriate portions of this system issurance that the releases of radioactive materials in liq is is reasonably achievable. This control implements th CFR 50.36a, General Design Criterion 60 of Appendix A ign objective given in Section II.D of Appendix I to 10 C governing the use of appropriate portions of the Liquid were specified as a suitable fraction of the dose design of Appendix I, 10 CFR Part 50 for liquid effluents.	t this system release to the be used when quid effluents e A to 10 CFR FR Part 50. Radwaste objectives set
This control applies unit at the site. For from the shared sys	to the release of radioactive materials in liquid effluents units with shared Radwaste Treatment Systems, the lic tem are to be proportioned among the units sharing tha	from each juid effluents t system.
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BASES		

3/4.11.2	GASEOUS	EFFLUENTS

3/4.11.2.1 DOSE RATE

This control is provided to ensure that the dose at any time at and beyond the SITE BOUNDARY from gaseous effluents from all units on the site will be within the annual dose limits of 10 CFR Part 20 to UNRESTRICTED AREAS. The annual dose limits are the doses associated with the concentration of 10 CFR Part 20, Appendix B, Table 2, Column I. These limits provide reasonable assurance that radioactive material discharged in gaseous effluents will not result in the exposure of a MEMBER OF THE PUBLIC in an UNRESTRICTED AREA, either within or outside the SITE BOUNDARY, to an annual average concentration exceeding the limits specified in Appendix B, Table 2 of 10 CFR Part 20 (Subpart D of 10 CFR Part 20). For MEMBERS OF THE PUBLIC who may at times be within the SITE BOUNDARY, the occupancy of that MEMBER OF THE PUBLIC will usually be sufficiently low to compensate for any increase in the atmospheric diffusion factor above that for the SITE BOUNDARY. The specified release rate limits restrict, at all times, the corresponding gamma and beta dose rates above background to a MEMBER OF THE PUBLIC at or beyond the SITE BOUNDARY to less than or equal to 500 mrems/year to the total body or to less than or equal to 3000 mrem/year to the skin. These release rate limits also restrict, at all times, the corresponding thyroid dose rate above background to a child via the inhalation pathway to less than or equal to 1500 mrems/year.

This control applies to the release of radioactive materials in gaseous effluents from all units at the site.

The required detection capabilities for radioactive materials in gaseous waste samples are tabulated in terms of the lower limits of detection (LLDs). Detailed discussion of the LLD and other detection limits can be found in Currie, L. A., Lower Limit of Detection: Definition and Elaboration of a Proposed Position for Radiological Effluent and Environmental Measurements, NUREG/CR-4007 (September 1984) and in the HASL Procedures Manual, <u>HASL-300</u>.

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BASES		

3/4.11.2.1 DOSE - NOBLE GASES

This control is provided to implement the requirements of Sections II.B, III.A and IV.A of Appendix I, 10 CFR Part 50. The control implements the guides set forth in Section I.B of Appendix I. The ACTION statements provide the required operating flexibility and at the same time implement the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive material in gaseous effluents to UNRESTRICTED AREAS will be kept as low as is reasonably achievable. The Surveillance Requirements implement the requirements in Section III.A of Appendix I that conformance with the guides of Appendix I be shown by calculational procedures based on models and data such that the actual exposure of a MEMBER OF THE PUBLIC through appropriate pathways is unlikely to be substantially underestimated. The dose calculation methodology and parameters established in the ODCM for calculating the doses due to the actual release rates of radioactive noble gases in gaseous effluents are consistent with the methodology provided in Regulatory Guide 1.109, Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I, Revision 1, October 1977 and Regulatory Guide 1,111. Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water Cooled Reactors, Revision 1, July 1977. The ODCM equations provided for determining the air doses at and beyond the SITE BOUNDARY are based upon the historical average atmospheric conditions.

This control applies to the release of radioactive materials in gaseous effluents from each unit at the site. For units with shared Radwaste Treatment Systems, the gaseous effluents from the shared system are to be proportioned among the units sharing that system.

3/4.11.2.3 DOSE - IODINE-131, IODINE-133, TRITIUM AND RADIOACTIVE MATERIAL IN PARTICULATE FORM

This control is provided to implement the requirements of Sections II.C, III.A and IV.A of Appendix I, 10 CFR Part 50. The Controls are the guides set forth in Section II.C of Appendix I. The ACTION statements provide the required operating flexibility and at the same time implement the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive material in gaseous effluents to UNRESTRICTED AREAS will be kept as low as is reasonably achievable. The ODCM calculational methods specified in the Surveillance Requirements implement the requirements in Section III.A of Appendix I to that conformance with the guides of Appendix I be shown by calculational procedures based on models and data such that the actual exposure of a MEMBER OF THE PUBLIC through appropriate pathways is unlikely to be substantially underestimated.

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3/4.11.2.1 DOSE - NOBLE GASES (Continued)

3/4.11.2.3 DOSE - IODINE-131, IODINE-133, TRITIUM AND RADIOACTIVE MATERIAL IN PARTICULATE FORM (Continued)

The ODCM calculational methodology and parameters for calculating the doses due to the actual release rates of the subject material are consistent with the methodology provided in Regulatory Guide 1.109. Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I, Revision 1, October 1977 and Regulatory Guide 1.111, Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water Cooled Reactors, Revision 1, July 1977. These equations also provide for determining the actual doses based upon the historical average atmospheric conditions. The release rate controls for lodine-131, lodine-133, tritium and radionuclides in particulate form with half-lives greater than 8 days are dependent upon the existing radionuclide pathways to man in the areas at and beyond the SITE BOUNDARY. The pathways that were examined in the development of the calculations were: (1) individual inhalation of airborne radionuclides, (2) deposition of radionuclides onto green leafy vegetation with subsequent consumption by man, (3) deposition onto grassy areas where milk animals and meat producing animals graze with consumption of the milk and meat by man and (4) deposition on the ground with subsequent exposure of man.

This control applies to the release of radioactive materials in gaseous effluents from each unit at the site. For units with shared Radwaste Treatment Systems, the gaseous effluents from the shared system are proportioned among the units sharing that system.

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3/4.11.2.4 GASEOUS RADWASTE TREATMENT SYSTEM

The OPERABILITY of the WASTE GAS HOLDUP SYSTEM and the VENTILATION EXHAUST TREATMENT SYSTEM ensure that the systems will be available for use whenever gaseous effluents require treatment prior to release to the environment. The requirement that the appropriate portions of these systems be used, when specified. provides reasonable assurance that the releases of radioactive materials in gaseous effluents will be kept as low as is reasonably achievable. This control implements the requirements of 10 CFR 50.36a, General Design Criterion 60 of Appendix A to 10 CFR Part 50 and the design objective given in Section II.D of Appendix I to 10 CFR Part 50. The specified limits governing the use of appropriate portions of the systems were specified as a suitable fraction of the dose design objectives set forth in Section II.B and II.C of Appendix I, 10 CFR Part 50 for gaseous effluents.

This control applies to the release of radioactive materials in gaseous effluents from each unit at the site. For units with shared Radwaste Treatment Systems, the gaseous effluents from the shared system are proportioned among the units sharing that system.

3/4.11.2.5 NOT USED

3/4.11.2.6 NOT USED

3/4.11.3 NOT USED

3/4.11.4 TOTAL DOSE

This control is provided to meet the dose limitations of 10 CFR Part 190 that have been incorporated into 10 CFR Part 20 by 46 FR 18525. The control requires the preparation and submittal of a Special Report whenever the calculated doses due to releases of radioactivity and to radiation from uranium fuel cycle sources exceed 25 mrems to the whole body or any organ, except the thyroid, which shall be limited to less than or equal to 75 mrems. For sites containing up to four reactors, it is highly unlikely that the resultant dose to a MEMBER OF THE PUBLIC will exceed the dose limits of 40 CFR Part 190 if the individual reactors remain within twice the dose design objectives of Appendix I, and if direct radiation doses from the units (including outside storage tanks, etc.) are kept small. The Special Report will describe a course of action that should result in the limitation of the annual dose to a MEMBER OF THE PUBLIC to within the 40 CFR Part 190 limits.

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3/4.11.4 TOTAL DOSE (Continued)

For the purposes of the Special Report, it may be assumed that the dose commitment to the MEMBER OF THE PUBLIC from other uranium fuel cycle sources is negligible, with the exception that dose contributions from other nuclear fuel cycle facilities at the same site or within a radius of 8 kilometers must be considered. If the dose to any MEMBER OF THE PUBLIC is estimated to exceed the requirements of 40 CFR Part 190, the Special Report with a request for a variance (provided the release conditions resulting in violation of 40 CFR Part 190 have not already been corrected), in accordance with the provisions of 40 CFR 190.11 and Subpart M of 10 CFR Part 20, is considered to be a timely request and fulfills the requirements of 40 CFR Part 190 and does not apply in any way to the other requirements for dose limitation of 10 CFR Part 20, as addressed in Controls 3.11.1.1 and 3.11.2.1. An individual is not considered a MEMBER OF THE PUBLIC during any period in which he/she is engaged in carrying out any operation that is part of the nuclear fuel cycle.

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BASES		

3/4.12.1 MONITORING PROGRAM

The Radiological Environmental Monitoring Program required by this control provides representative measurements of radiation and of radioactive materials in those exposure pathways and for those radionuclides that lead to the highest potential radiation exposure of MEMBERS OF THE PUBLIC resulting from the plant operation. This monitoring program implements Section IV.B.2 of Appendix I to 10 CFR Part 50 and thereby supplements the Radiological Effluent Monitoring Program by verifying that the measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of the effluent measurements and the modeling of the environmental exposure pathways. Guidance for this monitoring program is provided by the Radiological Assessment Branch Technical Position on Environmental Monitoring, Revision 1, November 1979. The initially specified monitoring program will be effective for at least the first three years of commercial operation. Following this period, program changes may be initiated based on operational experience.

The required detection capabilities for environmental sample analyses are tabulated in terms of the lower limits of detection (LLDs). The LLDs required by Table 4.12-1 are considered optimum for routine environmental measurements in industrial laboratories. It should be recognized that the LLD is defined as an <u>a priori</u> (before the fact) limit representing the capability of a measurement system and not as an <u>a posteriori</u> (after the fact) limit for a particular measurement.

Detailed discussion of the LLD and other detection limits can be found in Currie, L. A., Lower Limit of Detection: Definition and Elaboration of a Proposed Position for Radiological Effluent and Environmental Measurements, NUREG/CR-4007 (September 1984) and in the HASL Procedures Manual, <u>HASL-300</u>.

3/4.12.2 LAND USE CENSUS

This control is provided to ensure that changes in the use of areas at and beyond the SITE BOUNDARY are identified and that modifications to the Radiological Environmental Monitoring Program given in the ODCM are made if required by the results of this census. The best information from the door-to-door survey, from aerial survey or from consulting with local agricultural authorities shall be used.

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3/4.12.2 LAN	D USE CENSUS (Continued)	

This census satisfies the requirements of Section IV.B.3 of Appendix I to 10 CFR Part 50. Restricting the census to gardens of greater than 50 square meters provides assurance that significant exposure pathways via leafy vegetables will be identified and monitored since a garden of this size is the minimum required to produce the quantity (26 kilograms/year) of leafy vegetables assumed in Regulatory Guide 1.109 for consumption by a child. To determine this minimum garden size, the following assumptions were made: (1) 20% of the garden was used for growing broad leaf vegetation (i.e., similar to lettuce and cabbage) and (2) a vegetation yield of 2 kilograms per square meter.

3/4.12.3 INTERLABORATORY COMPARISON PROGRAM

This requirement for participation in an approved Interlaboratory Comparison Program is provided to ensure that independent checks on the precision and accuracy of the measurements of radioactive materials in environmental sample matrices are performed as part of the quality assurance program for environmental monitoring in order to demonstrate that the results are valid for the purposes of Section IV.B.2 of Appendix I to 10 CFR Part 50.

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	METHODOLOGY SECTION	
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	METHODOLOGY	
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METHODOLOGY SECTION GLOSSARY OF COMMONLY USED TERMS IN METHODOLOGY SECTION (Page 1 of 3)				
D _B	-	Dose from Beta Radiation		
CC or cc	-	Cubic centimeter		
Ci	-	Curies - a unit of radioactivity see μ Ci		
Ci	-	Activity or concentration of a nuclide in the release soul of μ Ci, μ Ci/cc or μ Ci/ml	rce. Units	
CFR	-	Code of Federal Regulations		
Control(s)	-	Regulations for operating, controlling, monitoring and re radioactive effluent related activity as indicated by the 0 Section of the ODCM.	eporting Controls	
Dose	-	The exposure, in mrem or mrad, the organ or the individual receives from radioactive effluents		
Dose Factor	-	Normally, a factor that converts the effect of ingesting r material into the body, to dose to a specific organ. Boc radioactive decay and organ uptake are some of the fa- determine a dose factor for a given nuclide	adioactive ly elimination, ctors that	
Dose Pathway	-	A specific path that radioactive material physically trave prior to exposing an individual to radiation. The Grass- Infant is a dose pathway	els through Cow-Milk-	
Dose Rate	-	The dose received per unit time		
(D/Q)	-	A long term D over Q - a factor with units of $1/m^2$ which describes the deposition of particulate matter from a plume at a point downrange from the source. It can be thought of as what part of the cloud is going to fallout and deposit over one square meter of ground. (See Appendix C).		
ECL	-	Effluent Concentration Limit		
FUSAR	-	Final Updated Safety Analysis Report.		
Y	-	A gamma photon - The dose from Gammas in air, etc.		
1				

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GLOSSA	METHODOLOGY SECTION GLOSSARY OF COMMONLY USED TERMS IN METHODOLOGY SECTION				
		(Page 2 of 3)			
Ground Plane	-	Radioactive material deposited uniformly over the ground emits radiation that produces an exposure pathway when an individual is standing, sitting, etc., in the area. It is assumed that an adult receives the same exposure as an infant, regardless of the physical height differences. Only the whole body is considered for the ODCM.			
Н-3	-	Hydrogen-3 or Tritium, a weak Beta emitter			
I&8DP	-	Radioiodines and particulates with half-lives greater than 8 days			
m ³	-	Cubic Meters			
m²	-	Square Meters			
nuclide	-	For the purposes of this manual, a radioactive isotope. Nuclide (i) signifies a specific nuclide, the 1st, 2nd, 3rd one under consideration. If nuclide (i) is I-131, then the Mi (dose factor) under consideration should be M_{I-131} for example.			
Organ	-	For the ODCM either the bone, liver, thyroid, kidney, lung, GI-LLI or the Whole Body. Whole Body is considered an organ for ease of writing the methodology in the ODCM.			
рСі	-	1 pico-Curie = 1.E-12 Curies.			
(Q Dot) _i	-	(Q Dot) _i - Denotes a release rate in μ Ci/sec for nuclide (i).			
Qi	-	Denotes μ Ci of nuclide (i) released over a specified time interval.			
Radioiodines	-	lodine-131 and lodine I-133 for gaseous release pathways.			
Receptor	-	The individual receiving the exposure in a given location or who ingests food products from an animal for example. A receptor can receive dose from one or more pathways.			
Release Source	(s)	 A subsystem, tank or vent where radioactive material can be released independently of other radioactive release points. 			
тѕ		- The St. Lucie Plant Standard Technical Specifications			
Total Body		- Same as Whole Body in Control Statements			
μCi		- micro Curies. 1 μ Ci = 10 ⁻⁶ Curies. The μ Ci is the standard unit of radioactivity for all dose calculations in the ODCM.			

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GLOSSARY	METHODOLOGY SECTION GLOSSARY OF COMMONLY USED TERMS IN METHODOLOGY SECTION (Page 3 of 3)				
(X/Q)	 A long term Chi over Q. It describes the physical di characteristics of a semi-infinite cloud of noble gase cloud traverses downrange from the release point. Gases are inert, they do not tend to settle out on the (See Appendix C). 	spersion es as the Since Noble e ground.			
(X/Q) _D	 A long term Depleted Chi over Q. It describes the p dispersion characteristics of a semi-infinite cloud of iodines and particulates as the cloud travels downra lodines and particulates tend to settle out (fallout of the ground, the (X/Q)_D represents what physically re cloud and its dispersion qualities at a given location from the release point. (See Appendix C). 	ohysical radioactive ange. Since the cloud) on emains of the downrange			
dt, ∆t or delta t	- A specific delta time interval that corresponds with t interval data etc.	he release			

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		METHODOLOGY SECTION	
1.0	LIQUID RELE	EASES METHODOLOGY	
1.1	<u>Radioactive L</u>	iquid Effluent Model Assumptions	
	The FUSAR of description the The St	contains the official description of the site characteristic at follows is a brief summary for dose calculation purpo Lucie Plant is located on an island surrounded on two c Ocean and the Indian River, an estuany of the Atlantic	s. The oses: o sides by the
	Norma Circula approx for sub of radi wind a are su and no	Illy, all radioactive liquid releases enter the Atlantic Oce ating Water Discharge Pipe terminates on the ocean flo simately 1200 feet offshore (Figure 1-1 Point "L"). No consequent mixing of the discharge flume with the ocean. The ocean is dependent on the ocean is dependent on the corr and some eddy currents caused by the Gulf Stream. The fficiently random enough to distribute the discharges of the ocean trating effects are assumed.	an where the or at a point redit is taken The diffusion nditions of tide, ne conditions /er a wide area
	There or sour Indian to prov Water No rac the Int discha source constri second that we descrij	are no direct discharge paths for liquid effluents to eith th private property boundary lines. The Big Mud Creek River) does connect to a normally locked shut dam, the vide an emergency supply of circulating water to the Int Canal in the event a Hurricane causes blockage of the lioactive water from plant systems could be discharged ake Cooling Water Canal because all plant piping is rou- rge canal and no back flow can occur. However, dilute s from such outfalls as the industrial wastewater system uction dewatering may be pumped to the Intake Canal. dary sources would be secured under the extraordinary build precede opening the dam. Consult the FUSAR for potion of characteristics of the water bodies surrounding	er of the north (part of the at is intended ake Cooling Intake Canal. directly into uted to the secondary m and These conditions r a detailed the plant site.
	Only th consid	nose nuclides that appear in the Liquid Dose Factor Ta ered for dose calculation.	bles will be

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			METHODOLOGY SECTION		
1.2	<u>Determi</u> Source	inin <u>g t</u>	the Fraction F of 10 CFR Part 20 ECLs Limits for A Liqu	uid Release	
	Discuss liquid w procedu unrestri Part 20, provides adequa determi source. summas 20 ECL obtaines	sion - (aste (cted a , Appe s instr te mix natior The tion of . The d from	Control 3.11.1.1 requires that the sampling and analysis prior to discharge) be used with calculation methods in assure that the concentration of liquid radioactive mat areas will not exceed ten times the concentrations spec- endix B, Table 2. CY-SL-102-0104, Processing Aerated ruction for ensuring batch release tanks will be sampled sing. This section presents the calculation method to be in This method only addresses the calculation for a spec- in-plant procedures will provide instructions for determint f each release source's F values do not exceed the site a values for release rate, dilution rate, etc., will also have in in-plant procedures. The basic equation is:	s results of the in-plant erial in the ified in 10 CFR d Liquid Waste, d after e used for this ecific release ning that the 's 10 CFR Part e to be	
	$F_{L} = \frac{R}{D} \sum_{i=1}^{n} \frac{C_{i}}{(ECL)_{i}}$				
	Where:				
	FL	= tł s	ne fraction of 10 CFR Part 20 ECL that would result if the ource was discharged under the conditions specified.	ne release	
	R	= T L S L L	The undiluted release rate in gpm of the release source. iquid Rad Waste = 170 gpm for Waste Monitor Tank Steam Generator = 125 gpm/Steam Generator iquid Rad Waste = 60 gpm for AWST #2 iquid Rad Waste = 60 gpm for Laundry Drain Pumps 2	A/2B	
	D	= T P Ir C	The dilution flow in gpm of Intake Cooling Water or Circu Pumps ntake Cooling flow is 14,500 gpm/pump Circulating Water flow is 121,000 gpm/pump	ulating Water	
	Ci	= Т	he undiluted concentration of nuclide (i) in μ Ci/ml from	sample assay	
	(ECL) _i	= T F fc	The Effluent Concentration Limit of nuclide (i) in μ Ci/ml for dissolved or entrained noble gases the ECL value is for the sum of all gases.	rom Table L-1. 2 X 10 ⁻⁴ μCi/ml	

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			METHODOLOGY SECTION		
1.2	<u>Deter</u> Sourc	mining (<u>e</u> (conti	the Fraction F of 10 CFR Part 20 ECLs Limits for A Liqu nued)	uid Release	
The fraction of the 10 CFR Part 20 ECL limit may be determined by a nuclide-by-nuclide evaluation or for purposes of simplifying the calculation be cumulative activity evaluation. If the simplified method is used, the value of $3 \times 10^{-8} \mu$ Ci/ml (unidentified ECL value) should be substituted for (ECL) _i an cumulative concentration (sum of all identified radionuclide concentrations) gross concentration should be substituted for C _i . As long as the diluted concentration (C _{total} R/D) is less than $3 \times 10^{-8} \mu$ Ci/ml, the nuclide-by-nuclide calculation is not required to demonstrate compliance with the 10 CFR Part The following section provides a step-by-step procedure for determining the fraction.					
	1.	Calcul	ation Process for Solids		
		A.	Obtain from the in-plant procedures, the release rate v gpm for the release source.	alue (R) in	
		В.	Obtain from the in-plant procedures, the dilution rate (I credit is taken for any dilution beyond the discharge ca	D) in gpm. No Inal flow.	
		C.	Obtain (C _i), the undiluted assay value of nuclide (i), in simplified method is used, the cumulative concentratio used.	μCi/ml. If the n (C _{total}) is	
		D.	From Table L-1, obtain the corresponding (ECL) for nu μ Ci/ml. The value of 3 X 10 ⁻⁸ μ Ci/ml should be used for method.	iclide (i) in or the simplified	
		E.	Divide C _i by (ECL) _i and write down the quotient		
		F.	If the simplified method is used, proceed to the next st determining the ECL fraction by the nuclide-by-nuclide repeat steps 1.2.1.C through 1.2.1.E for each nuclide r assay, for H ₃ from previous month composite and for S Fe55 from previous quarter composite with known rest	ep. If evaluation, reported in the \$R89/90 and ults.	

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4.0	. .			•••
1.2	<u>Deter</u> Sourc	<u>mining t</u> <u>ce</u> (conti	ne Fraction F of 10 CFR Part 20 ECLs Limits for A Liqu nued)	IId Release
	1.	Calcula	ation Process for Solids (continued)	
		G.	Add each C _i /(ECL) quotient from step 1.2.1.E and solve follows:	e for F_L as
			$F_{L} = \frac{R}{D} \sum_{i=1}^{n} \frac{C_{i}}{(ECL)i}$	
			$F_L = a$ unit-less value where:	
			the value of F_L could be \leq or >1. The purpose of the carbon determine what the initial value of F_L is for a given set conditions.	alculation is to of release
		H.	The F_L value just obtained is for one release pathway. ODCM control 3.11.1.1 allow for a site limit of F_L less to 10. Chemistry Procedure CY-SL-102-0104 administrative each pathway's allocation. Compare your F_L result wit administrative control for the release pathway in CY-SI	The TS and nan or equal to tively controls h the 102-0104.
	2.	Calcula	ation Process for Gases in Liquid	
		A.	Sum the μ Ci/ml of each noble gas activity reported in t	he release.
		В.	The values of R and D from 1.2.1 above shall be used calculations below:	in the
			$F_g = \frac{(\text{sum of } 1.2.2.A) \mu\text{Ci/ml}}{1} X \frac{R}{D}$	
		C.	F_g shall be less than 2 X 10 ⁻⁴ µCi/ml for the site for all r progress. Each release point will be administratively c Consult CY-SL-102-0104 procedure for instructions.	eleases in ontrolled.
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	METHODOLOGY SECTION	
1.3 <u>Determining S</u>	Setpoints for Radioactive Liquid Effluent Monitors	
1.3.1 Setpoir 301 on Batch I	nts for Batch Liquid Release Monitors channel numbers Table 3.3-14, Radioactive Effluent Monitor Setpoint Ba Liquid Effluent Monitors.	s R6627 and asis, are the
<u>Discussion</u> - C instrumentatio radioactivity c concentration liquid effluents	Control 3.3.3.9 requires that the liquid effluent monitorin on alarm / trip setpoints be set to initiate an alarm or trip oncentration in water in the unrestricted area does not of 10 CFR Part 20, Appendix B, Table 2 as a result of s (Control 3.11.1.1).	ng o so that the exceed the radioactivity in
Gross cpm vs Monitors base gross cpm an in the discharg reports was u These concer discharge can 121,000 gpm nuclide's resp on the table th	total liquid activity curves are available for Batch Liqued on a composite of real release data. A direct correlated the concentrations that would achieve 10 CFR Part 2 ge canal can be estimated. The 1978 liquid release dated to determine the average undiluted release concernations were then projected to a diluted concentration and assuming a 1 gpm release rate and a constant dilutiform 1 circ. water pump. This diluted activity was divid ective 10 CFR Part 20 ECL value (Table L-1) to obtain the follows:	id Effluent ation between O ECL levels at from annual atration. in the on flow of led by the the Mi column

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1.3	Determining	Setpoints fo	r Radioactive Liquid Effluent	Monitors (continued)
	<u>.</u>			(,)
	NUCLIDE SY	MBOL	1978 UNDILUTED μCi/ml ¹	M _i ² (no units)
	I-131		4.43 E-5	3.66 E-4
	I-132		2.23 E-7	1.84 E-8
	I-133		3.17 E-6	3.74 E-6
	I-135		1.31 E-6	3.61 E-7
	Na-24		1.72 E-7	2.84 E-8
	Cr-51		2.51 E-5	4.15 E-7
	Mn-54	•	5.64 E-6	1.55 E-6
	Mn-56		1.11 E-9	1.31 E-10
	Co-57	, , , , , , , , , , , , , , , , , , , ,	3.69 E-7	5.08 E-8
	Co-58 Fe-59 Co-60 Zn-65 Ni-65		1.51 E-4	6.24 E-5
			2.92 E-6	2.41 E-6
			3.66 E-5	1.01 E-4
			4.55 E-7	7.52 E-7
			8.23 E-7	6.8 E-8
	Ag-11()	1.96 E-6	2.70 E-6
	Sn-113	3	5.75 E-7	1.58 E-7
	Sb-122 Sb-124		2.15 E-6	1.78 E-6
			8.40 E-6	9.92 E-6
	W-187	7	3.51 E-6	9.67 E-7
	Np-239	9	1.57 E-7	6.49 E-8
	Br-82		3.64 E-7	7.52 E-8
	Zr-95		2.82 E-5	1.17 E-5
	Zr-97		4.05 E-6	3.72 E-6
	Mo-99)	3.24 E-6	1.34 E-6
	Ru-103	3	3.84 E-8	1.06 E-8
	Sb-12	5	2.26 E-6	6.23 E-7
	Cs-134	4	2.14 E-5	1.97 E-4
	Cs-136	3	7.82 E-7	1.08 E-6
	Cs-137	7	4.85 E-5	4.01 E-4
	Ba-140	о	6.44 E-7	6.65 E-7
	Ce-14	1	3.04 E-8	8.38 E-9
	Ce-144	4	2.37 E-6	6.53 E-6
	A _{tot} =		4.01 E-4	
	M _{Total} =			1.18 E-3

(1) 1978 Undiluted Release Volume = 7 E 9 ml.

(2) $M_i = \frac{1978 \text{ Undil. Act Nuclide (i)}}{\text{ECL}_i \text{ (from Table L - 1)}} \times \frac{1 \text{ gpm (release rate)}}{121000 \text{ gpm (dil rate)}}$

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		METHODOLOGY SECTION				
1.3 <u>[</u>	Determining	Setpoints for Radioactive Liquid Effluent Monitors (conti	inued)			
A t A e c s	A_{Tot} is the total average μ Ci/ml concentration of the reference mixture and M_{Tot} is the fraction of the MPC of all nuclides for the release conditions specified. Dividing A_{Tot} by M_{Tot} yields A_{Max} , which is the maximum total activity concentration equivalent to the ECL limit for the nuclide distribution typical of radwaste discharges. The Technical Specifications allow 10 times the ECL limit where the Site Limit is 10 times A_{Max} as follows:					
	Ą	$A_{\text{Max}} = \frac{A_{\text{Tot}}}{M_{\text{Tot}}} = \frac{4.01\text{ E}-4}{1.18\text{ E}-3} = 0.34 \mu\text{Ci/ml} = \text{ECL Limit}$				
5	Site Limit = 1	0 x A _{Max} = 10 x 0.34 = 3.4 µCi/ml				
۲ a	To provide co as follows:	onservative administrative control, A_{Max} of 0.34 μ Ci/ml s	hould be used			
1	1. If the e cpm s radioa	effluent monitor requires counts per minute units, a (C_{ma} hould be obtained for the A_{max} (0.34 µCi/ml) from the re ctive liquid effluent monitor curve of cpm vs. µCi/ml.	_{ux}) value in lease sources			
<u>NOTE</u> This setpoint is for a specified release of 1 gpm into 121000 gpm dilution flow.						
2	2. For es (or C _m (i.e., a contrit Activit	tablishing the setpoint prior to liquid radwaste discharge _{ax}) will be adjusted as needed to account for actual rele ctual design maximum discharge flow rate, dilution flow pution of dissolved and entrained Nobles Gas Activity to y Level).	es, the A _{max} ase conditions rate and the the Monitor			
		、				

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1.3	<u>Deterr</u>	nining (Setpoints for Radioactive Liquid Effluent Monitors (conti	inued)
	1.3.2	Setpoi	nts for Continuous Liquid Release Monitors	
		Discus Monito Genera Reacto exist a Site Lie be bas with 1 ODCW fraction control remain for soli therefo admini	sion - The activity mixture described in 1.3.1 for Liquid rs cannot be used for Continuous Liquid Pathways since ator (S/G) Blowdown Secondary Side is subject to what or Coolant System (RCS) activity and primary-to-second t any time. Although S/G blowdown is not normally alig quid Radwaste Release Point (Figure 1-1), the monitor ed on the ODCM maximum design S/G blowdown rate Circulating Water Pump (CWP) 121,000 gpm in operat and CY-SL-102-0104, Processing Liquid Waste assur n of solids entering the Discharge Canal to the site rele- led less than or equal to 1.0, with batch release using 8 ing 20% allocated to continuous sources on site. The ds is 10 times the concentration specified in 10 CFR Pa ore a conservation factor of 10 is already included in the strative site limit.	Batch Release be the Steam t the current dary leakage gned to the setpoints will of 125 gpm ion. The ne that the ase point are 30% and the actual site limit art 20,
		Since s monito canal a (F _L) as Dissolv gaseou	source in-leakage to a S/G cannot be controlled, a High r setpoint is calculated based on one S/G releasing to at design blowdown rate while attaining the 20 percent suming all the gross solid activity is I-131. The contribu- ved and Entrained Gases is assumed to be zero with all us activity going to the Steam Condenser and Air Ejector	n alarm the discharge of the site limit ution from Il of the or pathway.
		F _L at 2	0% = <u>0.2</u> = <u>Design blowdown rate</u> x <u>I-131 uCi/m</u> 1 CWP Dilution rate I-131 uCi/ml (Tab	<u>l (S/G)</u> le L-1ECL)
		F_L at 2	0% = <u>0.2</u> = <u>125 gal/min</u> x <u>I-131 uCi/ml (S/4</u> 1 121,000 gal/min 1.E-06 uCi/ml (I-131 Tab	<u>G)</u> le L-1ECL)
		Solving	g for the S/G High Alarm Setpoint I-131 Activity ,	
		I-1: tha dise	31 uCi/ml (S/G) = ~2E-04 uCi/ml I-131 is the maximum t could be allowed such that 20 percent of the administ charge canal limit would not be exceeded.	S/G activity rative
		This S using I	/G Monitor High Alarm Setpoint activity may be convert _iquid Monitor uC/ml to cpm conversion constants.	ed to cpm
		This S factor purpos that it i 20 gall	etpoint is conservative given that the actual Liquid Site of ten times higher than the administrative limit used for ses, that I-131's ECL is conservative vs other isotope m s unlikely that more than one S/G would be allowed to on per day primary-to-secondary leak rate.	Limit is a r calculation ixtures, and operate with a

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				METHODOLOGY SECTION	
1.4	<u>Deter</u>	<u>mining t</u>	he D	ose for Radioactive Liquid Releases	
	Discus 31 day exces calend any of be use	<u>ssion</u> - (ys to ve s of 1.5 dar qua rgan du ed for th	Contr rify th mrer rter a ring a nis ve	ol 3.11.1.2 requires calculations be performed at l nat cumulative radioactive liquid effluents do not ca n to the whole body and 5 mrem to any organ dur nd not in excess of 3 mrem to the whole body and any calendar year. This section presents calculation rification.	east once per ause a dose in ing any I 10 mrem to onal method to
	This n NURE both th pathw can al are us at St. which 3.11.2 consid	nethod i EG-0133 he fish a ray for v so be c sed for t Lucie si age gro 2.6.c). (dered.	is bas 3 Rev and s which alcula he or ince t oup is Only t	sed on the methodology suggested by sections 4.3 ision 1, November, 1978. The dose factors are a hellfish pathways so that the fish-shellfish pathwa dose will be calculated. The dose for adult, child ated by this method provided that their appropriate gan of interest. An infant is excluded from Liquid hey do not eat fish-shellfish. The effluent supervise the controlling (most restrictive) age group (see hose nuclides that appear in the Tables of this ma	3 and 4.3.1 of composite of y is the only and teenager e dose factors Dose Pathway sor will track control anual will be
	1.	This m for a g time in	iethoo iven a iterva	d provides for a dose calculation to the whole body age group based on real release conditions during I for radioactive liquid release sources. The equa	y or any organ y a specified tion is:
		Where	:		
		D_{1T}		$D_{1T} = \frac{A_{iT} dt_1 Q_{i1}}{(DF)_1}$	
			=	dose commitment in mrem received by organ T ((to be specified) during the release time interval	of age group dt ₁ .
		A _{iT}	=	the composite dose factor for the fish-shellfish pa nuclide (i) for organ T of age group (to be specifi values listed in the Tables in this manual are ind any site specific information and have the units	athway for ed). The A _{iT} ependent of
				mrem - ml µCi - hr	
		dt ₁	=	the number of hours that the release occurs.	
		Q _{il}	=	The total quantity of nuclide (i) release during dt_1	ι (μ Ci)
		(DF)₁		The total volume of dilution that occurred during time period dt_1 (i.e., the circulating water flow time	the release les time)

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1.4	Deter	mining t	<u>he Dose for Radioacti</u>	ve Liquid Releases (continued)	
	1.	(contin	ued)		
		The do the cur release	oses associated with e mulative dose over a c e during a 31 day perio	ach release may then be summe lesired time period (e.g., sum all od, calendar quarter or a year).	ed to provide doses for
			D _{tot}	_{alτ} = Σ _{D1τ}	
		Where	:		
		$D_{\tau_{\tau}}$	the total dose of during the desir	commitment to organ _T due to all ed time interval (mrem)	releases
		Tabl	e 1.4 may be used for	NOTE compiling the dose accounting.	
		A.	Determine the time in For once per 31 day of month's hours.	terval dt _i in hours that the release lose calculations dt _i would be for	e took place. the entire
			For quarterly dose cal and for annual dose o required, dt _i may be h a batch release.	lculations dt _l would be the hours i alculations dt _l would be the hours ours of duration of a single releas	in the quarter, s in the year. If se to evaluate
		B.	Obtain (DF) _I for the tir Records for the releas	ne period dt _i from Liquid Waste N se source(s) of interest.	<i>l</i> anagement
		C.	Obtain Q _i for nuclide (Management Records	(i) for the time period dt ₁ from the s	Liquid Waste
		D.	Obtain A _{i⊤} from the ap	ppropriate Liquid Dose Factor Tal	ble
			Age Group	Dose Factor Table	
			Infant	N/A	
			Child	L-4	
			Teen	L-3	

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1.4 <u>Determining</u>	the Dose for Radioact	ive Liquid Releases	(continued)	
1. (conti	nued)			
	FISH AND SH	HELLFISH PATHW	AY	
TIME/DATE START:	://	TIME/DATE STOP	::/	/HOURS
TOTAL DILUTION V	OLUME:r	nls		
AGE GROUP:	ORGAN:	DOS	SE FACTOR TABLE	: #:
NUCLIDE (i)	C _i (µCi)	A _{iT}	DOSE (i) mrem	
				_
	-			
				_
				-
		TOTAL DOSE $_{T}$ =		mrem
E.	Solve for Dose (i)			
	Dose (i) =	$\frac{Q_{i1} dt_1 A_{iT}}{(DF)_1}$		
F.	For the age group(s) for each nuclide repo	of interest, repeat s orted and each orga	teps 1.4.1.C throu n required.	igh 1.4.1.E
G.	For the age group(s) total dose to organ T	of interest, sum the from the fish-shellfi	Dose (i) values to sh pathway.	obtain the
1				

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		METHODOLOGY SECTION	
Projec	cting Do	se for Radioactive Liquid Effluents	
Discu radwa efflue UNRE whole metho dose	ssion - (aste trea nts whe STRIC body o od is pro as calcu	Control 3.11.1.3 requires that appropriate subsystems of the system be used to reduce radioactive material in n the projected doses due to the liquid effluent, from ea TED AREAS (see TS Figure 5.1-1) would exceed 0.06 r 0.2 mrem to any organ in a 31 day period. The follow ovided for performing this dose projection. The method lated in section 1.4 with the adult as the bases for projection	of the liquid liquid ich unit, to mrem to the ing calculation is based on ecting.
1.	For the calcula doses	e controlling age group obtain the latest result of the mo ition of the whole body dose and the highest organ dos can be obtained from the in-plant records.	nthly e. These
2.	Divide during	each dose by the number of days the reactor plant was the month.	operational
3.	Multipl project project neede operat	y the quotient of each dose by the number of days the need to be operational during the next month. The produced dose for the next month. These values should be a d to account for any changes in failed fuel or other iden ing conditions that could significantly alter the actual rel	reactor plant is cts are the djusted as tifiable leases.
4.	If the p than 0 system	rojected dose is greater than 0.06 mrem to the whole b 2 mrem to the adults highest exposed organ, the liquid a shall be used.	ody or greater radwaste
			1 .
	Project DURE NO C-200 Discu radwa efflue UNRE whole metho dose 1. 2. 3. 4.	Projecting Do Discussion - O radwaste trea effluents whe UNRESTRIC whole body o method is pro dose as calcu 1. For the calcula doses 2. Divide during 3. Multipl project needed operat 4. If the p than 0 system	C-200 ST. LUCIE PLANT METHODOLOGY SECTION Projecting Dose for Radioactive Liquid Effluents Discussion - Control 3.11.1.3 requires that appropriate subsystems of radwaste treatment system be used to reduce radioactive material in effluents when the projected doses due to the liquid effluent, from ear UNRESTRICTED AREAS (see TS Figure 5.1-1) would exceed 0.06 whole body or 0.2 mrem to any organ in a 31 day period. The follow method is provided for performing this dose projection. The method dose as calculated in section 1.4 with the adult as the bases for projet. 1. For the controlling age group obtain the latest result of the moto calculation of the whole body dose and the highest organ dos doses can be obtained from the in-plant records. 2. Divide each dose by the number of days the reactor plant was during the month. 3. Multiply the quotient of each dose by the number of days the reactur plant was during the month. 4. If the projected dose is greater than 0.06 mrem to the whole b than 0.2 mrem to the adults highest exposed organ, the liquid system shall be used.

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2.0	<u>GASEOUS R</u>	ELEASES METHODOLOGY	
2.1	<u>Gaseous Effl</u>	uent Model Assumptions	
	Description of characteristic purposes only sides by the A Private proper meteorologica are 16 sector tower is calible A bearing of a and 11.25° de private proper calculation, the Unrestricted A over water are O.W. (over w sector is O.W calculations u <u>Historical ME</u> from the St. L D.C. The me suggested by were also cal MET tables (1) determined the Dose Calcular calculated us doses no low MET data face annual report actual meteor Live MET data manual. Hist used for ease limits may be dose calculated the annual report actual meteor	<u>f Site</u> - (The FUSAR contains the official description of s. The description that follows is a brief summary for d y). The St. Lucie Plant is located on an island surround Atlantic Ocean and the Indian River, an estuary of the A rty adjoins the plant site in the north and south direction al tower is located north of the plant near the site prope s, for dose calculation purposes, divided into 22.5° eac rated such that a zero degree bearing coincides with TI zero degrees dissects the north sector such that bearin efine the boundaries of the north sector. The nearest d rty occurs in the north sector at approximately 0.97 mile is 0.97 mile radius is assumed in all directions, althoug Area Boundary is defined in Figure 5.1-1 of the TS. Do eas do not apply to Controls or the annual report and n ater) in lieu of performing calculations. The 0.97 mile r <i>A</i> , but it was chosen as the worst sector for conservativ using the historical MET data. <u>T Data</u> - MET data, between September 1, 1976 and A cucie MET Tower was analyzed by Dames & Moore of 1 thodology used by Dames & Moore was consistent wit regulatory Guide 1.111, Revision 1. Recirculation co culated for the St. Lucie Site and are incorporated into Tables M5, M6 and M7) in Appendix A of this manual. hat these two years are representative data for this loca tions - Dose calculations for Control dose limits are not ing historical MET data and receptor location(s) which er than the real location(s) experiencing the most expo tors are calculated and are normally used in dose calcu- s. Approximate and conservative methods may be use rological measurements. a and hour-by-hour dose calculations. Dose calculations for performed using actual MET data and real receptor loca- tions performed with actual data should note the source port. Actual MET data reduction should be performed ory Guide 1.111, Revision 1 and should incorporate Re- actors from Table M-4 of this manual.	the site ose calculation led on two Atlantic Ocean. Ins. A orty line. There h. The MET RUE NORTH. gs of 348.75° listance to es. For ease of gh the real ses calculated hay be listed as ange in the NW e dose August 31, 1978, Washington, h methods rrection factors the historical It was ale. It was ale. It was ale. It was for the data in in accordance circulation

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		METHODOLOGY SECTION	
2.1	Gaseous Effl	uent Model Assumptions (continued)	
	Dose Calcula	tions - (continued)	
	The St. Lucie effluents. On tables will be lodine-131 ar included in do contribution d Census inforr census was ta	site uses the long term ground release model for all ga ly those radionuclides that appear in the gaseous efflue considered in any dose calculations. Radioiodines are nd I-133 for application to Controls. Other nuclides of lo ose calculations for ease of performing calculations, but loes not have to be included in the Control requirement mation will apply to the calendar year following the year aken in to avoid splitting quarters, etc.	aseous ent dose factor defined as odine may be t their dose s. Land that the
2.2	Determining t Establishing	he Total Body and Skin Dose Rates for Noble Gas Rel Setpoints for Effluent Monitors	eases And
	Discussion - (releases to < requires that operable with exceeded. T Table 4.11-2	Control 3.11.2.1 limits the dose rate from noble gases in 500 mrem/yr - total body and <3000 mrem/yr - skin. Co the gaseous radioactive effluent monitoring instrumenta alarm/trip setpoints set to ensure that these dose rate he results of the sampling and analysis program of Cor are used to demonstrate compliance with these limits.	n airborne ontrol 3.3.3.11 ation be limits are not htrol
	The following total body and are based on releases on the release point. The calculation November 19	calculation method is provided for determining the dos d skin from noble gases in airborne releases. The alarn the dose rate calculations. The Controls apply to all ai he site but all releases may be treated as if discharged . Only those noble gases appearing in Table G-2 will b on methods are based on Sections 5.1 and 5.2 of NURI 978. The equations are:	e rates to the m/trip setpoints irborne from a single e considered. EG-0133,
	For TOTAL B	ODY Dose Rate:	
		n DR _{TB} = Σ _K _i (X/Q) (Q DOT) _i i	
	For TOTAL S	KIN Dose Rate:	
	D	n n _{Rskin} = Σ[L _i + 1.1 _{Mi}] (X/Q) (Q DOT) _i	

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2.2	<u>Determini</u> Establishi	ng t ng S	<u>he Total Body and Skin Dose Rates for Noble Gas Rel</u> Setpoints for Effluent Monitors (continued)	eases And					
	Where:								
	DR _{TB}	=	total body dose rate from noble gases in airborne rele	eases (mrem/yr)					
	DR _{skin}	=	skin dose rate from noble gases in airborne releases	(mrem/yr)					
	ŗΣ	Ξ	a mathematical symbol to signify the operations to th symbol are to be performed for each noble gas nuclio and the individual nuclide doses are summed to arriv dose rate for the release source.	e right of the de (i) through (n) e at the total					
	K _i = the total body dose factor due to gamma emissions for eac gas nuclide reported in the release source. (mrem-m ³ /μCi								
	Li	=	 the skin dose factor due to beta emissions for each noble gas (i) reported in the assay of the release source. (mrem-m³/μCi 						
	Mi	Ξ	the air dose factor due to gamma emissions for each nuclide (i) reported in the assay of the release source 1.1 converts mrad to mrem since the units of M _i are i (mrad-m ³ /μCi-yr)	noble gas e. The constant n					
	(X/Q)	=	for ground level, the highest calculated annual long to relative concentration for any of the 16 sectors, at or exclusion area boundary (sec/m ³)	erm historic beyond the					
	(Q DOT) _i	=	The release rate of noble gas nuclide (i) in $\mu\mbox{Ci/sec}$ fr source of interest	om the release					

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		METHODOLC	GY SECTION	
2.2	Determining Establishing	the Total Body and Skin D Setpoints for Effluent Mon	ose Rates for Noble Gas Rel itors (continued)	eases And
	1. Setpoi	int Determination		
	Α.	To comply with Control 3. established to ensure that exceed the ODCM Control the site. Using pre-ODCM determined to be more lim therefore the site release mrem/yr has been determ being released from the s equivalent of 100 percent may be allotted a portion release point portions allo percent. The release point account the physical release volume release rate and it point since uCi/sec is pro release points and an exa Site Limit in Percent = 10 Site Limit in uCi/sec = 3.5	3.3.10, the alarm/trip setpoin t all noble gas releases in pro- ol 3.11.2.1 noble gas release A Revision 0 data, the total be- niting than the calculated skir rate limit of total body dose r nined to be equivalent to 3.5E ite. Using 3.5E+05 uCi/sec a of the site limit, each release of the 100 percent, such that of the 100 percent, such that of the 100 percent, such that of the shall be less than or equi- nt's actual monitor setpoint sha ase characteristics of maximus portional to volume rate. The ample of percent allotments is 0%	ts are ogress do not rate limit for ody dose was a dose, ate of 500 +05 uCi/sec as the e point on site the sum of all ual to 100 hall take into um expected gle release e ODCM actual s provided:
		(Exa	nple)	
	<u>ODC</u>	M Release Point	Percent <u>Allotment</u>	
	Unit ECC ECC Unit ECC ECC ECC Blow Total	1 Plant Vent 1 Fuel Bldg. Vent S 1A S 1B 2 Plant Vent 2 Fuel Bldg. Vent S 2A S 2B down Bldg. Vent I Percent Allocated =	40 5 1 1 40 5 1 1 + 5 99 or 1 percent below the Site Limit	<u>v</u>

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2.2	Determining Establishing	the Total Body and Skin Dose Rates for Noble Gas Releases And Setpoints for Effluent Monitors (continued)
	1. (con	tinued)
	А.	(continued)
		sum of the total percent allocated to the above Release Points shall never be allowed to exceed 100 percent. The ECCS Reactor Auxiliary Building Exhaust are not ODCM required monitored release points, but a small percentage should be allotted to each to cover short periodic fan surveillance runs. This allocation is controlled per Chemistry Procedure CY-SL-104-0112, Determination of Process Radiation Monitor Setpoints where Chemistry Supervisor approval is required. CY-SL-104-0112, Determination of Process Radiation Monitor Setpoints provides calculation steps to calculate a Noble Gas Release Rate Setpoint based on the methodology steps described below. A release point's percent allotment will be converted into the release point's indicating engineering unit of uCi/cc that will be equivalent to the allocated portion of the site limit.
		 Obtain the release point's <u>maximum expected</u> process flow release rate (V) in Cubic Feet per Minute (cfm) from the Effluent Supervisor.
		 Obtain the release point's percent of site limit allotment (PA) from the Chemistry Supervisor.
		 Substitute the release point's V and PA values into the below equation(s) to obtain the Release Point's Setpoint (SP) in the desired engineering unit (uCi/cc or uCi/sec).
		SP = <u>3.5E+05 uCi x 60 sec</u> x <u>min</u> x <u>ft3</u> x <u>PA</u> uCi/cc sec min V ft3 28317 cc 100%
		SP =uCi/cc which is the TABLE 3.3-14 HIGH uCi/cc SETPOINT for ODCM Effluent Gas Channels that have a "Allotted % of Site Limit" declared as their HIGH SETPOINT.
		SP = <u>3.5E+05 uCi x</u> <u>PA</u> uCi/cc sec 100%
		SP =uCi/cc uCi/cc

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2.2 <u>Deter</u> <u>Estab</u>	mining (lishing (<u>:he Tot</u> Setpoir	al Bod its for	y and s Effluer	<u>Skin [</u> it Moi	<u>Dose F</u> nitors (Rates for N continued	<u>loble Gas R</u>	eleases And
1.	1. (continued)								
	A.	(contin	ued)						
		In the c Monitor uCi/sec RANGI at the r same r allotted	ase of ring the is equ E GAS naximu elease % of t	Unit 2 Plant V ivalent channe im expe point (i he Site	Plant Vent. to 2A el 624 ected .e., ea Limit)	Vent th The wi PV PIC uses th process ach of t	ere are 3 (ide range o G LOW RA ne equivale s flow rate. hese chan	DDCM Effluen channel 624 H NGE GAS an ent uCi/sec ba Since they a nels does not	at Gas Channels IIGH SETPOINT in Id 2B PIG LOW Ised on the uCi/cc are monitoring the receive their own
		4.	The si "Allotte (Mid a discus	gnifican ed % of nd High sion):	ice of Site I Nobl	an OD ₋imit" H le Gas /	CM Effluer IGH Setpo Accident C	it Gas Chann int requires fu hannels are r	el that has a ırther discussion iot part of this
			а.	For Pla "Allotte Batch Ventin Proces admin radioa to exc	ant Ve ed % Relea g Ope ssing istration ctive eed th	ent Rele of Site ases fro erations Gaseou vely co concen ne site I	ease Point Limit" need on Gas De s, and at th us Waste s ntrolling Ba tration and imit at any	s on each rea ls to be high e cay Tank and e same time (shall provide in atch Releases release rate time.	ctor unit, the enough to allow for Containment CY-SL-102-0105, nstruction for s such that the will not be allowed
	b.					of a va Low Ra ely equa te limit on that i	lid HIGH A nge Gas C al to the HI has been e is equivale	larm on a rele channel's radie GH Alarm set exceeded, rati nt to the "Allo	ease point where oactivity is point does not her it is at a tted % of Site
		setpoin	t in <u>uC</u>	i/cc	V or	Vmax	ft3/minute	vent flow	
				<u>uCi</u> x <u>2</u>	<u>8317 cc</u> x	<u>Vmax ft3</u> x <u>m</u>	inute		
uCi/sec (equivalent)						сс	ft3	minute 60) second
		SP =				<u>uCi</u>	equivale	nt to a channe	el indicating a
		(uCi/se	c)			sec	uCi/cc cc release r	ncentration a ate of V or Vn	ssuming a volume nax.
		SP =	-		·	<u>uCi</u> x	100	=	%
	(% of S	ite Limi	t) (ab	ove)	sec	350,00	00 uCi/sec	of Site Lin	nit

REVISI	ON NO.:		PROCE	DURE TIT	LE:							PAGE:
	41		OFF	SITE D	os	E CALC	CULA	TION	MAN	JAL (O	DCM)	102 of 231
RUCE	C-200 ST. LUCIE PLANT											
				<u>N</u>	IETI	HODOL	.0G)	SEC	<u>FION</u>			
2.2	Deter	mining (he To	tal Bod	ly ar	nd Skin	Dose	e Rate	s for N	loble G	as Rel	eases And
	<u>Estab</u>	lishing	Setpoi	ints for	Efflu	uent Mo	nitor	<u>s</u> (con	linued)		
	1.	(contir	ued)									
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				C.	The wh rac ma	e receip ere the lioactivi ly quick	ot of a ODC ity is ily be	a valid CM Lov greate <u>estim</u> a	HIGH v Ran r than <u>ated</u> b	l Alarm ge Gas the Hl based o	on a re Chanr GH Ala n:	elease point nel's rm setpoint
			F _{SL} =	RP _{SL} +	· (Su	ım of <u>al</u>	l oth	<u>er</u> Rele	ease F	Point's I	RP _{SL} or	n site)
			RP _{SL}	= Rel Cha uCi/	Pťs nnel cc	l's x	Rel Rele Rate	Pt's ease x e (V)	volu con con	ime v. x st.	time conv. const	x 1/(site limit)
			RP _{SL}	= <u>uCi</u> cc	× _	<u>V ft³</u> min	x <u>2</u>	28317 (ft₃	<u>cc</u> x	<u>min</u> 60 sec	x <u>3.5</u>	<u>sec</u> E+05 uCi
				Wher	e:							
				F_{SL}	=	Fracti	on of	the Si	te Lin	nit		
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				V	=	in ft ³ /r Volum	nin, f ne flo	he Rel w rele	lease ase ra	Point's ite	actual	process

41 OFFSITE DOSE CALCULATION MANUAL (ODCM) 103 of 2 PROCEDURE NO: ST. LUCIE PLANT 103 of 2 METHODOLOGY SECTION 2.2 Determining the Total Body and Skin Dose Rates for Noble Gas Releases And Establishing Setpoints for Effluent Monitors (continued) 1. (continued) A. (continued) 4. (continued) C. (continued) A. value of RPsL >1.0 or a FsL >1.0 would be exceeding the Site Limit Based on the above estimate. Off Normal Procedure allow 1 hour to obtain a grab sample of the Rele Point so that the actual site limit situation may be evaluate. This method is discussed in the following step. 5. To quantify the Release Point's actual Noble Gas Dose Ra the following would need to be performed: a. A Noble Gas Activity Grab Sample would be obtain a and analyzed to determine each Noble Gas Isotopic concentration. b. The results would be used to perform calculations p ODCM Step 2.2.2 for Noble Gas Total Body Dose F and Skin Dose Rate. c. If the Release Point's HIGH Alarms were received a the Table 3.3.14 ODCM Related Particulate and/or lodine Channel, then ODCM Step 2.3 calculations should be performed as soon as possible after the continuous collection medium(s) and a Tritium Sam can be pulled and analyzed to evaluate compliance ODCM Control 3.11.2.1.b.	41 OFFSITE DOSE CALCULATION MANUAL (ODOM) PROCEDURE NO.: ST. LUCIE PLANT 02200 ST. LUCIE PLANT METHODOLOGY SECTION 2.2 Determining the Total Body and Skin Dose Rates for Noble Gas Releases And Establishing Setpoints for Effluent Monitors (continued) 1. (continued) A. (continued) 4. (continued) C. (continued) A. (continued) A. (continued) A. (continued) A. value of RPst, >1.0 or a Fst, >1.0 would be exceeding the Site Limit Based on the above estimate. Off Normal Procedure allow 1 hour to obtain a grab sample of the Rele Point so that the actual site limit situation may be evaluated This method is discussed in the following step. 5. To quantify the Release Point's actual Noble Gas Dose Ra the following would need to be performed: a. A Noble Gas Activity Grab Sample would be obtaine and analyzed to determine each Noble Gas Isotopic concentration. b. The results would be used to perform calculations pr ODCM Step 2.2 for Noble Gas Total Body Dose R and Skin Dose Rate. c. If the Release Point's HIGH Alarms were received o the Table 3.3.14 ODCM Related Particulate and/or Iodine Channel, then ODCM Step 2.3 calculations should be eptformed as son as possible after the continuous collection medium(s) and a Tritium Samp can be pulled and analyzed to evaluate compliance ODCM Control 3.11.2.1.b.	2.2	41 DURE NO. C-200 Deter Estab 1.) <u>mining</u> lishing (cont A.	OFF the To Setpoi inued) (conti 4.	SITE <u>tal Bo</u> ints for inued) (cont c. A val Site Proc Point This To q the fo	DOSE CALCULATION MANUAL (ODCM) ST. LUCIE PLANT METHODOLOGY SECTION dy and Skin Dose Rates for Noble Gas Relation dy and Skin Dose Rates for Noble Gas Relation r Effluent Monitors (continued) tinued) (continued) lue of $RP_{SL} > 1.0$ or a $F_{SL} > 1.0$ would be exc Limit Based on the above <u>estimate</u> . Off No- redure allow 1 hour to obtain a grab sample t so that the actual site limit situation may b method is discussed in the following step.	eases And eases And ceeding the rmal of the Relea e evaluated.
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 A. (continued) 4. (continued) c. (continued) A value of RP_{SL} >1.0 or a F_{SL} >1.0 would be exceeding the Site Limit Based on the above <u>estimate</u>. Off Normal Procedure allow 1 hour to obtain a grab sample of the Rele Point so that the actual site limit situation may be evaluated. This method is discussed in the following step. 5. To quantify the Release Point's <u>actual Noble Gas Dose Rate</u> the following would need to be performed: a. A Noble Gas Activity Grab Sample would be obtained and analyzed to determine each Noble Gas Isotopic concentration. b. The results would be used to perform calculations produced the Table 3.3-14 ODCM Related Particulate and/or lodine Channel, then ODCM Step 2.3 calculations should be performed as soon as possible after the continuous collection medium(s) and a Tritium Sam can be pulled and analyzed to evaluate compliance ODCM Control 3.11.2.1.b. 	 A. (continued) 4. (continued) c. (continued) A value of RP_{SL} >1.0 or a F_{SL} >1.0 would be exceeding the Site Limit Based on the above <u>estimate</u>. Off Normal Procedure allow 1 hour to obtain a grab sample of the Rele Point so that the actual site limit situation may be evaluated. This method is discussed in the following step. 5. To quantify the Release Point's <u>actual Noble Gas Dose Ra</u> the following would need to be performed: a. A Noble Gas Activity Grab Sample would be obtaine and analyzed to determine each Noble Gas Isotopic concentration. b. The results would be used to perform calculations pr ODCM Step 2.2.2 for Noble Gas Total Body Dose R and Skin Dose Rate. c. If the Release Point's HIGH Alarms were received o the Table 3.3.14 ODCM Related Particulate and/or lodine Channel, then ODCM Step 2.3 calculations should be performed as soon as possible after the continuous collection medium(s) and a Tritium Samp can be pulled and analyzed to evaluate compliance ODCM Control 3.11.2.1.b. 			Α.	(conti 4. 5.	inued) (coni c. A va Site Proc Poini This To q the fe	tinued) (continued) lue of RP _{SL} >1.0 or a F _{SL} >1.0 would be exc Limit Based on the above <u>estimate</u> . Off No edure allow 1 hour to obtain a grab sample t so that the actual site limit situation may b method is discussed in the following step.	ceeding the rmal of the Relea e evaluated.
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 c. (continued) A value of RP_{SL} >1.0 or a F_{SL} >1.0 would be exceeding the Site Limit Based on the above <u>estimate</u>. Off Normal Procedure allow 1 hour to obtain a grab sample of the Rele Point so that the actual site limit situation may be evaluated. This method is discussed in the following step. 5. To quantify the Release Point's <u>actual Noble Gas Dose Ra</u> the following would need to be performed: a. A Noble Gas Activity Grab Sample would be obtained and analyzed to determine each Noble Gas Isotopic concentration. b. The results would be used to perform calculations performed to DOCM Step 2.2.2 for Noble Gas Total Body Dose Ra and Skin Dose Rate. c. If the Release Point's HIGH Alarms were received of the Table 3.3-14 ODCM Step 2.3 calculations should be performed as soon as possible after the continuous collection medium(s) and a Tritium Sam can be pulled and analyzed to evaluate compliance ODCM Control 3.11.2.1.b. 	 c. (continued) A value of RP_{SL} >1.0 or a F_{SL} >1.0 would be exceeding the Site Limit Based on the above <u>estimate</u>. Off Normal Procedure allow 1 hour to obtain a grab sample of the Rele Point so that the actual site limit situation may be evaluated. This method is discussed in the following step. 5. To quantify the Release Point's <u>actual Noble Gas Dose Ra</u> the following would need to be performed: a. A Noble Gas Activity Grab Sample would be obtaine and analyzed to determine each Noble Gas Isotopic concentration. b. The results would be used to perform calculations pr ODCM Step 2.2.2 for Noble Gas Total Body Dose R and Skin Dose Rate. c. If the Release Point's HIGH Alarms were received o the Table 3.3-14 ODCM Related Particulate and/or lodine Channel, then ODCM Step 2.3 calculations should be performed as soon as possible after the continuous collection medium(s) and a Tritium Samp can be pulled and analyzed to evaluate compliance ODCM Control 3.11.2.1.b. 				5.	C. A val Site Proc Point This To q the fe	(continued) lue of RP _{SL} >1.0 or a F _{SL} >1.0 would be exc Limit Based on the above <u>estimate</u> . Off No edure allow 1 hour to obtain a grab sample t so that the actual site limit situation may b method is discussed in the following step.	ceeding the rmal of the Relea e evaluated.
 A value of RP_{SL} >1.0 or a F_{SL} >1.0 would be exceeding the Site Limit Based on the above <u>estimate</u>. Off Normal Procedure allow 1 hour to obtain a grab sample of the Rele Point so that the actual site limit situation may be evaluated. This method is discussed in the following step. 5. To quantify the Release Point's <u>actual Noble Gas Dose Ra</u> the following would need to be performed: a. A Noble Gas Activity Grab Sample would be obtained and analyzed to determine each Noble Gas Isotopic concentration. b. The results would be used to perform calculations product the Table 3.3-14 ODCM Related Particulate and/or lodine Channel, then ODCM Step 2.3 calculations should be performed as soon as possible after the continuous collection medium(s) and a Tritium Sam can be pulled and analyzed to evaluate compliance ODCM Control 3.11.2.1.b. 	 A value of RP_{SL} >1.0 or a F_{SL} >1.0 would be exceeding the Site Limit Based on the above <u>estimate</u>. Off Normal Procedure allow 1 hour to obtain a grab sample of the Rele Point so that the actual site limit situation may be evaluated. This method is discussed in the following step. 5. To quantify the Release Point's <u>actual Noble Gas Dose Ra</u> the following would need to be performed: a. A Noble Gas Activity Grab Sample would be obtaine and analyzed to determine each Noble Gas Isotopic concentration. b. The results would be used to perform calculations pr ODCM Step 2.2.2 for Noble Gas Total Body Dose R and Skin Dose Rate. c. If the Release Point's HIGH Alarms were received o the Table 3.3-14 ODCM Related Particulate and/or Iodine Channel, then ODCM Step 2.3 calculations should be performed as soon as possible after the continuous collection medium(s) and a Tritium Samp can be pulled and analyzed to evaluate compliance ODCM Control 3.11.2.1.b. 				5.	A val Site Proc Point This To q the fe	lue of $RP_{SL} > 1.0$ or a $F_{SL} > 1.0$ would be exc Limit Based on the above <u>estimate</u> . Off No edure allow 1 hour to obtain a grab sample t so that the actual site limit situation may b method is discussed in the following step.	ceeding the rmal of the Relea e evaluated.
 5. To quantify the Release Point's <u>actual Noble Gas Dose Ra</u> the following would need to be performed: a. A Noble Gas Activity Grab Sample would be obtained and analyzed to determine each Noble Gas Isotopic concentration. b. The results would be used to perform calculations p ODCM Step 2.2.2 for Noble Gas Total Body Dose R and Skin Dose Rate. c. If the Release Point's HIGH Alarms were received of the Table 3.3-14 ODCM Related Particulate and/or lodine Channel, then ODCM Step 2.3 calculations should be performed as soon as possible after the continuous collection medium(s) and a Tritium Sam can be pulled and analyzed to evaluate compliance ODCM Control 3.11.2.1.b. 	 5. To quantify the Release Point's <u>actual Noble Gas Dose Ra</u> the following would need to be performed: a. A Noble Gas Activity Grab Sample would be obtaine and analyzed to determine each Noble Gas Isotopic concentration. b. The results would be used to perform calculations perform ODCM Step 2.2.2 for Noble Gas Total Body Dose R and Skin Dose Rate. c. If the Release Point's HIGH Alarms were received o the Table 3.3-14 ODCM Related Particulate and/or lodine Channel, then ODCM Step 2.3 calculations should be performed as soon as possible after the continuous collection medium(s) and a Tritium Samp can be pulled and analyzed to evaluate compliance ODCM Control 3.11.2.1.b. 				5.	To q the f	uantify the Belease Deint's actual Nable Ca	
 a. A Noble Gas Activity Grab Sample would be obtained and analyzed to determine each Noble Gas Isotopic concentration. b. The results would be used to perform calculations product of the Step 2.2.2 for Noble Gas Total Body Dose Frand Skin Dose Rate. c. If the Release Point's HIGH Alarms were received of the Table 3.3-14 ODCM Related Particulate and/or lodine Channel, then ODCM Step 2.3 calculations should be performed as soon as possible after the continuous collection medium(s) and a Tritium Sam can be pulled and analyzed to evaluate compliance ODCM Control 3.11.2.1.b. 	 a. A Noble Gas Activity Grab Sample would be obtained and analyzed to determine each Noble Gas Isotopic concentration. b. The results would be used to perform calculations prodoc Step 2.2.2 for Noble Gas Total Body Dose R and Skin Dose Rate. c. If the Release Point's HIGH Alarms were received o the Table 3.3-14 ODCM Related Particulate and/or lodine Channel, then ODCM Step 2.3 calculations should be performed as soon as possible after the continuous collection medium(s) and a Tritium Samp can be pulled and analyzed to evaluate compliance ODCM Control 3.11.2.1.b. 					-	ollowing would need to be performed:	as Dose Rate
 b. The results would be used to perform calculations p ODCM Step 2.2.2 for Noble Gas Total Body Dose F and Skin Dose Rate. c. If the Release Point's HIGH Alarms were received of the Table 3.3-14 ODCM Related Particulate and/or lodine Channel, then ODCM Step 2.3 calculations should be performed as soon as possible after the continuous collection medium(s) and a Tritium Sam can be pulled and analyzed to evaluate compliance ODCM Control 3.11.2.1.b. 	 b. The results would be used to perform calculations produced Step 2.2.2 for Noble Gas Total Body Dose R and Skin Dose Rate. c. If the Release Point's HIGH Alarms were received o the Table 3.3-14 ODCM Related Particulate and/or lodine Channel, then ODCM Step 2.3 calculations should be performed as soon as possible after the continuous collection medium(s) and a Tritium Samp can be pulled and analyzed to evaluate compliance ODCM Control 3.11.2.1.b. 					a.	A Noble Gas Activity Grab Sample would and analyzed to determine each Noble G concentration.	l be obtained as Isotopic
c. If the Release Point's HIGH Alarms were received on the Table 3.3-14 ODCM Related Particulate and/or lodine Channel, then ODCM Step 2.3 calculations should be performed as soon as possible after the continuous collection medium(s) and a Tritium Sam can be pulled and analyzed to evaluate compliance ODCM Control 3.11.2.1.b.	c. If the Release Point's HIGH Alarms were received o the Table 3.3-14 ODCM Related Particulate and/or lodine Channel, then ODCM Step 2.3 calculations should be performed as soon as possible after the continuous collection medium(s) and a Tritium Samp can be pulled and analyzed to evaluate compliance ODCM Control 3.11.2.1.b.					b.	The results would be used to perform cal ODCM Step 2.2.2 for Noble Gas Total Bo and Skin Dose Rate.	culations per ody Dose Rat
						C.	If the Release Point's HIGH Alarms were the Table 3.3-14 ODCM Related Particula lodine Channel, then ODCM Step 2.3 cal should be performed as soon as possible continuous collection medium(s) and a Tr can be pulled and analyzed to evaluate co ODCM Control 3.11.2.1.b.	received on ate and/or culations after the ritium Sample compliance w

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	METHODOLOGY SECTION	
2.2 Dotormining	the Total Pady and Skin Deep Pates for Nable Cas Pal	
Establishing	Setpoints for Effluent Monitors (continued)	eases And
1. (contir	nued)	
В.	No Particulate or Iodine Radioactivity Channels are red ODCM. Table 3.3-13 requires Iodine and Particulate S Technical Specification Table 3.3-6 requires a Fuel Bui Particulate Channel (the bases for the setpoint on the I Vent Particulate Channel is described in 2.2.1.C). The describe Particulate and Iodine Radioactivity Channels Channels are listed in ODCM Table 3.3-14 and ALERT Setpoints are provided. The intent of providing these s provide early warning that the effluent pathway condition increased such that a grab sample should be obtained Alarm Setpoint is reached or exceeded. The Particulat HIGH Alarm Setpoint bases is that the collection mediu filter where continuing deposition of radioactivity would increase in the channel count rate up to the setpoint le resulting dose rate can be shown to be less than 1 per- limit for ODCM Control 3.11.2.1.b for Iodine-131, Iodine radionuclides in particulate from with half-lives greater that these channel detectors are gross activity monitors scintillation type where the count rate is not dependent threshold) on the energy of the isotope entrained on the medium, and that these channels are qualitative trend since the channel count rate cannot be corrected for the sample collection volume. Plant historical trends have Noble Gas Activity may contribute to the count rate of the sample collection volume. Plant historical trends have in this event the Noble Gas contribution may be added Table 3.3-14 Alert and High Setpoints for Plant Vents of the sampling mediums associated with the Particulate Channels in Table 3.3-14 are also controlled by the red ODCM Table 4.11-2 which requires 4/M Minimum Ana Frequency of the sampling mediums. These analysis a confirm and quantify the isotopic composition of the rad being monitored by these channels. The presence of I collection medium would be confirmed by these analysis	quired by the samplers only. ilding Vent Fuel Building FUSAR does These and HIGH setpoints is to ons have if a HIGH te and Iodine ums are fixed cause a vel(s), the cent of the site e-133, and all than 8 days, is s of the cabove e collection indicators te accrued shown that the Reactor hannel(s). to the only. and Iodine quirements of lysis are used to dioactivity Noble Gas on is.

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2.2	<u>Dete</u> Estat	rmining t	he Total Body and Skin Dose Rates for Noble Gas Rele Setpoints for Effluent Monitors (continued)	eases And						
	1.	(contin	ued)							
		В.	(continued)							
			If an alarm occurs, Channel Check(s) should be perform channel(s), an ALERT Alarm should be investigated an Alarm shall require isotopic analysis of particulate and/ channel medium of the affected channel(s). The Isotop the medium shall be used to evaluate particulate and/o rate levels per the methodology of ODCM 2.3.	med on these Id a HIGH or iodine Dic analysis of r iodine dose						
		C.	To comply with Technical Specification 3.3.3.1, Table 3 Monitoring Instrumentation, "Instrument 2.a.ii. Particula with Alarm/Trip Setpoint determined and set in accorda requirements of the Offsite Dose Calculation Manual, the BASES for Fuel Building Particulate Channel High A Setpoints for Unit 1 and Unit 2:	8.3-6 Radiation ite Activity", ince with the ne following is Alarm						
			Unit 1 Fuel Building:							
			The 10,000 cpm High Setpoint is based on an Infant's I Exposed Organ Dose Rate (Liver) from Inhalation of Cs Site Boundary. The value of 10,000 cpm is very conse to the site dose rate limit of 1500 mrem/yr. The method based on measured particulate channel count rates wh detector was calibrated with a known source activity of on default assumptions as follows:	Maximum s-137 at the rvative relative dology is en the Cs-137, and						
			 The particulate channel read 32,385 ccpm when 7.67 uCi source of Cs-137. 	exposed to a						
			 Assuming that 7.67 uCi of Cs-137 were collected 1 hour of skid sample collection (fixed filter), the volume would yield ~3.3E+06 cc's. Greater than filter efficiency is assumed. 	d during typical sample n 99% sample						
,			3. The maximum building process flow exhaust is -	~24,576 cfm.						
			 Q(dot) for Cs-137 uCi/sec release rate is approx uCi/sec as follows: 	imately 27						
		<u>7.67 uC</u> hour	i x <u>hour</u> x <u>28317 cc's</u> x <u>24576 ft3</u> x <u>min</u> 3.3E+06cc.s ft3 min 60 sec	= <u>27 uCi</u> sec						

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2.2 <u>Determining the Total Body and Skin Dose Rates for Noble Gas Releases And</u> Establishing Setpoints for Effluent Monitors (continued)											
1. (continued)											
C.	C. (continued)										
	orst sector	(NW) at the									
	6.	The dose rate (ODCM Section resulting dose	(equivalent 2.3 Inhala rates yield.	t to 10,000 c ition Dose R	pm) is calc ate to an Ir	ulated per nfant. The					
Bone I mrem/yr mi 7.4E+00 7.9	Liver rem/yr 9E+00	Thyroid mrem/yr r 0.0E+00	Kidney nrem/yr 4.2E-01	Lung mrem/yr 1.0E+00	GI-LLI mrem/yr 1.5E-02	W.Body mrem/yr 4.8E-01					
	7.	The ODCM 3.1 1500 mrem/yr. Liver is the mai site dose rate li	1.2.1.b do From the ximum exp imit.	se rate limit preceding c oosed organ	to any orga alculation t at 0.52 per	an is he Infant's rcent of the					
8. A particulate channel setpoint of 10,000 cpm provides a conservative setpoint given that this channel analyzes gro activity on a fixed filter, Cs-137 is a typical long-lived fission product present at all times with spent fuel in the pool, and sample collection intervals shorter than 1 hour would provide adequate warning response if significant particulate activiti were being released, i.e., the above assumptions assume Cs-137 activity of ~2.3E-06 uCi/cc.											
 Cs-137 activity of ~2.3E-06 uCi/cc. 9. The setpoint of 10,000 cpm was administratively chosen to provide early detection/alarm of a problem. The above dose rate calculations are provided to document that the particulate channel is capable of detection sensitivities to insure compliance with the ODCM site limit. Grab samples should be performed to accurately calculate actual releases associated with real high alarm events as per the ODCM methodology for performing dose rate calculations. (End of Unit 1 Fuel Building evaluation) 											

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2.2	Determining the Total Body and Skin Dose Rates for Noble Gas Releases And Establishing Setpoints for Effluent Monitors (continued)								
	1. (continued)								
:	(C.	(contin	ued)					
				Unit 2 Fuel Building:					
	The 10,000 cpm High Setpoint is based on an Infant's Maxim Exposed Organ Dose Rate (Liver) from Inhalation of Cs-137 Site Boundary. The value of 10,00 cpm is very conservative to the site dose rate limit of 1500 mrem/yr. The methodology based on measured particulate channel count rates when the detector was calibrated with a known source activity of Cs-13 on default assumptions as follows:							Maximum s-137 at the vative relative dology is ien the Cs-137, and	
			1. The particulate channel read 39,782 ccpm when exposed to a 7.59 uCi source of Cs-137 (decayed to June 19, 1996 data).						
			 Assuming that 7.59 uCi of Cs-137 were collected during 1 hour of skid sample collection (fixed filter), the typical sample volume would yield ~5.32E+06 cc's. Greater than 99% sample filter efficiency is assumed. 						
			3.	The maximum building process flow exhaust is ~31,584 cfm.					
			 Q(dot) for Cs-137 uCi/sec release rate is approximately 21 uCi/sec as follows: 						
<u>7.59 uCi</u> x <u>hour</u> x <u>28317 cc's</u> x <u>31584 ft3</u> x <u>min</u> = <u>21.26</u> hour 5.32E+06cc.s ft3 min 60 sec sec								= <u>21.26 uCi</u> sec	
	 The default historical (X/Q)d for the worst sector (NW) at the site boundary is 1.3E-06 meters/sec. The dose rate (equivalent to 10,000 cpm) is calculated per ODCM Section 2.3 Inhalation Dose Rate to an Infant. The resulting dose rates yield. 							(NW) at the	
								culated per nfant. The	
	Bone mrem/yr 4.8E+00	L mr 5.08	iver em/yr 8E+00	Thyroid mrem/yr 0.0E+00	Kidney mrem/yr 2.7E-01	Lung mrem/yr 7.0E+01	GI-LLI mrem/yr 1.0E-02	W.Body mrem/yr 3.1E-01	
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2.2	<u>Deter</u> Estab	mining t lishing (<u>he Tot</u> Setpoi	tal Body and Skin Dose Rates for Noble Gas Rel nts for Effluent Monitors (continued)	eases And				
	1.	(contin	ued)						
		C.	(contii	nued)					
			7.	The ODCM 3.11.2.1.b dose rate limit to any org mrem/yr. From the preceding calculation the In the maximum exposed organ at 0.34 percent of rate limit.	an is 1500 fant's Liver is the site dose				
			8.	A particulate channel setpoint of 10,000 cpm proconservative setpoint given that this channel an activity on a fixed filter, Cs-137 is a typical long-product present at all times with spent fuel in the sample collection intervals shorter than 1 hour wadequate warning response if significant particulation were being released, i.e., the above assumption Cs-137 activity of ~1.4E-06 uCi/cc.	ovides a alyzes gross lived fission e pool, and that vould provide llate activity ns assume a				
			9.	The setpoint of 10,000 cpm was administratively provide early detection/alarm of a problem. The rate calculations are provided to document that channel is capable of detection sensitivities to in compliance with the ODCM site limit. Grab sam performed to accurately calculate actual release with real high alarm events as per the ODCM m performing dose rate calculations.	y chosen to above dose the particulate nsure ples should be as associated hethodology for				
			~						

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2.2	Determining Establishing	the Total Body and Skin Dose Rates for Noble Gas Relea Setpoints for Effluent Monitors (continued)	ases And				
	2. Total I	Body and Skin Nuclide Specific Dose Rate Calculations					
	The fo body c compl releas	llowing outline provides a step-by-step explanation of ho dose rate is calculated on a nuclide-by-nuclide basis to ev iance with Control 3.11.2.1. This method is only used if the es exceed the value of $3.5 \times 10^5 \ \mu$ Ci/sec.	w the total valuate the actual				
A. The (X/Q) value =sec/m ³ andis the mos limiting sector at the exclusion area. (See Table M-1 for value ar sector.)							
	В.	Enter the release rate in ft ³ /min of the release source an to:	id convert it				
		$= \frac{()\text{ft}^3}{\text{min}} X \frac{2.8317 X 10^4 \text{cc}}{\text{ft}^3} X \frac{\text{min}}{60 \text{sec}}$					
		= cc/sec volume release rate					
	C.	Solve for(Q DOT) _i for nuclide (i) by obtaining the μ Ci/cc of the release source and multiplying it by the product of above.	assay value f 2.2.2.B				
		(Q DOT) _i = (nuclide [i])					
		(assay) µCi cc X (2.2.2.B value) cc sec					
		$(Q DOT)_i = \mu Ci/sec$ for nuclide (i)					
	D.	To evaluate the total body dose rate obtain the $K_{\rm i}$ value from Table G-2.	for nuclide (i)				
	E.	Solve for DR _{TBi}					
		$DR_{TBi} = K_i (X/Q) (Q DOT)_i = \frac{mrem - m^3}{\mu Ci - yr} X \frac{sec}{m^3} X \frac{\mu Ci}{sec}$					
		$DR_{TBi} = \frac{mrem}{yr}$ total body dose from nuclide (i) for the s release source	pecified				

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2.2	<u>Deter</u> Estab	mining t	<u>he Total Body and Skin Dose Rates for Noble Gas Rel</u> Setpoints for Effluent Monitors (continued)	eases And			
	2.	(contin	ued)				
		F.	To evaluate the skin dose rate, obtain the L _i and M _i val Table G-2 for nuclide (i).	ues from			
		G.	Solve for DR _{skin i}				
			$DR_{skin i} = [L_i + 1.1 M_i] (X/Q)(Q DOT)_i$				
			$DR_{skin} = \frac{mrem}{yr}$ skin dose from nuclide (i) for the speci	fied release			
		H.	Repeat steps 2.2.2.D through 2.2.2.G for each noble g reported in the assay of the release source.	as nuclide (i)			
		I.	The Dose Rate to the Total Body from radioactive nob radiation from the specified release source is:	le gas gamma			
			n				
			$DR_{TB} = \sum DR_{TBi}$				
		J.	The Dose Rate to the skin from noble gas radiation fro release source is:	m the specified			
			п				
			$DR_{skin} = \sum DR_{skin i}$				
			The dose rate contribution of this release source shall other gaseous release sources that are in progress at interest. Refer to in-plant procedures and logs to dete Dose Rate to the Total Body and Skin from noble gas	be added to all the time of rmine the Total effluents.			

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2.3	<u>Determining</u> <u>Releases</u> (co	<u>the Ra</u> Intinue	adioiodine & Particulate Dose Rate to Any Organ Fro ed)	<u>m Gaseous</u>		
	<u>For Total Do</u>	se Rat	te from I & 8DP and H-3 To An Infant Organ T:			
	DR⊤ = Σ Z[DF	RI&8DPT	+ DR _{H-3T}]			
	Where:					
	Т	=	The organ of interest for the infant age group			
	Z	=	The applicable pathways			
	DR _{I&8DPT}	=	Dose Rate in mrem/yr to the organ T from iodines a particulates	and 8 day		
	DR _{H-3} T	=	Dose Rate in mrem/yr to organ T from Tritium			
	DR_{T}	=	Total Dose Rate in mrem/yr to organ T from all path under consideration	hways		
	ŗΣ	=	A mathematical symbol to signify the operations to the symbol are to be performed for each nuclide (i) and the individual nuclide dose rates are summed to the total dose rate from the pathway.	the right of through (n) to arrive at		
	Σ Ζ	=	A mathematical symbol to indicate that the total do to organ T is the sum of each of the pathways dose	se rate D _T e rates		
	R _i	=	The dose factor for nuclide (i) for organ T for the pa specified (units vary by pathway)	athway		
	Pi	Ξ	The dose factor for instantaneous ground plane pa units of <u>mrem-m² sec</u> μCi-yr	thway in		

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2.3	<u>Determining t</u> <u>Releases</u> (co	he Radioiodine & Particulate Dose Rate to Any Organ ntinued)	From Gaseous				
	From an evaluation of the radioactive releases and environmental pathways, the grass-cow/goat-milk pathway has been identified as the most limiting pathway with the infant's thyroid being the critical organ. This pathway typically contributes >90% of the total dose received by the infant's thyroid and the radioiodine contribute essentially all of this dose. Therefore, it is possible to demonstrate compliance with the release rate limit of Control 3.11.2.1 for radioiodines and particulates by only evaluating the infant's thyroid dose for the release of radioiodines via the grass-cow/goat-milk pathway. The calculation method of Section 2.3.3 is used for this determination. If this limited analysis approach is used, the dose calculations for other radioactive particulate matter and other pathways need not be performed. Only the calculations of Section 2.3.3 for the radioiodines need be performed to demonstrate compliance with the Control dose rate limit.						
	releases of ra	adioiodines.					
	n. <u>Ine In</u>	nalation Dose Rate Method:					
		NOTE The H-3 dose is calculated as per 2.3.4.					
	Α.	The controlling location is assumed to be an Infant location is sector at the mit X/Q) _D for this location is sec/m ³ . To common to all nuclides. (See Table M-2 for value, sector at the sector at thes ecctor at the sector at	ated in the le range. The his value is tor and range.)				
	В.	Enter the release rate in ft ³ /min of the release source a cc/sec.	ind convert to				
		$= \frac{\text{ft}^{3}}{\text{min}} \times \frac{2.8317 \times 10^{4} \text{ cc}}{\text{ft}^{3}} \times \frac{\text{min}}{60 \text{ sec.}} = \text{cc/sec}$					

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2.3	<u>Deter</u>	<u>mining</u>	the Radioiodine & Particulate Dose Rate to Any Organ	From Gase	
	Relea	<u>ases</u> (co	ntinued)		
	1.	(contir	nued)		
		C.	Solve for (Q DOT) _i for nuclide (i) by obtaining the μ Ci/c of the release source activity and multiplying it by the p 2.3.1.B above.	c assay val product of	
			$(Q DOT)_i = \frac{(nuclide[i] assay) \ \mu Ci}{cc} X \frac{(Value 2.3.1.B) \ cc}{sec}$		
D. E.			$(Q DOT)_i = \mu Ci/sec$ for nuclide (i)		
		D.	Obtain the R _i value from Table G-5 for the organ T.		
		E.	Solve for DR _i		
			$DR_{iT} = R_{iT} (X/Q)_{D} (Q DOT)_{i} = \frac{mrem - m^{3}}{\mu Ci - yr} X \frac{sec}{m^{3}} X \frac{\mu Ci}{sec}$		
			DR _{iT} = <u>mrem</u> The Dose Rate to organ T from nuclid yr	e (i)	
		F.	Repeat steps 2.3.1.C through 2.3.1.E for each nuclide the assay of the release source.	(i) reported	
		G.	The Dose Rate to the Infants organ T from the Inhalati	on Pathway	
			$DR_{Inhalation_T} = DR_1 + DR_2 + \dots + DR_n$		
			for all nuclides except H-3. This dose rate shall be add other pathways as per 2.3.5 - Total Organ Dose.	ded to the	
	Steps	s 2.3.1.(NOTE C through 2.3.1.G need to be completed for each organ	T of the	

41 OFFSITE DOSE CALCULATION MANUAL (ODCM) PROCEDURE NO.: C-200 C-200 ST. LUCIE PLANT METHODOLOGY SECTION 2.3 Determining the Radioiodine & Particulate Dose Rate to Any Organ From Gased Releases (continued) 2. The Ground Plane Dose Rate Method: NOTE Tritium dose via the ground plane is zero. A. The controlling location is assumed to be an Infant located in the mile range. The (D/Q) for the ground plane range.				
C-200 ST. LUCIE PLANT <u>METHODOLOGY SECTION</u> 2.3 Determining the Radioiodine & Particulate Dose Rate to Any Organ From Gased Releases (continued) 2. The Ground Plane Dose Rate Method: <u>NOTE</u> Tritium dose via the ground plane is zero. A. The controlling location is assumed to be an Infant located in thesector at themile range. The (D/Q) for t				
METHODOLOGY SECTION 2.3 Determining the Radioiodine & Particulate Dose Rate to Any Organ From Gased Releases (continued) 2. The Ground Plane Dose Rate Method: NOTE Tritium dose via the ground plane is zero. A. The controlling location is assumed to be an Infant located in the mile range. The (D/Q) for the sector at the mile range.				
 2.3 <u>Determining the Radioiodine & Particulate Dose Rate to Any Organ From Gased Releases</u> (continued) 2. <u>The Ground Plane Dose Rate Method</u>: <u>NOTE</u> Tritium dose via the ground plane is zero. A. The controlling location is assumed to be an Infant located in the sector at the mile range. The (D/Q) for the formula of the provide the ground plane is zero. 				
2. <u>The Ground Plane Dose Rate Method</u> : <u>NOTE</u> Tritium dose via the ground plane is zero. A. The controlling location is assumed to be an Infant located in the sector at the mile range. The (D/Q) for t				
NOTE Tritium dose via the ground plane is zero. A. The controlling location is assumed to be an Infant located in the sector at the mile range. The (D/Q) for the				
A. The controlling location is assumed to be an Infant located in the sector at the mile range. The (D/Q) for t				
location is 1/m ² . This value is common to all nuclides (See Table M-2 for sector, range and value.)				
B. Enter the release rate in ft ³ /min of the release source and convert t cc/sec.				
$= \frac{\text{ft}^{3}}{\text{min}} \times \frac{2.8317 \times 10^{4} \text{ cc}}{\text{ft}^{3}} \times \frac{\text{min}}{60 \text{ sec.}} = \text{cc/sec}$				
C. Solve for (Q DOT) _i for nuclide (i) by obtaining the μCi/cc assay value from the release source activity and multiplying it by the product of 2.3.2.B above.				
$(Q DOT)_i = \frac{(nuclide[i]assay) \mu Ci}{cc} \times \frac{(Value 2.3.2.B) cc}{sec}$				
$(Q DOT)_i = \mu Ci/sec$ for nuclide (i)				
D. Obtain the P _i value from Table G-3				
E. Solve for DR _i				
$DR_i = P_{iT} (D/Q) (Q DOT)_i = \frac{mrem - m^2 - sec}{\mu Ci - yr} X \frac{1}{m^2} X \frac{\mu Ci}{sec}$				
DR _i = <u>mrem</u> The Dose Rate to organ T from nuclide (i) yr				
F. Repeat steps 2.3.2.C through 2.3.2.E for each nuclide (i) reported the assay of the release source.				

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2.3	<u>Deter</u>	mining t	the Radioiodine & Particulate Dose Rate to Any Organ	From Gaseous
	<u>Relea</u>	ases (co	ntinued)	
	2.	(contir	ued)	
		G.	The Dose Rate to the Infant's Whole Body from the Gr Pathway is:	ound Plane
			$DR_{GrPl} = DR_1 + DR_2 + ___ + DR_n$	
	~		for all nuclides. This dose rate shall be added to the o as per 2.3.5.	ther pathways
	3.	<u>The G</u>	rass-Cow/Goat-Milk Dose Rate Method:	
			<u>NOTE</u> H-3 dose is calculated as per 2.3.4.	
		A.	The controlling animal was established as a the sector at miles. The (D/ location is 1/m ² . This value is common to (See Table M-3 for sector, range and value.)	located in Q) for this all nuclides.
		В.	Enter the anticipated release rate in ft ³ /min of the release convert to cc/sec.	ise source and
			$= \frac{\text{ft}^{3}}{\text{min}} \times \frac{2.8317 \times 10^{4} \text{ cc}}{\text{ft}_{3}} \times \frac{\text{min}}{60 \text{ sec.}} = \text{cc/sec}$	
		C.	Solve for (Q DOT) _i for nuclide (i) by obtaining the μ Ci/c of the release source activity and multiplying it by the p 2.3.3.B above.	c assay value product of
			$(Q \text{ DOT })_i = \frac{(\text{nuclide [i] assay}) \ \mu\text{Ci}}{\text{cc}} \times \frac{(\text{value 2.3.3.B}) \ \text{cc}}{\text{sec}}$	
			(Q DOT) _i = μ Ci/sec for nuclide (i)	
		D.	Obtain the R_i value from Table G-6(7) (whichever is the animal, cow/goat, for infant).	e controlling
			If the limited analysis approach is being used, limit the the infant thyroid.	calculation to

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2.2	Dotor	minina (the Rediciedine & Retigulate Deep Rate to Any Organ				
2.3	<u>Relea</u>	<u>ses</u> (co	ntinued)	FIOIT Gaseous			
1	3.	(contin	ued)				
		E.	Solve for DR _{iT}				
			$DR_{iT} = R_{iT} (D/Q) (Q DOT)_i = \frac{mrem - m^2 - sec}{\mu Ci - yr} X \frac{1}{m^2} X \frac{\mu C}{sec}$.i _ _			
			DR _{iT} = <u>mrem</u> the Dose Rate to organ T from nuclide (i) yr				
		F.	Repeat steps 2.3.3.C through 2.3.3.E for each nuclide (i) reported in the assay of the release source.				
			Only the radioiodines need to be included if the limited analysis approach is being used.				
		G.	The Dose Rate to the Infant's organ T from Grass pathway is:	Milk			
			$DR_{grass} - Milk_T = DR_1 + DR_2 + - + DR_n$				
	for all nuclides. This dose rate shall be added to the o as per 2.3.5 - Total Organ Dose.						
			NOTE				
	Steps Infant appro	2.3.3.0 Limit ach is t	C through 2.3.3.G need to be completed for each organ the calculation to the infant thyroid if the limited analysi being used.	of the s			
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2.3	Deter	mining t	he Radioiodine & Particula	ate Dose Rate to Any Organ	From Gaseous	
	Relea	<u>ises</u> (co	ntinued)		_	
	4.	<u>The H</u>	<u>3 Dose Rate Method</u> :			
		Α.	The controlling locations a are:	nd their (X/Q) _D values for ea	ch pathway	
			Inhalation - Infant at	range in the	sector.	
			$(X/Q)_D$ = sec/m ³ (See Table M-2 for range, sector and value)			
			Ground Plane - Does not a	apply to H-3		
			Grass-Cow/Goat-Milk- atmiles with an Infa sector drinking the milk. T (X/Q) _D =sec sector corresponding to th	located in the int at the exclusion area in th The $(X/Q)_D$ for the /m ³ . (From Table M-6 at the ine location of the Milk Animal	sector location is range and above.)	
		B.	Enter the anticipated relea convert it to cc/sec.	ase rate in ft ³ /min of the relea	ase source and	
			$= \frac{1}{\min} \frac{ft^{3}}{x} \frac{2.8317 \times 10^{4}}{ft^{3}}$	$\frac{cc}{cc} \times \frac{min}{60 \text{ sec.}}$		
			= cc/sec volume	release rate		
		C.	Solve for (Q DOT) _{H-3} for T of the release source and above.	ritium, by obtaining the µCi/c multiplying it by the product	c assay value of 2.3.4.B	
			$(Q DOT)_{H-3} = \frac{(H-3) \ \mu Ci}{cc} X$	(2.3.4.B value) cc sec		
			$(Q DOT)_{H-3} = \mu Ci/sec$	c activity release rate		
		D.	Obtain the Tritium dose fa	ctor (R _i) for Infant organ T fr	om:	
			PATH	TABLE #		
			Inhalation	G-5		
			Grass-Cow/Goat-Milk	G-6(7)		

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2.3	<u>Deter</u> Relea	<u>mining t</u> ases (co	he Radioiodine & Particulate Dose Rate to Any Organ ntinued)	From Gaseous		
	4.	(contin	ued)			
		E.	Solve for D_{H-3} (Inhalation) using the (X/Q) _D for inhalatic and R_{H-3} (Inhalation) from 2.3.4.D.	on from 2.3.4.A		
			$DR_{H-3_{Inh_{T}}} = R_{H-3} (X/Q)_{D} (Q DOT)_{H-3}$			
			$DR_{H-3_{lnh_T}}$ = mrem/yr from H - 3 Infant Inhalation for organ	ηΤ		
F.			Solve for D _{H-3} (GrassMilk) using the (X/Q) _D for GrassMilk from 2.3.4.A and R _{H-3} (GrassMilk) from 2.3.4.D			
			$DR_{H-3_{GM_{T}}} = R_{H-3_{GM_{T}}} (X/Q)_{D} (Q DOT)_{H-3}$ $DR_{H-3_{GM_{T}}} = mrem/yr \text{ from } H - 3 \text{ Infant}$			
		G.	Repeat steps 2.3.4.D through 2.3.4.F for each Infant o interest.	rgan T of		
		H.	The individual organ dose rates from H-3 shall be addo organ pathway dose rates as per 2.3.5.	ed to the other		

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2.3	<u>Determinin</u>	g the Radioiodine & Parl	ticulate Dose Rate to An	y Organ From Gaseous
	<u>Releases</u> (continued)		
	5. <u>Dete</u> <u>H-3</u>	ermining the Total Organ from Release Source(s)	Dose Rate from lodines	, 8D-Particulates, and
	Α.	The following table de to arrive at the total de	escribes all the pathways ose rate to an organ T:	that must be summed
		PATHWAY	DOSE RATE	STEP # REF.
		Inhalation (I&8DP)		2.3.1.G
		Ground Plane (I&8DP)	(Whole Body only)	2.3.2.G
	G	rMilk (I&8DP)		2.3.3.G
		Inhalation (H-3)		2.3.4.E
		GrMilk (H-3)		2.3.4.F
		DR _T =	(sum of above)	
	В. С.	Repeat the above sur The DR _T above shall site that will be in prog procedures and logs t	mmation for each Infant of be added to all other rele gress at any instant. Re to determine the Total Di	organ T. ease sources on the fer to in-plant R⊤ to each organ.
2.4	Determinin	g the Gamma Air Dose f	for Radioactive Noble Ga	as Release Source(s)
	Discussion effluents for calendar ye noble gas of November equation m annual rep used as ou air dose is: D_{Y} - air = Σ i	- Control 3.11.2.2 limits or gamma radiation to <5 ear. The following calcul gamma air dose and is b 1978. The dose calcula hay be used for Control d ort or for projecting dose utlined in the detailed exp $13.17 \times 10^{-8} M_i (X/Q) Q_i$	the air dose due to noble mrads for the quarter ar lation method is provided based on section 5.3.1 of tion is independent of ar lose calculation, the dose by provided that the appro- blanation that follows. The	e gases in gaseous nd to <10 mrads in any d for determining the NUREG-0133, ny age group. The e calculation for the opriate value of (X/Q) is ne equation for gamma

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2.4	Determining	he Gamma Air Dose for Radioactive Noble Gas Release Source(s)			
	(continued)				
	Where:				
	D _Y -air	 gamma air dose in mrad from radioactive noble gases. 			
	Σ	A mathematical symbol to signify the operations to the right side of the symbol are to be performed for each nuclide (i) through (n) and summed to arrive at the total dose, from all nuclides reported during the interval. No units apply.			
	3.17 X 10 ⁻⁸	 the inverse of the number of seconds per year with units of year/sec. 			
Mi		= the gamma air dose factor for radioactive noble gas nuclide (i) in units of $\frac{mrad-m^3}{\mu Ci-yr}$			
	(X/Q)	the long term atmospheric dispersion factor for ground level releases in units of sec/m ³ . The value of (X/Q) is the same for all nuclides (i) in the dose calculation, but the value of (X/Q) does vary depending on the Limiting Sector the Control is based on, etc.			
	Qi	 the number of micro-curies of nuclide (i) released (or projected) during the dose calculation exposure period. (e.g., month, quarter or year) 			
1					

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2.4	Deteri	mining t	<u>he Gamma Air Dose for Radioactive Noble Gas Releas</u>	se Source(s)			
	(contii	nued)					
	The fo dose i	llowing s calcul	steps provide a detailed explanation of how the radion ated.	uclide specific			
	1.	To deto the typ Dose F nuclide	ermine the applicable (X/Q) refer to Table M-1 to obtain the value for e of dose calculation being performed. (i.e., Quarterly Control or Projection for examples). This value of (X/Q) applies to each e (i).				
	2.	Detern	nine (M_i) the gamma air dose factor for nuclide (i) from	Table G-2.			
	3.	Obtain waste interva	the micro-Curies of nuclide (i) from the in-plant radioad management logs for the sources under consideration I.	ctive gaseous during the time			
	4.	Solve	for D _i as follows:				
		$D_i = \frac{3}{2}$	$\frac{17 \text{ X} 10^{-8} \text{ yr}}{\text{sec}} \text{ X} \frac{\text{M}_{i} \text{mrad} - \text{m}^{3}}{\mu \text{Ci} - \text{yr}} \text{ X} \frac{(\text{X}/\text{Q}) \text{sec}}{\text{m}^{3}} \text{ X} \frac{\text{Q}_{i} \ \mu \text{Ci}}{1}$				
		D _i = r	nrad = the dose from nuclide (i)				
	5.	Perfori time in	m steps 2.4.2 through 2.4.4 for each nuclide (i) reported terval in the source.	d during the			
	6.	The to dose o	tal gamma air dose for the pathway is determined by si f each nuclide (i) to obtain D _Y -air dose.	umming the D _i			
		D _{Y-air} =	$D_1 + D_2 + ___ + D_n = mrad$				
	7.	Refer f applica	to in-plant procedures for comparing the calculated dos able limits that might apply.	e to any			

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2.5	Determining				
	<u>Discussion</u> - Control 3.11.2.2 limits the quarterly air dose due to beta radiation from noble gases in gaseous effluents to <10 mrads in any calendar quarter and <20 mrads in any calendar year. The following calculation method is provided for determining the beta air dose and is based on Section 5.3.1 of NUREG-0133, November 1978. The dose calculation is independent of any age group. The equation may be used for Control dose calculation, dose calculation for annual reports or for projecting dose, provided that the appropriate value of (X/Q) is used as outlined in the detailed explanation that follows.				
	The equation	for beta air dose is:			
		n			
		$D_{B-air} \Sigma = 3.17 \times 10^{-8} N_i (X/Q) Q_i$			
		. i			
	Where:				
	D _{B-air}	= beta air dose in mrad from radioactive noble gases.			
	ïΣ	 a mathematical symbol to signify the operations to the of the symbol are to be performed for each nuclide (n) and summed to arrive at the total dose, from all reported during the interval. No units apply. 	ne right side (i) through nuclides		
	3.17 X 10 ⁻⁸	 the inverse of the number of seconds per year with u year/sec. 	units of		
	Ni	= the beta air dose factor for radioactive noble gas nucleurity of $\frac{mrad-m^3}{\mu Ci-yr}$	clide (i) in		
	(X/Q)	the long term atmospheric dispersion factor for groun releases in units of sec/m ³ . The value of (X/Q) is the nuclides (i) in the dose calculation, but the value of (vary depending on the Limiting Sector the Control is etc.	nd level e same for all X/Q) does based on,		
	Qi	 the number of micro-Curies of nuclide (i) released (o during the dose calculation exposure period 	or projected)		

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2.5	<u>Deter</u>	mining t	he Beta Air Dose for Radioactive Noble Gas Releases	(continued)
	The fo	ollowing	steps provide a detailed explanation of how the dose is	s calculated.
	1.	To det the typ project	ermine the applicable (X/Q) refer to Table M-1 to obtair be of dose calculation being performed (i.e., quarterly C tion for examples). This value of (X/Q) applies to each	n the value for ontrol or Dose nuclide (i).
	2.	Detern	nine (N _i) the beta air dose factor for nuclide (i) from Tab	ole G-2.
	3.	Obtain waste interva	the micro-curies of nuclide (i) from the in-plant radioac management logs for the source under consideration d I.	tive gaseous luring the time
	4 .	Solve	for D _i as follows:	
		$D_i = \frac{3}{2}$	$\frac{17 \text{ X } 10^{-8} \text{ yr}}{\text{sec}} \text{ X} \frac{\text{N}_{\text{i}} \text{ mrad} - \text{m}^{3}}{\mu \text{Ci} - \text{yr}} \text{ X} \frac{(\text{X}/\text{Q}) \text{ sec}}{\text{M}^{3}} \text{ X} \frac{\text{Q}_{\text{i}} \mu \text{Ci}}{1}$	
		D _i = m	rad = the dose from nuclide (i)	
	5.	Perfore time in	m steps 2.5.2 through 2.5.4 for each nuclide (i) reported terval in the release source.	d during the
	6.	The to dose c	tal beta air dose for the pathway is determined by sum f each nuclide (i) to obtain D _{B-air} dose.	ming the D _i
		D _{B-air} =	: D ₁ + D ₂ + D _n = mrad	
	7.	Refer applica	to in-plant procedures for comparing the calculated dos able limits that might apply.	e to any

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2.6	Determining t From Cumula	<u>he Radioiodine and Particulate Dose To Any Age Grou</u> tive Releases	p's Organ
	Discussion - 0 resulting from days to ≤7.5 r year. The foll organ dose d Section 5.3.1 any age group dose reflects Effluent Supe age group (see (X/Q) which is the loss of I&B given distance cloud that affe I&8DP and H and Tritium. included (see is to calculate age group. T pathways tha apply to Gras eat only milk.	Control 3.11.2.3 limits the dose to the whole body or an a the release of I-131, I-133, tritium and particulates with mrem during any calendar quarter and \leq 15 mrem during lowing calculation method is provided for determining the ue to releases of radioiodines and particulates and is b of NUREG-0133, November 1978. The equations can p provided that the appropriate dose factors are used a only those pathways that are applicable to the age grou- rvisor will track which age group is the controlling (mos- econtrol 3.11.2.6.c). The (X/Q) _D symbol represents a s different from the Noble Gas (X/Q) in that (X/Q) _D take 3DP and H-3 from the plume as the semi-infinite cloud e. The (D/Q) dispersion factor represents the rate of fa- ects a square meter of ground at various distances from -3 notations refer to I-131, I-133 Particulates having ha For ease of calculations, dose from other lodine nuclide 2.1). Tritium calculations are always based on (X/Q) _D , the I&8DP and H-3 dose for each pathway that applies the total dose to an organ can then be determined by su t apply to the receptor in the sector. The infant age grou- s-Cow-Meat or Vegetation pathway dose since they are	y organ n half-lives >8 g any calendar ne critical ased on be used for and the total up. The trestrictive) DEPLETED- s into account travels over a allout from the n the site. The lf-lives >8 days es may be The first step s to a given umming the oup does not e assumed to
	The equation	s are:	
	For Inhalatior n	Pathway (excluding H-3):	
	D _{I&8DPT} = Σ3. i	17 X 10 ⁻⁸ R _i (X/Q) _D Q _i	
	For Ground P	lane, Grass-Cow/Goat-Milk, Grass-Cow/Goat-Milk, or	Vegetation
	n D _{I&8DPT} = Σ3. i	17 X 10 ⁻⁸ R _i (D/Q) Q _i	
	For each path	way above (excluding Ground Plane) For Tritium:	
	D _{H-3T} = 3.	17 Х 10 ⁻⁸ R _{н-зт} (X/Q) _D Q _i	

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	METHODOLOGY SECTION
6 <u>Determining t</u> From Cumula	<u>he Radioiodine and Particulate Dose To Any Age Group's Organ</u> <u>itive Releases</u> (continued)
For Total Dos group:	e from Particulate Gaseous effluent to organ T of a specified age
$D_{T} = \frac{\Sigma}{Z} [D_{1&SDP}]$	+ D _{H-3}]
Where:	
Т	the organ of interest of a specified age group
Z	the applicable pathways for the age group of interest
D _{I&8DP}	 Dose in mrem to the organ T of a specified age group from radioiodines and 8D Particulates
D _{H-3}	 Dose in mrem to the organ T of a specified age group from Tritium
DT	 Total Dose in mrem to the organ T of a specified age group from Gaseous particulate Effluents
ŗΣ	A mathematical symbol to signify the operations to the right of the symbol are to be performed for each nuclide (i) through (n) and the individual nuclide doses are summed to arrive at the total dose from the pathway of interest to organ T.
Σ Z	= A mathematical symbol to indicate that the total dose D_T to organ T is the sum of each of the pathway doses of I&8DP and H-3 from gaseous particulate effluents.
3.17 X 10 ⁻⁸	 The inverse of the number of seconds per year with units of year/sec.
R _i	 The dose factor for nuclide (i) (or H-3) for pathway Z to organ T of the specified age group. The units are either
	$\frac{mrem - m^3}{yr - \mu Ci} \begin{array}{l} \text{for pathways} \\ \text{using } (X/Q)_D \end{array} OR \frac{mrem - m^2 - sec}{yr - \mu Ci} \begin{array}{l} \text{for pathways} \\ \text{using } (D/Q) \end{array}$

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2.6	Determining From Cumula		ing the Radioiodine and Particulate Dose To Any Age Group's Organ nulative Releases (continued)				
	(X/Q) _D		=	The depleted-(X/Q) value for a specific location where receptor is located (see discussion). The units are see			
	(D/Q)		=	the depos is located m=meters	le deposition value for a specific location where the receptor located (see discussion). The units are 1/m ² where l=meters.		
	Qi		 The number of micro-Curies of nuclide (i) released (or projected) during the dose calculation exposure period. 				
	Q _{LI 2}		=	the number	er of micro-Curies of H-3 released (or	projected)	
	11-5			during the	dose calculation exposure period.		
	1	The Inh	alation	Doso Pati	way Method		
	1. <u>The Inh</u>		aiation	Doserau			
			The H	I-3 dose sl	NOTE nould be calculated as per 2.6.4.		
		A.	Deterr where (i)	nine the a the recept	pplicable $(X/Q)_D$ from Table M-2 for the tor is located. This value is common to	e location o each nuclide	
		В.	For the	e age grou organ T a	ip(s) of interest, determine the R _i facto and age group from the appropriate tab	r of nuclide (i) Ie number.	
		A	ge Gro	oup	Inhalation Dose Factor Table Numb	er	
			Infan	t	G-5		
			Child		G-8		
			Teen		G-13		
			Adult	t	G-18		
	C.		Obtair waste consid	the micro managem leration du	-Curies (Q _i) of nuclide (i) from the radi ent logs for the release source(s) unde ring the time interval.	oactive gas er	
		D.	Solve	for D _I			
			D _i = 3.	17 X 10 ⁻⁸ F	Ri(X/Q) _D Q _I		
			D _i =	n	nrem from nuclide (i)		
						I	

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		METHODOLOGY SECTION	
2.6	Determining From Cumu	the Radioiodine and Particulate Dose To Any Age Grou lative Releases (continued)	<u>p's Organ</u>
	1. (conti	inued)	
	E.	Perform steps 2.6.1.B through 2.6.1.D for each nuclide during the time interval for each organ.	(i) reported
	F.	The Inhalation dose to organ T of the specified age gro determined by summing the D _i Dose of each nuclide (i)	oup is)
		$D_{Inhalation} = D_1 + D_2 + \ + D_n = mrem$ (Age Group)	
		Refer to 2.6.5 to determine the total dose to organ T from radioiodines & 8D Particulates	om
	2. <u>The G</u> r	round Plane Dose Pathway Method:	
	Tritium dose organ consi	<u>NOTE</u> e via the ground plane is zero. The Whole Body is the or dered for the Ground Plane pathway dose.	ıly
	Α.	Determine the applicable (D/Q) from Table M-2 for the the receptor is located. This (D/Q) value is common to (i)	location wher each nuclide
	B .	Determine the Ri factor of nuclide (i) for the whole body Table G-4. The ground plane pathway dose is the sam groups.	y from ne for all age
	C.	Obtain the micro-Curies (Q _i) of nuclide (i) from the radi waste management logs for the source under consider	oactive gas ation.
	D.	Solve for D _I	
		$D_i = 3.17 \times 10^{-8} R_i (D/Q) Q_i$	
		D _i = mrem for nuclide (i)	

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2.6	Det	ermining	the Radioiodine	and Particulate Dose 1	To Any Age Grou	ıp's Organ	
	From Cumulative Releases (continued)						
	2. (continued)						
		F.	The Ground Plathe Di Dose of	ane dose to the whole I each nuclide (i)	body is determine	ed by summing	
			$D_{Gr.PlWBody} = D$	$D_1 + D_2 + ___ + D_n =$	mrem		
			Refer to step 2	.6.5 to calculate total de	ose to the Whole	Body.	
	3.	The Gra	ass-Cow/Goat-N	<u>lilk Dose Pathway Metl</u>	hod:		
				NOTE			
			Tritium dose is calculated as per 2.6.4.				
		A.	A cow or a goa the sum of eac milk from only t determine whic	t, will be the controlling h animal), as the huma the most restrictive anir ch animal is controlling l	animal; (i.e., dos n receptor is ass nal. Refer to Tal based on its (D/0	se will not be umed to drink ble M-3 to Q).	
		B.	For the age gro nuclide (i), for o applicable milk	oup(s) of interest, detern organ T, from the appro animal.	mine the dose fa opriate table num	ctor R _i for ber for the	
		Ag	ge Group	Cow Milk Dose Factor Table Number	Goat Milk Do Factor Table Nu	se Imber	
			Infant	G-6	G-7		
			Child	G-9	G-10		
			Teen	G-14	G-15		
			Adult	G-19	G-20		
		C.	Obtain the mick waste manage during the time	ro-Curies (Q _i) of nuclide ment logs for the releas interval.	e (i) from the radi se source under o	oactive gas consideration	
		D.	Solve for D _i				
			D _i = 3.17 X 10 ⁻¹	⁸ R _i (D/Q)Q _i			
			D _i = mre	em from nuclide (i)			

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			METHODOLOGY SECTION			
2.6	<u>Dete</u> Fron	ermining t n Cumula	the Radioiodine and Particulate Dose To Any Age Group's Organ ative Releases (continued)			
	3.	(contin	nued)			
		E.	Perform steps 2.6.3.B through 2.6.3.D for each nuclide (i) reported during the time interval. Only the radioiodines need to be included the limited analysis approach is used.	t d if		
		F.	The Grass-Cow-Milk (or Grass-Goat-Milk) pathway dose to organ is determined by summing the Di dose of each nuclide(i).	т		
			D_{G-C-M} (or D_{G-G-M}) = $D_1 + D_2 + \ + D_n = mrem$			
	4.	The dose to each organ should be calculated in the same manner with steps 2.6.3.B through 2.6.3.F. Refer to step 2.6.5 to determine the total dose to organ T from radioiodines &8D Particulates. If the limited analysis approach is being used the infant thyroid dose via the grass-cow(goat)-milk pathway is the only dose that needs to be determined. Section 2.6.5 can be omitted.				
	 [
			<u>NOTE</u> Tritium dose is calculated as per 2.6.6.	·		
		Α.	Determine the controlling herd location by:			
			1. For dose calculations (other than the annual report) the historical herd was determined to be located in Sector at miles. This herd shall be used for all ODCM Control required dose calculations.			
			2. For annual report dose calculations the herd from the Land Use Census having the highest (D/Q) at its location will be reporting herd. The Land Use Census for 1978 (for examp shall apply to the calendar year 1979 (for example) and will locate the nearest herd in each sector over land. The real (D/Q) will be determined from actual met data that occurred during the reporting period.	the le) l		
		B.	Determine the applicable (D/Q) from Table M-3 for the location(s) the herd as determined in 2.6.4.A above.	of		

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2.6	<u>Deter</u>	mining (the Radioiodine a	and Particulate Dose To Any Age Grou	<u>ıp's Organ</u>		
	From	Cumula	<u>ative Releases</u> (c	ontinued)			
	4.	(contir	nued)				
		C.	Determine the dose factor Ri for nuclide (i) for organ tau from the Table specified below:				
			Age	Meat Dose Factor Table No.			
			Infant	N/A *			
			Child	G-11			
			Teen	G-16			
			Adult	G-21			
		D.	 The infant of to this path Obtain the micro waste managem nuclide (i) to be consideration du from a single relo Limits or annual 	does not eat meat and therefore dose way. -Curies (Qi) of nuclide (i) from the rad ent logs (for projected doses - the mic projected) for the release source(s) un ring the time interval. The dose can b ease source, but the total dose for OD reports shall be from all gaseous relea	does not apply ioactive gas cro-Curies of ider e calculated CM Control ase sources.		
		E.	Solve for Di				
			Di = 3.17 X 10 R	li (D/Q) Qi			
			Di =	mrem from nuclide (i)			
		F.	Perform Steps 2.6.4.C through 2.8.4.E for each nuclide (i) reported during the time interval.				
		G.	The Grass-Cow- summing the Di	Meat pathway dose to organ tau is de dose of each nuclide (i).	termined by		
			Dose	= D1 + D2 + D3 + + Dn =	mrem		
			Grass-Cow-Mea Excluding Tritiur (Child, Teen, or	t n Adult)			

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2.6	Determining From Cumul	<u>the Radioiodine a ative Releases</u> (c	and Particulate Dose To Any Age Grou ontinued)	<u>ıp's Organ</u>		
	5. The Ve	getation (Garden) Dose Pathway method:			
	A.	Determine the c	ontrolling garden location by:			
		1. For dose garden w Control d	calculations (other than annual reports as determined to be located in Sector miles. This garden shall be used fo ose calculations.	s) the historical at or all ODCM		
 For annual report dose calculations the Land having the highest real (D/Q) at its location w reporting garden. The Land Use Census for example) shall apply to the calendar year 19 and will locate the nearest garden in each se (D/Q) will be determined from actual met dat during the reporting period. 				ensus Garden be the 78 (for (for example) or. The real nat occurred		
	В.	Determine the a the garden(s) as	pplicable (D/Q) from Table M-3 for the determined above.	location(s) of		
	C.	Determine the d Table specified	ose factor Ri for nuclide (i) for organ ta below:	au from the		
	Γ	Age	Vegetation Dose Factor Table No.			
	Γ	Infant	N/A *			
	ſ	Child	G-12			
	ļ.	Teen	G-17			
	ľ	Adult	G-22			
	L	* denotes the not apply to	e infant does not eat vegetation and th o this pathway.	erefore does		
	D.	Obtain the micro waste managem nuclide (i) to be consideration du	p-Curies (Qi) of nuclide (i) from the rad nent logs (for projected doses - the mic projected) for the release source(s) ur uring the time interval. The dose can b	ioactive gas ro-Curies of ider be calculated		

from a single release source, but the total dose for ODCM Control Limits or annual reports shall be from all gaseous release sources.

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2.6	<u>Deter</u> From	rmining Cumul	<u>the Radioiodine and Particulate Dose To Any Age Grouative Releases</u> (continued)	ıp's Organ
	5.	(conti	nued)	
		E.	Solve for Di	
			Di = 3.17 X 10 ⁻⁸ Ri (D/Q) Qi	
			Di = mrem from nuclide (i)	
		F.	Perform Steps 2.6.5.C through 2.6.5.E for each nuclide during the time interval.	e (i) reported
		G.	The Vegetation pathway dose to organ tau is determin summing the Di dose of each nuclide (i).	ed by
			Dose = D1 + D2 + D3 + + Dn =	mrem
			Vegetation (Excluding Tritium) (Child, Teen, or Adult)	
	6.	The C	Baseous Tritium Dose (Each Pathway) Method:	
		A.	The controlling locations for the pathway(s) has alread determined by:	y been
			Inhalation-as per 2.6.1.AGround Plane-not applicable for H-3Grass-Cow/Goat-Milk-as per 2.6.3.AGrass-Cow/Goat-Milk-as per 2.6.4.AVegetation (Garden)-as per 2.6.5.A	
		В.	Tritium dose calculations use the depleted $(X/Q)_D$ inste Table M-2 describes where the $(X/Q)_D$ value should be	ead of (D/Q). e obtained

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2.6	<u>Dete</u> From	rmining t n Cumula	the Radioiod ative Releas	dine and Particulate es (continued)	e Dose To Any A	<u>ge Group's</u>	<u>Organ</u>			
	6.	(contir	ntinued)							
		C.	For the age group(s) of interest, determine the Pathway Tritium dose factor (R_{H-3}) for the organ T of interest from the Table specified below:							
					MI	LK				
			AGE	INHALATION -	COW	GOAT				
			Infant	G-5	G-6	G-7				
			Child	G-8	G-9	G-10				
			Teen	G-13	G-14	G-15				
l			Adult	G-18	G-19	G-20				
		D.	(i) to be producing the formation of the	int logs (for projected) ojected) for the releating time interval. The curce, but the total de ill be from all gased	ase source(s) un lose can be calc lose for Control li lous release source	icro-Curies ider conside ulated from mits or qual ces.	of nuclide eration a single terly			
		E.	Solve for D	H-3						
			D _{H-3} = 3.17	7 X 10 ⁻⁸ R _{H-3} (X/Q) _D (Z					
	D		D _{H-3} = mrem from Tritium in the specified pathway for organ T of the specified age group							

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2.6 <u>Determining</u> From Cumula	the Radioic ative Relea	odine and Particulate ses (continued)	e Dose To Any Age G	iroup's Organ					
7. <u>Deterr</u> <u>From</u>	nining the ⁻ Cumulative	<u> Total Organ Dose F</u> Gaseous Releases	<u>rom Iodines, 8D-Parti</u>	culates and H-3					
Control dose from the read	limits for I8 ctor unit of i	<u>NOTE</u> &8DP shall consider interest.	dose from all release	e sources					
A.	A. The following pathways shall be summed to arrive at the total dose to organ T from a release source or if applicable to Control, from all release sources:								
Organ: BONE L	IVER TH	YROID KIDNEY	LUNG GI-LLI V	VHOLE BODY					
PATHWA	Y	DOSE	Reference to STEP No.	Remark					
Inhalation (I&	BDP)		2.6.1.F						
Inhalation (Tri	tium)		2.6.6.E						
Ground Plane (I	&8DP)		2.6.2.F						
GrassM	ilk (I&8DP)		2.6.3.F						
GrassM	lk (Tritium)		2.6.6.E						
GrassMe	eat (I&8DP)		2.6.4.G	N/A for INFANT					
GrassMe	at (Tritium)		2.6.6.E	N/A for INFANT					
Vegetable Garder	(I&8DP)		2.6.5.G	N/A for INFANT					
Vegetable Garden	(Tritium)		2.6.6.E	N/A for INFANT					
Dose _T =		(sum of above)]						
В.	B. The dose to each of the applicable age group's ORGANS shall be calculated:								

BONE, LIVER, THYROID, KIDNEY, LUNG, WHOLE BODY, & GI-LLI

The age group organ receiving the highest exposure relative to its Control Limit is the most critical organ for that age group resulting from the radioiodine & 8D Particulates gaseous effluents.

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2.7	Projecting	Dose for Radioactive Gaseous Effluents					
	<u>Discussion</u> - Control 3.11.2.4 requires that the waste gas holdup syste to reduce releases of radioactivity when the projected doses in 31 day gaseous effluent releases, from each unit, to areas at and beyond the BOUNDARY (see TS Figure 5-1-1) would exceed 0.2 mrad for gamma and 0.4 mrad for beta radiation. The following calculation method is p determining the projected doses. This method is based on using the r calculations performed in Sections 2.4 and 2.5.						
	1. Obt (Se can	ain the latest results of the monthly calculations of the ga ction 2.4) and the beta air dose if performed (Section 2.5 be obtained from the in-plant records.	mma air dose). These doses				
	2. Div the	de these doses by the number of days the plant was ope month.	es by the number of days the plant was operational during				
	3. Multiply the quotient by the number of days the plant is projected to be operational during the next month. The product is the projected dose fo next month. The value should be adjusted as needed to account for an changes in failed-fuel or other identifiable operating conditions that could significantly alter the actual releases.						
	4. If the projected doses are >0.2 mrads gamma air dose or > 0.4 mrads beta air dose, the appropriate subsystems of the waste gas holdup system shall be used.						
3.0	<u>40 CFR 19</u>	0 Dose Evaluation					
	<u>Discussion</u> - Dose or dose commitment to a real individual from all uranium fuel cycle sources be limited to \leq 25 mrem to the whole body or any organ (except thyroid, which is limited to \leq 75 mrem) over a period of 12 consecutive months. The following approach should be used to demonstrate compliance with these dose limits. This approach is based on NUREG-0133, Section 3.8.						
3.1	Evaluation	Bases					
	Dose eval be perforn twice the o 3.11.2.3a whole bod gamma air from radio evaluation	uations to demonstrate compliance with the above dose I ned if the quarterly doses calculated in Sections 1.4, 2.4 a lose limits of Controls 3.11.1.2.a, 3.11.1.2.b, 3.11.2.2a, 3 and 3.11.2.3b respectively; i.e., quarterly doses exceedin y (liquid releases), 10 mrem to any organ (liquid releases dose, 20 mrads beta air dose or 15 mrem to the thyroid iodines and particulates (atmospheric releases). Otherwis s are required and the remainder of this section can be o	imits need only and 2.6 exceed .1.2.2b, g 3 mrem to the .), 10 mrads or any organ ise, no mitted.				

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		METHODOLOGY SECTION	
3.2	Doses From	Liquid Releases	
•. •.	For the evalu calculation m realistic assu shellfish by ir Radiological more realistic levels of plan	ation of doses to real individuals from liquid releases, the ethod as employed in Section 1.4 will be used. However mptions will be made concerning the dilution and inges individuals who live and fish in the area. Also, the result Environmental Monitoring program will be included in d to dose to these real people by providing data on actual in t related radionuclides in the environment.	ne same er, more tion of fish and s of the etermining measured
3.3	Doses From	<u>Atmospheric Releases</u>	
	same calcula Section 2.4, t dose factor (I sequence ap the actual loc consumption (Control 3.12 the results of in determining measured lev	tion methods as employed in Section 2.4 and 2.6 will be the total body dose factor (K _i) should be substituted for M _i) to determine the total body dose. Otherwise the sar plies. However, more realistic assumptions will be made ation of real individuals, the meteorological conditions a of food (e.g., milk). Data obtained from the latest land .2) should be used to determine locations for evaluating the Radiological Environmental Monitoring program will g more realistic doses to these real people by providing yels of radioactivity and radiation at locations of interest	e used. In the gamma air ne calculation le concerning and the use census g doses. Also, I be included data on actua

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4.0	<u>Annı</u>	ual Radio	active	Effluent Report		
Discussion - The information contained in a annual report shall not apply to a Control. The reported values are based on actual release conditions instead historical conditions that the Control dose calculations are based on. The Co dose limits are therefore included in item 1 of the report, for information only. ECLs in item 2 of the report shall be those listed in Tables L-1 and G-1 of this manual. The average energy in item 3 of the report is not applicable to the St. Lucie Plant. The format, order of nuclides and any values shown as an example in Tables 3.3 through 3.8 are samples only. Other formats are acce if they contain equivalent information. A table of contents should also accom the report. The following format should be used:						
		RADIO	ACTIN	/E EFFLUENTS - SUPPLEMENTAL INFORMAT	ION	
	1.	Regula	atory L	.imits:		
		1.1	For R	adioactive liquid waste effluents:		
			а.	The concentration of radioactive material releas site (see TS Figure 5.1-1) shall be limited to ten concentrations specified in 10 CFR Part 20.100 Appendix B, Table 2, Column 2 for radionuclides dissolved or entrained noble gases. For dissolv entrained noble gases, the concentration shall b 2 X 10^{-4} µCi/ml total activity.	ed from the times the 1-20.2401, s other than ed or be limited to	
			b.	The dose or dose commitment to a MEMBER O from radioactive materials in liquid effluents rele reactor unit to unrestricted areas (See TS Fig. 5 limited during any calendar quarter to \leq 1.5 mrer body and to \leq 5 mrem to any organ and \leq 3 mrem body and \leq 10 mrem to any organ during any calendar quarter during any calendar	F THE PUBLIC ased from each .1-1) shall be n to the whole n to the whole lendar year.	
		1.2	For R	adioactive Gaseous Waste Effluents:		
			a.	The dose rate resulting from radioactive materia gaseous effluents to areas at or beyond the SIT (See TS Figure 5.1-1) shall be limited to the follow	Ils released in E BOUNDARY owing values:	
				The dose rate limit for noble gases shall be \leq 50 the total body and \leq 3000 mrem/yr to the skin an	0 mrem/yr to Id	
				The dose rate limit from I-131, I-133, Tritium and with half-lives >8 days shall be \leq 1500 mrem/yr t	d particulates o any organ.	

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4.0	<u>Annu</u>	al Radio	active	Effluent Report (continued)	
	1.	(contin	ued)		
		1.2	(contir	nued)	
			b.	The air dose (see TS Figure 5.1-1) due to noble released in gaseous effluents, from each reacto at and beyond the SITE BOUNDARY shall be lin following:	egases r unit, to areas mited to the
				During any calendar quarter, to ≤ 5 mrad for gan and ≤ 10 mrad for beta radiation and during any to ≤ 10 mrad for gamma radiation and ≤ 20 mrad radiation	nma radiation calendar year for beta
			C.	The dose to a MEMBER OF THE PUBLIC from Tritium and all radionuclide in particulate form, v >8 days in gaseous effluents released from eac to areas at and beyond the SITE BOUNDARY (1 in the TS-A) shall be limited to the following:	I-131, I-133, with half-lives h reactor unit see Figure 5.1-
				During any calendar quarter to \leq 7.5 mrem to an during any calendar year to \leq 15 mrem to any or	ny organ and rgan.
	2.	Effluer	nt Limit	ting Concentrations:	
		Air - as	s per a	ttached Table G-1	
		Water	- as pe	er attached Table L-1	
	3.	Averaç applica	ge ene able to	ergy of fission and activation gases in gaseous ef the St. Lucie Plant.	fluents is not
	·				

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			<u>ר</u>	METHOD	OLOGY	SECTION	<u>1</u>				
4.0	<u>Annu</u>	al Radio	active Efflue	ent Repoi	r <u>t (</u> contin	ued)					
	4.	Measu	rements and Approximations of Total Radioactivity:								
		A sum	mary of liquid effluent accounting methods is described in Table 3.1.								
		A sum Table ∶	mmary of gaseous effluent accounting methods is described in e 3.2.								
		Estima	Estimate of Errors:								
				OUS							
		Erro	r Topic		Avg. %	Max. %	Avg. %	Max. %			
	R	elease F	oint Mixing	-	2	5	NA	NA			
	S	ampling			1	5	2	5			
	S	ample Pi	reparation		1	5	1	5			
5		ample A	nalysis		3	10	3	10			
		-1	aluma		2	5	4	15			
	R	elease v	olume			-	-	10			
	R	elease v	olume	Total %	9	30	10	35			

The predictability of error for radioactive releases can only be applied to nuclides that are predominant in sample spectrums. Nuclides that are near background relative to the predominant nuclides in a given sample could easily have errors greater than the above listed maximums.

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4.0 <u>Annual Radic</u>	<u>pactive Effluent Report</u> (c	continued)					
4. (contir	nued)						
TABLE 3.1 RADIOACTIVE LIQUID EFFLUENT SAMPLING AND ANALYSIS							
LIQUID SOURCE S	AMPLING FREQUENCY	TYPE OF ANALYSIS	METHOD OF ANALYSIS				
	EACH BATCH	PRINCIPAL GAMMA EMITTERS	p.h.a.				
MONITOR		TRITIUM	L.S.				
RELEASES	MONTHLY COMPOSITE	GROSS ALPHA	A.I.C.				
QI	UARTERLY COMPOSITE	Sr-89, Sr-90, Fe-55	C.S.				
STEAM	FOUR PER MONTH	PRINCIPAL GAMMA EMITTERS AND DISSOLVED GASES	p.h.a.				
		TRITIUM	L.S.				
RELEASES	MONTHLY COMPOSITE	GROSS ALPHA	A.I.C.				
QI	UARTERLY COMPOSITE	Sr-89, Sr-90, Fe-55	C.S.				

TABLE NOTATION:

p.h.a. - gamma spectrum pulse height analysis using High Purity Germanium (HPGE) detectors. All peaks are identified and quantified.

- L.S. Liquid Scintillation counting
- C.S. Chemical Separation
- A.I.C. Air Ion Chamber

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4.0 <u>Annual Rad</u>	ioactive Effluent Report	(continued)	
4. (cont	inued)		
RADI	<u>TA</u> OACTIVE GASEOUS W	<u>BLE 3.2</u> ASTE SAMPLING AND AN	ALYSIS
GASEOUS SOURCE	SAMPLING FREQUENCY	TYPE OF ANALYSIS	METHOD OF ANALYSIS
Waste Gas Decay Tank Releases	Each Tank	Principal Gamma Emitters	G, p.h.a.
Containment	Each Purge	Each Purge Principal Gamma Emitters	
Purge Releases		H-3	L.S.
	Four per Month	Principal Gamma Emitters	(G, C, P) - p.h.a.
		H-3	L.S.
Diant \ (ant	Monthly Composite	Gross	
	(Particulates)	Alpha	P - A.I.C.
	Quarterly Composite	Sr-90	
	(Particulates)	Sr-89	0.8.
		Principal Gamma Emitters	(G, C, P) - p.h.a.
	VVEEKIY	H-3	L.S.
Cask Handling	Monthly Composite	Gross	
Facility Vent (1)	(Particulate)	Alpha	P - A.I.C.
	Quarterly Composite	Sr-90	0.0
	(Particulate)	Sr-89	0.8.
ΤΑΒΙ Ε ΝΟΤΑΤΙΟΙ	N.		

TABLE NOTATION:

- G Gaseous Grab Sample
- C Charcoal Filter Sample
- P Particulate Filter Sample
- L.S. Liquid Scintillation Counting
- C.S. Chemical Separation
- p.h.a. Gamma spectrum pulse height analysis using High Purity Germanium(HPGE)detectors. All peaks are identified and quantified.
- A.I.C. Air Ion Chamber
- (1)—Only required when operating.

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4.0	<u>Annua</u>	al Radic	active	Effluent Report (continued)								
	5.	Batch	Releas	ses								
		A.	Liquid									
			1.	Number of batch releases:								
			2.	Total time period of batch releases:	minutes							
			3.	Maximum time period for a batch release:	minutes							
			4.	Average time period for a batch release:	minutes							
			5.	Minimum time period for a batch release:	minutes							
			6.	Average dilution stream flow during the period (see Note 1 on Table 3.3):	GPM							
			All	liquid releases are summarized in tables								
		В.	Gased	bus								
			1.	Number of batch releases:								
			2.	Total time period for batch releases:	minutes							
			3.	Maximum time period for a batch release:	minutes							
			4.	Average time period for batch releases:	minutes							
			5.	Minimum time period for a batch release:	minutes							
		A	All gase	eous waste releases are summarized in tables								
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4.0	<u>Annua</u>	al Radic	active	active Effluent Report (continued)								
	6.	Unplar	nned F	Releases								
		A.	Liquio	1								
				Number of releases:								
			2 .	Total activity releases:	Curies							
		В.	Gase	ous								
	C.			Number of releases:								
				Total activity released:	Curies							
				attachments (if applicable) for:								
				. A description of the event and equipment involved.								
				2. Cause(s) for the unplanned release.								
			3.	Actions taken to prevent a recurrence								
			4.	Consequences of the unplanned release								
	7.	Descri to the Janua	ption o genera ry ann	of dose assessment of radiation dose from radioa al public due to their activities inside the site are ual report.	active effluents reported on the							
	8.	Offsite period	dose . See	calculation manual revisions initiated during this Control 3.11.2.6 for required attachments to the	reporting Annual Report.							
	9.	Solid v Contro	vaste ol 3.11	aste and irradiated fuel shipments as per requirements of 3.11.2.6.								
	10.	Proces	ss Cor	ntrol Program (PCP) revisions as per requiremen	ts of TS 6.13.							
	11.	Major Syster	chang ns as	es to Radioactive Liquid, Gaseous and Solid Wa per requirements of Control 3.11.2.5.	ste Treatment							
	12.	Result INITIA been i	sults of water samples taken in support of the Groundwater Protection TIATIVE (NEI 07-07) during the previous calendar year that have not en incorporated into the Radiological Environmental Monitoring Program.									

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			METHODOLO	GY SEC	TION		a sa ana ana	rad f			
			FLORIDA POWER 8	LIGHT	COMPA	'NY					
			ST. LUCIE U	INIT #							
	1	ANNUA	L REPORT//	TH	ROUGH	//					
	TA	ABLE 3.	.3: LIQUID EFFLUENTS -	SUMMA	TION O	F ALL RELE	ASES				
А.	Fissio	n and A	Activation Products			QUARIER	<u># QUA</u>	<u>Riek#</u>			
	1.	 Total Release - (Not including Tritiun Gases, Alpha) 			Ci	E	: 	E			
	2.	Averaç Period	ge Diluted Concentration D)uring	μCi/ml	E	:	E			
В.	Tritiun	n									
	1.	Total I	Release		Ci	E	<u> </u>	E			
	2.	Averaç Perioc	ge Diluted Concentration D)uring	μCi/ml	E	<u> </u>	E			
C.	Disso	lved an	d Entrained Gases					l			
	1.	Total I	Release		Ci	E	:	<u> </u>			
	2.	Avera Period	ge Diluted Concentration D)uring	μCi/ml	E	<u> </u>	E			
D.	Gross	, Alpha	Radioactivity								
	1.	Total F	Release		Ci	E	<u> </u>	E			
E.	Volum (Prior	ie of W to Dilut	aste Released tion)		LITERS	E	<u> </u>	E			
F.	Volume of Dilution Water Used During Period ¹				LITERS	E	<u> </u>	E			
1 -	The vol during r dilution	ume re release stream	ported should be for the er intervals. This volume sho flow during the period.	ntire inter ould alsc	rval of th be used	e reporting p to calculate	beriod, n ≩ averag	iot just je			

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	L				I \						
		<u>METH</u>	ODOLOGY S	ECTION							
FLORIDA POWER & LIGHT COMPANY											
ST LUCIE UNIT #											
ANNUA	L REPOR	२०	_// '	THROUGH _	//						
ТА	BLE 3.4 :	LIQUID	EFFLUENTS	(EXAMPLE I	FORMAT)						
			CONTINUC	JUS MODE	BATCH	MODE					
	ASED*	* UNIT	QUARTER #	QUARTER #	QUARTER #	QUARTER #					
I-131		CI	E ,	E	E	E					
I-133		CI	E	E	Е	E					
I-135		CI	E	E	E	E					
NA-24	1	CI	E	E	E	E					
CR-51		CI	E	E	E	E					
MN-54		CI	E	E	E	E					
CO-57		CI	E	E	E	E					
CO-58		CI	E	E	E	E					
FE-59		CI	E	E	E	E					
CO-60		CI	E	E	E	E					
ZN-65		Cl	E	E	E	E					
NI-65		CI	E	E	E	E					
AG-110		CI	E	E	E	E					
SN-113		CI	E	E	E	E					
SB-122		CI	E	E	E	E					
SB-124		CI	E	E	E	E					
W-187		CI	E	E	E	E					
NP-239		CI	E	E	E	E					
ZR-95		CI	E	E	E	E					
MO-99		CI	E	E	E	E					
RU-103		CI	E	E	E	E					
CS-134		CI	E	E	E	E					
CS-136		CI	E	E	E	E					
CS-137		CI	E	E	E	E					
BA-140		CI	E	E	E	E					
CE-141		CI	E	E	E	E					
BR-82		CI	E	E	E	E					
ZR-97		CI	E	E	E	E					
SB-125		CI	E	E	E	E					
1		·	······	<u> </u>		L					

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All nuclides that were detected should be added to the partial list of the example format.

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	C-200										
			METHO	DDOLOGY S	ECTION						
	TABLE 3.4: LIQUID EFFLUENTS (EXAMPLE FORMAT) (continued)										
				CONTINUC	US MODE	BATCH	MODE				
	NUCLIDES RELE	LASED		QUARTER # QUARTER #		QUARTER #	QUARTER #				
	CE-144		CI	E	Е	E	E				
	SR-89		CI	E	E	Е	E				
	SR-90		CI	E	Е	E	E				
	UNIDENTIFIE	ED	CI	E	E	E	E				
	TOTAL FOR PE (ABOVE)	СІ	E	E	E	Е					
F			l			[
	NUCLIDES RELE	EASED	UNIT	CONTINUC	OUS MODE	BATCH	MODE				
				QUARTER #	QUARTER #	QUARTER #	QUARTER #				
-	AR-41		CI	E	E	E	E				
	KR-85		CI	E	E	E	E				
	XE-131M		CI	E	E	E	E				
	XE-133		CI	E	E	E	E				
	XE-133M		CI	E	E	E	E				
	XE-135		CI	E	E	E	E				

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		METHODOLO	GY SECTION									
		FLORIDA POWER 8	LIGHT COMPANY									
ST. LUCIE UNIT #												
	TABLE 3.5: LIQUID EFFLUENTS - DOSE SUMMATION											
	Ag	e Group: L	.ocation:	_								
Ex	posure l	nterval: From	Through									
	Fish &	Shellfish Pathway to Organ	CALENDAR YEAR DOSE (r	nrem)								
		BONE										
		LIVER										
		THYROID										
		KIDNEY										
		LUNG										
		GI-LLI										
		WHOLE BODY										

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			METHO	DOLOGY	SECTION	×.	S
			FLORIDA POV	VER & LIG	HT COMPANY	,	
			ST. LU	CIE UNIT	#		
	г			//			
	I	ADLE 3.	0. GASEOUS EFFL	UENTS-			4020
					<u>UNIT</u> QI	<u>UARTER #</u> Q	UARTER #
A.	Fissi	ion and A	Activation Gases				
	1.	Total F	Release		Ci	E	E
	2.	Avera	ge Release Rate For	Period	μCi/SEC	E	Е
В.	lodir	nes	-				
	1	Total I	odine-131		Ci	E	Е
	2	Avora	ne Delegso Date for	Period		= E	F
	Z.		ge Melease Male Ior	r enou	μοιισεο	E	Ľ
C.	Рап	iculates			.	_	_
	1.	Partic	ulates 1-1/2 > 8 Days	S	Ci	E	E
	2.	Avera	ge Release Rate for	Period	μCi/SEC	E	E
	3.	Gross	Alpha Radioactivity		Ci	E	E
D.	Tritiu	um					-
	1.	Total I	Release		Ci	E	E
	2.	Avera	ge Release Rate for	Period	μCi/SEC	E	E
1							

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Í	C-200			ST. LUCIE PI	LANT									
		L	METH	ODOLOGY S	ECTION	<u> </u>								
		FLC		OWER & LIGH	HT COMPAN	Y								
ĺ	ST LUCIE UNIT #													
	ANNU	JAL REP	ORT	//	_THROUGH	//_								
	TABLE 3.7: GASEOUS EFFLUENTS - GROUND LEVEL RELEASES (EXAMPLE FORMAT)													
				CONTINUC	OUS MODE	BATCH	MODE							
	JUCLIDES RELE	:ASED [*]	UNH	QUARTER #	QUARTER #	QUARTER #	QUARTER #							
1.	Fission Gases			4	L] !							
	AR-41		CI	E	E	Е	E							
	KR-85		CI	E	E	E	E							
	KR-85M		CI	E	E	Е	E							
	KR-87		CI	E	Е	E	E							
	KR-88	CI	E	E	E	E								
	XE-131M		CI	E	Е	E	E							
	XE-133		CI	E	E	E	E							
	XE-133M	-	CI	E	E	E	E							
	XE-135		CI	E	Е	E	E							
	XE-135M		CI	E	E	E	E							
	XE-138		CI	E	E	E	E							
	UNIDENTIFI	ED	CI	E	E	E	E							
	TOTAL FOR PE (ABOVE)	RIOD	CI	E	E	E	E							
2.	lodines													
	I-131		CI	E	E	E	E							
	I-133		CI	E	E	E	E							
	I-135		CI	E	E	E	E							
	TOTAL FOR PE (ABOVE)	RIOD	CI	E	E	E	E							
3.	Particulates		-											
	CO-58		CI	E	E	E	E							
	SR-89		CI	E	E	Ε	E							
	SR-90		CI	E	E	E	E							
					·		<u> </u>							

* All nuclides that were detected should be added to the partial list of the example format.

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			FLORIDA	POWER & L	IGHT COMP	ANY				
			ST	T. LUCIE UNI	IT #					
TABLE 3.8: GASEOUS EFFLUENTS - DOSE SUMMATION - CALENDAR YEAR										
,		01. 101/00								
PAT	HWAY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY]	
Orecord Dis		(mrem)	(mrem)	(mrem)	(mrem)	(mrem)	(mrem)	(mrem)	4	
Ground Pla	ne (/	<u>A) </u>		+		+			4	
			+		ł'		+		-	
	(/	<u> </u>	+	+	 	+			-	
		_		<u></u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>]	
A) SEC	FOR:	RANGE	: miles	(B) COW / GOAT SECTOR: RANGE:]	
•	[NOBLE GA	SFS		AR YEAR (m	orad)				
		Gamma Air	Dose		<u>/////</u>					
		Beta Air D	ose	+						
	Sect	or:		Range:			0.97 mile	.s		
				NOTE	; •					
٦ ا	The dose v	values above w	ere calculate	d using actua	I meteorologi	cal data durir	ng the specifi	ed		
	time interv	al with MET dat	ta reduced as	s per Reg. Gu	<u>ide 1.111, Ma</u>	arch 1976.				

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	HISTORICAL METEOROLOGICAL TABLES			
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<u>.</u>	I											
	TABLE L-1											
EFFLUEN	EFFLUENT CONCENTRATION LIMITS IN WATER IN UNRESTRICTED AREAS											
	······											
16		<u>NO</u>	<u>TE</u>		T-11-0							
If a nucl	Fifuent Concentrations Column 2 and use the most conservative ECL											
Listed for the nuclide												
		<u></u>										
Nuclide	ECL (µCi/ml)	Nuclide	ECL (µCi/ml)	Nuclide	ECL (µCi/ml)							
H-3	1 E-3	Sr-92	4 E-5	Te-129	4 E-4							
C-14	3 E-5	Y-90	7 E-6	Te-131m	8 E-6							
Na-24	5 E-5	Y-91m	2 E-3	Te-131	8 E-5							
P-32	9 E-6	Y-91	8 E-6	Te-132	9 E-6							
Cr-51	5 E-4	Y-92	4 E-5	I-130	2 E-5							
Mn-54	3 E-5	Y-93	2 E-5		1 E-6							
Mn-56	7 E-5	Zr-95	2 E-5	I-132	1 E-4							
Fe-55	1 E-4	Zr-97	9 E-6	l-133	7 E-6							
Fe-59	1 E-5	Nb-95	3 E-5	I-134	4 E-4							
Co-57	6 E-5	Nb-97	3 E-4	I-135	3 E-5							
Co-58	2 E-5	Mo-99	2 E-5	Cs-134	9 E-7							
Co-60	3 E-6	Tc-99m	1 E-3	Cs-136	6 E-6							
Ni-63	1 E-4	Tc-101	2 E-3	Cs-137	1 E-6							
Ni-65	1 E- 4	Ru-103	3 E-5	Cs-138	4 E-4							
Cu-64	2 E-4	Ru-105	7 E-5	Ba-139	2 E-4							
Zn-65	5 E-6	Ru-106	3 E-6	Ba-140	8 E-6							
Zn-69	8 E-4	Ag-110	6 E-6	Ba-141	3 E-4							
Br-82	4 E-5	Sn-113	3 E-5	Ba-142	7 E-4							
Br-83	9 E-4	In-113m	7 E-4	La-140	9 E-6							
Br-84	4 E-4	Sb-122	1 E-5	La-142	1 E-4							
Rb-86	7 E-6	Sb-124	7 E-6	Ce-141	3 E-5							
Rb-88	4 E-4	Sb-125	3 E-5	Ce-143	2 E-5							
Rb-89	9 E-4	Te-125m	2 E-5	Ce-144	3 E-6							
Sr-89	8 E-6	Te-127m	9 E-6	Pr-144	6 E-4							
Sr-90	5 E-7	Te-127	1 E-4	W-187	3 E-5							
	255	To 120m	7 5 6	Nn-239	2 E-5							

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41		OFFSIT	FE DOSE CALC	ULATION MANU	JAL (ODCM)		154 of 231				
PROCEDURE NO .:							104 01 201				
C-200	C-200 ST. LUCIE PLANT										
			TAB				\sim				
	ENVIRONMEN	ITAL PATHWA	Y-DOSE CONVE		RS FOR LIQUID	DISCHARGES	and the second sec				
	PATHWAY - SALT WATER FISH AND SHELLFISH AGE GROUP - ADULT										
		ORGAN D	OSE FACTOR	(MREM/HR PI	ER μCi/ML)						
	BONE			KIDNEY		GUU					
ri-3	U. 4.455+04	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01				
0-14	1.45E+04	2.91E+03	2.91E+U3	2.91E+03	2.91E+03	2.91E+03	2.91E+03				
NA-24	6.08E-01	6.08E-01	6.08E-01	6.08E-01	6.08E-01	6.08E-01	6.08E-01				
P-32	1.67E+07	1.05E+06	0.	0.	0.	1.88E+06	6.47E+05				
CR-51	0.	0.	3.34E+00	1.23E+00	7.42E+00	1.41E+03	5.59E+00				
MN-54	0.	7.07E+03	0.	2.10E+03	0.	2.17E+04	1.35E+03				
MN-56	0.	1.78E+02	0.	2.26E+02	0.	5.68E+03	3.17E+01				
FE-55	1.15E+05	5.19E+05	0.	0.	6.01E+05	2.03E+05	1.36E+05				
FE-59	8.08E+04	1.92E+05	0.	0.	5.32E+04	6.33E+05	7.29E+04				
CO-57	0.	1.42E+02	0.	0.	0.	3.60E+03	2.36E+02				
CO-58	0.	6.05E+02	0.	0.	0.	1.22E+04	1.35E+03				
CO-60	0.	1.74E+03	0.	0.	0.	3.26E+04	3.83E+03				
Ni-63	4.97E+04	3.45E+03	0.	0.	0.	7.19E+02	1.67E+03				
NI-65	2.02E+02	2.63E+01	0.	0.	0.	6.65E+02	1.20E+01				
CU-64	0.	2.15E+02	0.	5.41E+02	0.	1.83E+04	1.01E+02				
ZN-65	1.62E+05	5.13E+05	0.	3.43E+05	0.	3.23E+05	2.32E+05				
ZN-69	3.43E+02	6.60E+02	0.	4.27E+02	0.	9.87E+01	4.57E+01				

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41		OFFSI	TE DOSE CALC	ULATION MAN	JAL (ODCM)		155 of 231					
PROCEDURE NO .:	7											
C-200			ST. LL	JCIE PLANT								
							$\sum_{i=1}^{n} \sum_{j=1}^{n} \sum_{i=1}^{n} \sum_{j=1}^{n} \sum_{i$					
	ENVIRONMENTAL PATHWAY-DOSE CONVERSION FACTORS FOR LIQUID DISCHARGES											
		ORGAN [JOSE FACTOR	(MREM/HR P	ER μCi/ML)							
· · · · · · · · · · · · · · · · · · ·	, 	T	T		·····		······					
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY					
BR-82	0.	0.	0.	0.	0.	4.68E+00	4.08E+00					
BR-83	0.	0.	0.	0.	0.	1.05E-01	7.26E-02					
BR-84	0.	0.	0.	0.	0.	7.38E-07	9.42E-02					
BR-85	0.	0.	0.	0.	0.	0.	3.86E-03					
RB-86	0.	6.25E+02	0.	0.	0.	1.23E+02	2.91E+02					
RB-88	0.	1.79E+00	0.	0.	0.	0.	9.50E-01					
RB-89	0.	1.19E+00	0.	0.	0.	0.	8.38E-01					
SR-89	5.01E+03	0.	0.	0.	0.	8.01E+02	1.44E+02					
SR-90	1.23E+05	0.	0.	0.	0.	1.65E+03	3.02E+04					
SR-91	9.43E+01	0.	0.	0.	0.	4.75E+02	4.15E+00					
SR-92	3.50E+01	0.	0.	0.	0.	6.91E+02	1.51E+00					
Y-90	6.07E+00	0.	0.	0.	0.	6.43E+04	1.63E-01					
Y-91M	5.74E-02	0.	0.	0.	0.	1.68E-01	2.23E-03					
Y-91	8.89E+01	0.	0.	0.	0.	4.89E+04	2.38E+00					
Y-92	5.34E-01	0.	0.	0.	0.	9.33E+03	1.56E-02					

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C-200			ST. LI	JCIE PLANT			
	•		ТАВ	LE L-2			
	<u>ENVIRONMEN</u>	ITAL PATHWA	Y-DOSE CONVE	ERSION FACTO	<u>RS FOR LIQUID</u>) DISCHARGES	· · · · · · · · · · · · · · · · · · ·
	PATHW	AY - SALT WAT	FR FISH AND	SHELLFISH	AGE GROUP	' - ADULT	
		ORGAN [JOSE FACTOR	(MREM/HR PI	ER μCi/ML)		
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY
Y-93	1.69E+00	0.	0.	0.	0.	5.36E+04	4.67E-02
ZR-95	1.60E+01	5.13E+00	0.	8.09E+00	0.	1.59E+04	3.47E+00
ZR-97	8.82E-01	1.78E-01	0.	2.69E-01	0.	5.51E+04	8.19E-02
NB-95	4.48E+02	2.49E+02	0.	2.47E+02	0	1.51E+06	9.79E+01
NB-97	3.76E+00	9.50E-01	0.	1.11E+00	0.	3.51E+03	3.47E-01
MO-99	0.	1.28E+02	0.	2.90E+02	0.	2.97E+02	2.43E+01
TC-99M	1.30E-02	3.67E-02	0.	5.57E-01	1.80E-02	2.17E+01	4.67E-01
TC-101	1.33E-02	1.93E-02	0.	3.47E-01	9.82E-03	0.	1.89E-01
RU-103	1.07E+02	0.	0.	4.09E+02	0.	1.25E+04	4.61E+01
RU-105	8.90E+00	0.	0.	1.15E+02	0.	5.44E+03	3.51E+00
RU-106	1.59E+03	0.	0.	3.08E+03	0.	1.03E+05	2.01E+02
AG-110	1.57E+03	1.45E+03	0.	2.85E+03	0	5.92E+05	8.62E+02
SB-124	2.78E+02	5.23E+00	6.71E-01	0	2.15E+02	7.85E+03	1.10E+02
SB-125	2.20E+02	2.37E+00	1.96E-01	0.	2.30E+04	1.95E+03	4.42E+01
TE-125M	2.17E+02	7.89E+01	6.54E+01	8.83E+02	0.	8.67E+02	2.91E+01

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C-200				ST. LU	JCIE PLANT				
				ТАР				\sim \sim \sim $/$	
		ENVIRONMEN			ERSION FACTO	RS FOR LIQUI	DISCHARGES		
		PATHW	AY - SALT WAT	ER FISH AND	SHELLFISH	AGE GROUP	P - ADULT		
1			ORGAN [OOSE FACTOR	(MREM/HR P	ER μCi/ML)			
			· · · · · · · · · · · · · · · · · · ·	,			· · · · · · · · · · · · · · · · · · ·		
NUCLID	DE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY	
TE-127	м	5.50E+02	1.92E+02	1.40E+02	2.23E+03	0.	1.84E+03	6.70E+01	
TE-127		8.92E+00	3.20E+00	6.61E+00	3.63E+01	0.	7.04E+02	1.93E+00	
TE-129	M	9.32E+02	3.49E+02	3.20E+02	3.89E+03	0.	4.69E+03	1.48E+02	
TE-129		2.55E+00	9.65E-01	1.95E+00	1.07E+01	0.	1.92E+00	6.21E-01	
TE-131	M	1.41E+02	6.87E+01	1.09E+02	6.95E+02	0.	6.81E+03	5.72E+01	
TE-131		1.60E+00	6.68E-01	1.31E+00	7.00E+00	0.	2.39E-01	5.04E-01	
TE-132		2.05E+03	1.33E+02	1.46E+02	1.28E+03	0.	6.25E+03	1.24E+02	
I-130		3.98E+01	1.18E+02	1.50E+04	1.83E+02	0.	1.01E+02	4.63E+01	
I-131		2.18E+02	3.13E+02	1.02E+05	5.36E+02	0.	8.24E+01	1.79E+02	
I-132		1.07E+01	2.85E+01	3.76E+03	4.55E+01	0.	5.36E+00	1.01E+01	
I-133		7.51E+01	1.30E+02	2.51E+04	2.27E+02	0.	1.15E+02	3.98E+01	
I-134		5.57E+00	1.51E+01	1.96E+03	2.41E+01	0.	1.32E-02	5.41E+00	
I-135		2.33E+01	6.14E+01	8.03E+03	9.77E+01	0.	6.88E+01	2.25E+01	
CS-134		6.85E+03	1.63E+04	0.	5.29E+03	1.75E+03	2.85E+02	1.33E+04	
CS-136		7.17E+02	2.83E+03	0.	1.58E+03	2.16E+02	3.22E+02	2.04E+03	

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C-200			ST. LI	JCIE PLANT			
			TAB	LE L-2	-		
	ENVIRONME	NTAL PATHWA	Y-DOSE CONVI	ERSION FACTO	RS FOR LIQUID	DISCHARGES	
	PATHW	AY - SALT WAT	FISH AND	SHELLFISH	AGE GROUF	- ADULT	
		ORGAN [JOSE FACTOR	(MREM/HR P	ER μCi/ML)		
		······	1				
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY
CS-137	8.79E+03	1.20E+04	0.	4.09E+03	1.36E+03	2.31E+02	7.88E+03
CS-138	6.08E+00	1.20E+01	0.	8.84E+00	8.73E-01	5.12E-05	5.96E+00
BA-139	7.87E+00	5.61E-03	0.	5.24E-03	3.18E-03	1.39E+01	2.30E-01
BA-140	1.65E+03	2.07E+00	0.	7.04E-01	1.18E+00	3.39E+03	1.09E+02
BA-141	0.	2.89E-03	0.	2.68E-03	1.64E-03	1.80E-09	1.29E-01
BA-142	1.73E+00	1.78E-03	0.	1.50E-03	1.01E-03	0.	1.09E-01
LA-140	1.58E+00	7.95E-01	0.	0.	0.	5.83E+04	2.11E-01
LA-142	8.07E-02	3.67E-02	0.	0.	0.	2.68E+02	9.15E-03
CE-141	3.43E+00	2.32E+00	0.	1.08E+00	0.	8.87E+03	2.63E-01
CE-143	6.05E-01	4.47E+02	0.	1.97E-01	0.	1.67E+04	4.95E-02
CE-144	1.79E+02	7.48E+01	0.	4.43E+01	0.	6.05E+04	9.60E+00
PR-144	1.91E-02	7.88E-03	0.	4.45E-03	0.	2.73E-09	9.65E-04
W-187	9.17E+00	7.68E+00	0.	0.	0.	2.51E+03	2.69E+00
NP-239	3.56E-02	3.50E-03	0.	1.08E-02	0.	7.12E+02	1.92E-03

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C-200			ST. LL	JCIE PLANT					
							and the second of the		
	ENVIRONMEN			LE L-3 ERSION FACT(DISCHARGES	and a second s		
	PATHWAY	- SALT WATE	R FISH AND SH	ELLFISH	AGE GROUP -	TEENAGER			
		ORGAN D	OOSE FACTOR	(MREM/HR F	PER μCi/ML)				
						····	· · · · · · · · · · · · · · · · · · ·		
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY		
H3	0.	2.17E-01	2.17E-01	2.74E-01	2.17E-01	2.17E-01	2.17E-01		
C-14	2.94E+03	2.94E+03	2.94E+03	2.22E+03	2.94E+03	2.94E+03	2.94E+03		
NA24	4.63E-01	4.63E-01	4.63E-01	4.63E-01	4.63E-01	4.63E-01	4.63E-01		
P32	1.27E+07	7.98E+05	0.	0.	0.	1.43E+06	4.93E+05		
CR51	0.	0.	2.54E+00	9.38E-01	5.64E+00	1.07E+03	4.25E+00		
MN54	0.	5.38E+03	0.	1.60E+03	0.	1.65E+04	1.03E+03		
MN56	0.	1.36E+02	0.	1.72E+02	0.	4.32E+03	2.42E+01		
FE55	8.78E+04	3.95E+05	0.	0.	4.57E+05	1.54E+05	1.04E+05		
FE59	6.14E+04	1.46E+05	0.	0.	4.05E+04	4.81E+05	5.55E+04		
CO57	0.	1.08E+02	0.	0.	0.	2.74E+03	1.79E+02		
CO58	0.	6.12E+02	0.	0.	0.	8.26E+03	1.39E+03		
CO60	0.	1.70E+03	0.	0.	0.	2.04E+04	3.88E+03		
Ni-63	3.78E+04	2.63E+03	0.	0.	0.	5.47E+02	1.27E+03		
NI65	1.54E+02	2.00E+01	0.	0.	0.	5.07E+02	9.11E+00		
CU64	0.	1.64E+02	0.	4.12E+02	0.	1.39E+04	7.69E+01		
ZN65	1.23E+05	3.90E+05	0.	2.61E+05	0.	2.46E+05	1.77E+05		
ZN69	2.61E+02	5.02E+02	0.	3.24E+02	0.	7.50E+01	3.47E+01		
BR82	0.	0.	0.	0.	0.	3.55E+00	3.10E+00		
BR83	0.	0.	0.	0.	0.	7.95E-02	5.52E-02		
BR84	0.	0.	0.	0.	0.	5.61E-07	7.16E-02		
BR85	0.	0.	0.	0.	0.	0.	2.94E-03		

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(C-200			ST. LU	JCIE PLANT			
		ENVIRONMEN PATHWAY	ITAL PATHWA - SALT WATE ORGAN [TAB <u>Y-DOSE CONVI</u> R FISH AND SH DOSE FACTOR	LE L-3 <u>ERSION FACTO</u> IELLFISH (MREM/HR P	<mark>RS FOR LIQUIE AGE GROUP -</mark> ER μCi/ML)	<u>) DISCHARGES</u> TEENAGER	
N	UCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY
F	RB86	0.	4.76E+02	0.	0.	0.	9.37E+01	2.22E+02
F	RB88	0.	1.37E+00	0.	0.	0.	0.	7.23E-01
F	RB89	0.	9.04E-01	0.	0.	0.	0.	6.38E-01
S	SR89	5.67E+03	0.	0.	0.	0.	6.15E+02	1.63E+02
S	SR90	1.28E+05	0.	0.	0.	0.	2.71E+03	3.17E+04
S	SR91	7.18E+01	0.	0.	0.	0.	3.61E+02	3.16E+00
S	SR92	2.66E+01	0.	0.	0.	0.	5.25E+02	1.15E+00
Y	/90	1.58E+01	0.	0.	0.	1.80E+04	5.23E+04	4.25E-01
Y	′91M	4.36E-02	0.	0.	0.	0.	1.28E-01	1.69E-03
Y	/91	9.40E+01	0.	0.	0.	0.	3.61E+04	2.51E+00
Y	/92	4.06E-01	0.	0.	0.	0.	7.10E+03	1.18E-02
Y	/93	1.29E+00	0.	0.	0.	0.	4.08E+04	3.55E-02
Z	(R95	1.49E+01	4.96E+00	0.	6.16E+00	0.	1.07E+04	3.46E+00
Z	2R97	6.72E-01	1.36E-01	0.	2.05E-01	0.	4.20E+04	6.24E-02
N	NB95	3.97E+02	2.39E+02	0.	1.88E+02	0.	9.76E+05	1.35E+02
N	IB97	2.87E+00	7.24E-01	0.	8.45E-01	0.	2.67E+03	2.64E-01
N	/099	0.	9.74E+01	0.	2.21E+02	0.	2.26E+02	1.85+01
Т	C-99M	9.87E-03	2.79E-02	0.	4.24E-01	1.37E-02	1.65E+01	3.56E-01
Т	C-101	1.02E-02	1.47E-02	0.	2.64E-01	7.47E-03	0.	1.44E-01

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C-200			ST. LU	JCIE PLANT			
		ITAL PATHWA	TAB <u>Y-DOSE CONVE</u> R FISH AND SH	LE L-3 ERSION FACTO	RS FOR LIQUIE	DISCHARGES	
		ORGAN	OSE FACTOR	(MREM/HR P	ER μCi/ML)		
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY
RU-103	1.04E+02	0.	0.	3.11E+02	0.	8.13E+03	4.66E+01
RU-105	6.77E+00	0.	0.	8.74E+01	0.	4.14E+03	2.67E+00
RU-106	1.76E+03	0.	0.	2.34E+03	0. [·]	7.95E+04	2.21E+02
AG110	1.19E+03	1.10E+03	0.	2.17E+03	0.	4.51E+05	6.56E+02
SB-124	2.11E+02	3.99E+00	5.11E-01	0.	1.64E+02	5.98E+03	8.35E+01
SB-125	1.68E+02	1.81E+00	1.49E-01	0.	1.75E+04	1.48E+03	3.37E+01
TE 125M	2.36E+02	8.45E+01	6.66E+01	6.72E+02	0.	6.60E+02	3.13E+01
TE 127M	4.18E+02	1.46E+02	1.07E+02	1.70E+03	0.	1.40E+03	5.09E+01
TE-127	9.31E+00	3.28E+00	6.35E+00	2.76E+01	0.	7.52E+02	1.99E+00
TE 129M	1.02E+03	3.79E+02	3.27E+02	2.96E+03	0.	3.58E+03	1.61E+02
TE-129	1.94E+00	7.34E-01	1.49E+00	8.14E+00	0.	1.46E+00	4.72E-01
TE 131M	1.07E+02	5.22E+01	8.26E+01	5.29E+02	0.	5.18E+03	4.35E+01
TE-131	1.21E+00	5.08E-01	9.99E-01	5.33E+00	0.	1.82E-01	3.83E-01
TE-132	2.19E+02	1.37E+02	1.46E+02	9.74E+02	0.	4.93E+03	1.30E+02
I130	3.03E+01	8.95E+01	1.14E+04	1.39E+02	0.	7.67E+01	3.52E+01
I131	2.23E+02	3.14E+02	9.07E+04	4.08E+02	0.	5.95E+01	1.87E+02
I132	8.11E+00	2.17E+01	2.86E+03	3.46E+01	0.	4.08E+00	7.71E+00
I133	8.11E+01	1.37E+02	2.50E+04	1.73E+02	0.	9.99E+01	4.24E+01
I134	4.24E+00	1.15E+01	1.49E+03	1.83E+01	0.	1.00E-02	4.12E+00

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C-200			ST. LI	JCIE PLANT			
		ITAL PATHWA	TAB <u>Y-DOSE CONVI</u> R FISH AND SH	LE L-3 <u>ERSION FACTO</u> IELL EISH	RS FOR LIQUIE) DISCHARGES	
		ORGAN	DOSE FACTOR	(MREM/HR P	ER μCi/ML)		
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY
I135	1.77E+01	4.68E+01	6.11E+03	7.43E+01	0.	5.23E+01	1.71E+01
CS-134	6.75E+03	1.63E+04	0.	4.03E+03	1.97E+03	1.88E+02	7.60E+03
CS-136	5.46E+02	2.16E+03	0.	1.20E+03	1.65E+02	2.45E+02	1.55E+03
CS-137	8.98E+03	1.21E+04	0.	3.11E+03	1.60E+03	1.61E+02	4.24E+03
CS-138	4.63E+00	9.15E+00	0.	6.73E+00	6.65E-01	3.90E-05	4.54E+00
BA-139	5.99E+00	4.27E-03	0.	3.99E-03	2.42E-03	1.06E+01	1.75E-01
BA-140	1.75E+03	2.15E+00	0.	5.35E-01	1.44E+00	2.55E+02	1.12E+02
BA-141	0.	2.20E-03	0.	2.04E-03	1.25E-03	1.37E-09	9.80E-02
BA-142	1.31E+00	1.35E-03	0.	1.14E-03	7.64E-04	0.	8.26E-02
LA-140	1.67E+00	8.25E-01	0.	0.	0.	4.55E+04	2.18E-01
LA-142	6.14E-02	2.79E-02	0.	0.	0.	2.04E+02	6.95E-03
CE-141	3.51E+00	2.36E+00	0.	8.19E-01	0.	6.38E+03	2.70E-01
CE-143	4.60E-01	3.40E+02	0.	1.50E-01	0.	1.27E+04	3.76E-02
CE-144	2.01E+02	8.25E+01	0.	3.37E+01	0.	4.74E+04	1.07E+01
PR-144	1.45E-02	5.99E-03	0.	3.39E-03	0.	2.08E-09	7.34E-04
W187	6.98E+00	5.85E+00	0.	0.	0.	1.91E+03	2.05E+00
NP-239	2.71E-02	2.67E-03	0.	8.25E-03	0.	5.43E+02	1.46E-03

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C-200			ST. LU	JCIE PLANT			j j
	ENVIRONMEN		TAB	LE L-4 ERSION FACTO			2
	PAInv	ORGAN C	OSE FACTOR	(MREM/HR P	AGE GROUP ER μCi/ML)		
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY
H3	0.	1.81E-01	1.81E-01	1.19E-01	1.81E-01	1.81E-01	1.81E-01
C-14	3.82E+03	3.82E+03	3.82E+03	9.61E+02	3.82E+03	3.82E+03	3.82E+03
NA24	2.03E-01	2.03E-01	2.03E-01	2.03E-01	2.03E-01	2.03E-01	2.03E-01
P32	5.53E+06	3.47E+05	0.	0.	0.	6.22E+05	2.14E+05
CR51	0.	0.	1.12E+00	4.13E-01	2.48E+00	4.70E+02	1.87E+00
MN54	0.	2.34E+03	0.	6.95E+02	0.	7.15E+03	4.46E+02
MN56	0.	5.88E+01	0.	7.46E+01	0.	1.88E+03	1.05E+01
FE55	3.87E+04	1.74E+05	0.	0.	2.02E+05	6.81E+04	4.58E+04
FE59	2.71E+04	6.43E+04	0.	0.	1.79E+04	2.12E+05	2.45E+04
CO57	0.	4.78E+01	0.	0.	0.	1.21E+03	7.94E+01
CO58	0.	5.05E+02	0.	0.	0.	3.00E+03	1.52E+03
CO60	0.	1.41E+03	0.	0.	0.	7.80E+03	4.23E+03
Ni-63	1.66E+04	1.15E+03	0.	0.	0.	2.39E+02	5.55E+02
NI65	6.73E+01	8.74E+00	0.	0.	0.	2.22E+02	3.98E+00
CU64	0.	7.15E+01	0.	1.80E+02	0.	6.09E+03	3.36E+01
ZN65	5.47E+04	1.74E+05	0.	1.16E+05	0.	1.09E+05	7.86E+04
ZN69	1.16E+02	2.23E+02	0.	1.44E+02	0.	3.34E+01	1.55E+01
BR82	0.	0.	0.	0.	0.	1.59E+00	1.39E+00
BR83	0.	0.	0.	0.	0.	3.55E-02	2.47E-02
BR84	0.	0.	0.	0.	0.	2.51E-07	3.20E-02
BR85	0.	0.	0.	0.	0.	0.	1.31E-03

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C-200		ST. LUCIE PLANT							
	ENVIRONMEN PATHW	ITAL PATHWA AY - SALT WA ORGAN [TAB <u>Y-DOSE CONVE</u> TER FISH AND DOSE FACTOR	LE L-4 <u>ERSION FACTO</u> SHELLFISH (MREM/HR P	<mark>RS FOR LIQUIE</mark> AGE GROUF ER μCi/ML)	<u>) DISCHARGES</u> ? - CHILD			
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY		
RB86	0.	2.08E+02	0.	0.	0.	4.09E+01	9.68E+01		
RB88	0.	5.96E-01	0.	0.	0.	0.	3.16E-01		
RB89	0.	3.95E-01	0.	0.	0.	0.	2.78E-01		
SR89	7.53E+03	0.	0.	0.	0.	2.81E+02	2.16E+02		
SR90	9.39E+04	0.	0.	0.	0	1.25E+03	2.38E+04		
SR91	3.18E+01	0	0.	0.	0.	1.60E+02	1.40E+00		
SR92	1.18E+01	0.	0.	0.	0.	2.33E+02	5.08E-01		
Y90	9.00E+00	0.	0.	0.	0.	2.57E+04	2.42E-01		
Y91M	1.95E-02	0.	0.	0.	0.	5.71E-02	7.55E-04		
Y91	1.25E+02	0.	0.	0.	0.	1.66E+04	3.34E+00		
Y92	1.81E-01	0.	0.	0.	0.	3.16E+03	5.28E-03		
Y93	5.73E-01	0.	0.	0.	0.	1.82E+04	1.58E-02		
ZR95	1.80E+01	4.19E+00	0.	2.67E+00	0.	4.33E+03	3.81E+00		
ZR97	2.91E-01	5.87E-02	0	8.86E-02	0.	1.82E+04	2.70E-02		
NB95	4.61E+02	1.97E+02	0.	8.11E+01	0.	3.41E+05	1.45E+02		
NB97	1.24E+00	3.12E-01	0.	3.64E-01	0.	1.15E+03	1.14E-01		
MO99	0.	4.23E+01	0.	9.59E+01	0.	9.81E+01	8.05E+00		
TC-99M	4.34E-03	1.23E-02	0.	1.86E-01	6.01E-03	7.26E+00	1.57E-01		
TC-101	4.47E-03	6.45E-03	0.	1.16E-01	3.29E-03	0.	6.33E-02		

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C-200			ST. LU	JCIE PLANT			
	ENVIRONMEN PATHW	NTAL PATHWA VAY - SALT WA ORGAN I	TAB <u>Y-DOSE CONVE</u> TER FISH AND DOSE FACTOR	LE L-4 ERSION FACTO SHELLFISH (MREM/HR P	<mark>RS FOR LIQUIE</mark> AGE GROUF ER μCi/ML)	<u>) DISCHARGES</u> 9 - CHILD	
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY
RU-103	1.33E+02	0.	0.	1.39E+02	0.	3.50E+03	5.38E+01
RU-105	3.03E+00	0.	0.	3.91E+01	0.	1.85E+03	1.19E+00
RU-106	2.34E+03	0.	0.	1.05E+03	0.	3.63E+04	2.91E+02
AG110	5.18E+02	4.80E+02	0.	9.43E+02	0.	1.96E+05	2.85E+02
SB-124	9.13E+01	1.72E+00	2.21E-01	0.	7.08E+01	2.58E+03	3.61E+01
SB-125	7.24E+01	7.80E-01	6.43E-02	0.	7.57E+03	6.40E+02	1.46E+01
TE 125M	3.11E+02	8.43E+01	8.73E+01	2.97E+02	0.	3.00E+02	4.15E+01
TE 127M	1.85E+02	6.47E+01	4.72E+01	7.50E+02	0.	6.19E+02	2.25E+01
TE-127	1.23E+01	3.27E+00	8.46E+00	1.22E+01	0.	5.24E+02	2.63E+00
TE129M	1.35E+03	3.77E+02	4.31E+02	1.31E+03	0.	1.63E+03	2.09E+02
TE-129	8.59E-01	3.25E-01	6.58E-01	3.60E+00	0.	6.47E-01	2.09E-01
TE131M	4.75E+01	2.31E+01	3.66E+01	2.34E+02	0.	2.29E+03	1.93E+01
TE-131	5.38E-01	2.25E-01	4.42E-01	2.36E+00	0.	8.05E-02	1.70E-01
TE-132	2.78E+02	1.23E+02	1.81E+02	4.31E+02	0.	2.15E+03	1.48E+02
I130	1.33E+01	3.94E+01	5.01E+03	6.12E+01	0.	3.38E+01	1.55E+01
I131	2.87E+02	2.94E+02	9.55E+04	1.79E+02	0.	2.51E+01	2.22E+02
I132	3.57E+00	9.55E+00	1.26E+03	1.52E+01	0.	1.79E+00	3.39E+00
I133	1.05E+02	1.30E+02	3.13E+04	7.61E+01	0.	5.26E+01	5.10E+01
I134	1.86E+00	5.06E+00	6.58E+02	8.07E+00	0.	4.41E-03	1.81E+00

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C-200		ST. LUCIE PLANT							
	<u>ENVIRONMEN</u> PATHW	ITAL PATHWAY AY - SALT WA' ORGAN E	TAB <u>Y-DOSE CONVI</u> TER FISH AND DOSE FACTOR	LE L-4 ERSION FACTO SHELLFISH (MREM/HR P	<mark>RS FOR LIQUIE</mark> AGE GROUF ER μCi/ML)	D DISCHARGES P - CHILD			
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY		
I135	7.79E+00	2.06E+01	2.69E+03	3.27E+01	0.	2.30E+01	7.54E+00		
CS-134	8.14E+03	1.37E+04	0.	1.75E+03	1.52E+03	7.42E+01	2.92E+03		
CS-136	2.37E+02	9.34E+02	0.	5.20E+02	7.13E+01	1.06E+02	6.73E+02		
CS-137	1.13E+04	1.10E+04	0.	1.35E+03	1.29E+03	6.69E+01	1.64E+03		
CS-138	2.01E+00	. 3.96E+00	0.	2.92E+00	2.88E-01	1.69E-05	1.97E+00		
BA-139	2.65E+00	1.89E-03	0.	1.77E-03	1.07E-03	4.69E+00	7.75E-02		
BA-140	2.25E+03	1.98E+00	0.	2.37E-01	1.18E+00	1.15E+02	1.32E+02		
BA-141	0.	9.71E-04	0.	9.03E-04	5.51E-04	6.06E-10	4.34E-02		
BA-142	5.81E-01	5.98E-04	0.	5.05E-04	3.38E-04	0.	3.66E-02		
LA-140	2.16E+00	7.52E-01	0.	0.	0.	2.14E+04	2.54E-01		
LA-142	2.74E-02	1.24E-02	0.	0.	0.	9.09E+01	3.10E-03		
CE-141	4.67E+00	2.34E+00	0.	3.66E-01	0.	2.93E+03	3.48E-01		
CE-143	2.05E-01	1.52E+02	0.	6.69E-02	0.	5.67E+03	1.68E-02		
CE-144	2.66E+02	8.33E+01	0.	1.50E+01	0.	2.16E+04	1.42E+01		
PR-144	6.46E-03	2.67E-03	0.	1.51E-03	0.	9.26E-10	3.27E-04		
W187	3.03E+00	2.54E+00	0.	0.	0.	8.31E+02	8.90E-01		
NP-239	1.18E-02	1.16E-03	0.	3.58E-03	0.	2.36E+02	6.34E-04		

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C-200		ST. LU	CIE PLANT				
	· · · · · · · · · · · · · · · · · · ·	TADI	E C 4				
EFFLUE			LE G-1 IS IN AIR IN UN	IRESTRICTE	DAREAS		
			•••••••••••••••••••••••••••••••••••••••				
		NO	TE	<u></u> ,			
If a nucli	de is not listed b	pelow, refer to	10 CFR Part 20	, Appendix B,	Table 2		
Effluent	Concentrations	Column 1 and	use the most co	onservative E			
listed for	the nuclide.		······································				
Nuclide	ECL (µCi/ml)	Nuclide	ECL (µCi/ml)	Nuclide	ECL (µCi/ml)		
Ar-41	1 E-8	Co-57	9 E-10	Sb-124	3 E-10		
Kr-83m	5 E-5	Co-58	1 E-9	Sb-125	7 E-10		
Kr-85m	1 E-7	Fe-59	5 E-10	Te-125m	1 E-9		
Kr-85	(r-8 <mark>5 7 E-7 Co-60 5 E-11 Te-127m</mark>						
Kr-87	Kr-87 2 E-8 Zn-65 4 E-10 Te-129m						
Kr-88	9 E-9	Rb-86	1 E-9	I-130	3 E-9		
Kr-89	None	Rb-88	9 E-8	I-131	2 E-10		
Kr-90	None	Sr-89	2 E-10	I-132	2 E-8		
Xe-131m	2 E-6	Sr-90	6 E-12	I-133	1 E-9		
Xe-133m	6 E-7	Y-91	2 E-10	I-134	6 E-8		
Xe-133	5 E-7	Zr-95	4 E-10	l-135	6 E-9		
Xe-135m	4 E-8	Nb-95	2 E-9	Cs-134	2 E-10		
Xe-135	7 E-8	Ru-103	9 E-10	Cs-136	9 E-10		
Xe-137	None	Ru-106	2 E-11	Cs-137	2 E-10		
Xe-138	2 E-8	Ag-110	1 E-10	Ba-140	2 E-9		
H-3	1 E-7	Sn-113	8 E-10	La-140	2 E-9		
P-32	1 E-9	In-113m	2 E-7	Ce-141	8 E-10		
Cr.51	3 E-8	Sn-123	2 E-10	Ce-144	2 E-11		
01-01	1 F-9	Sn-126	8 E-11				

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C-200			ST. LUCIE PLANT							
	TABLE G-2 DOSE FACTORS FOR NOBLE GASES*									
RADIONUC	LIDE	TOTAL BODY DOSE FACTOR K _i (mrem/vr per µCi/m ³)	SKIN DOSE FACTOR L _i (mrem/vr per µCi/m ³)	GAMMA AIR DOSE FACTOR M _i (mrad/yr per μCi/m ³)	BETA AIR DOSE FACTOR N ₁ (mrad/yr per µCi/m ³)					
Kr-83m		7.56E-02**		1.93E+01	2.88E+02					
Kr-85m	<u></u>	1.17E+03	1.46E+03	1.23E+03	1.97E+03					
Kr-85		1.61E+01	1.34E+03	1.72E+01	1.95E+03					
Kr-87		5.92E+03	9.73E+03	6.17E+03	1.03E+04					
Kr-88		1.47E+04	2.37E+03	1.52E+04	2.93E+03					
Kr-89		1.66E+04	1.01E+04	1.73E+04	1.06E+04					
Kr-90		1.56E+04	7.29E+03	1.63E+04	7.83E+03					
Xe-131r	m	9.15E+01	4.76E+02	1.56E+02	1.11E+03					
Xe-133r	n	2.51E+02	9.94E+02	3.27E+02	1.48E+03					
Xe-133		2.94E+02	3.06E+02	3.53E+02	1.05E+03					
Xe-135r	n	3.12E+03	7.11E+02	3.36E+03	7.39E+02					
Xe-135		1.81E+03	1.86E+03	1.92E+03	2.46E+03					
Xe-137		1.42E+03	1.22E+04	1.51E+03	1.27E+04					
Xe-138		8.83E+03	4.13E+03	9.21E+03	4.75E+03					
Ar-41		8.84E+03	2.69E+03	9.30E+03	3.28E+03					

* The listed dose factors are for radionuclides that may be detected in gaseous effluents.

** 7.56E-02 = 7.56 X 10^{-2}

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C-200					
		TABLE	G-3	<u> </u>	
ENV	IRONMENTAL PATHWAY-DOSE CO	NVERSIO	N FACTORS P (I)	FOR GASEOUS DISCHARGE	S
	PATHWAY - GROUND PLA	NE DEPOS	ITION AGE	GROUP - INFANT	
	ORGAN DOSE FACTO	R (SQ. M	ETER - MREM/YR	PER μCi/Sec)	
	<u> </u>	·		1	
	NUC	LIDE	WHOLE BODY	-	
	H-3		0.	-	
	CR-	51	6.68E+06		
	MN-	54	1.10E+09	_	
	FE-	59	3.92E+08		
	CO-	57	1.64E+08		
	CO-	58	5.27E+08		
	CO-	60	4.40E+09]	
	ZN-	65	6.87E+08]	
	RB-	36	1.29E+07		
	SR-	39	3.07E+04		
	SR-	90	5.94E+05		
	Y-9'		1.53E+06		
	ZR-	95	6.94E+08	4	
	NB-	95	1.95E+08	1	
		103	1.57E+08		
	RU-	106	2.99E+08		
		140		4	

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E	NVIRONMENTAL PATHWAY PATHWAY - GRO ORGAN DOS	TAB -DOSE CONVERS OUND PLANE DEP SE FACTOR (SQ.	LE G-3 I <u>ON FACTORS P (I)</u> OSITION AGE METER - MREM/YR	<mark>FOR GASEOUS DISCH</mark> GROUP - INFANT PER μCi/Sec)	ARGES				
		NUCLIDE]					
		SN-126	4.80E+09	-					
		SB-124	8.42E+08	-					
		SB-125	7.56E+08						
		TE-125M	2.19E+06						
		TE-127M	1.15E+06						
		TE-129M	5.49E+07						
		I-130	7.90E+06						
		I-131	2.46E+07						
		I-132	1.78E+06						
		I-133	3.54E+06						
		I-134	6.43E+05						
		I-135	3.66E+06						
		CS-134	2.82E+09						
		CS-136	2.13E+08						
		CS-137	1.15E+09						
		BA-140	2.39E+08						
		CE-141	1.95E+07						
		CE-144	9.52E+07						

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	OFF	OFFSITE DOSE CALCULATION MANUAL (ODCM)							
C-200		ST. LUCIE PLANT							
<u>El</u> P	NVIRONMENTAL PATHWAY-I ATHWAY - GROUND PLANE ORGAN DOSE	TAB DOSE CONVERS DEPOSITION FACTOR (SQ.	LE G-4 I <u>ON FACTORS R (I)</u> AGE GROUP - CH METER - MREM/YR	<mark>FOR GASEOUS DISCHAR(</mark> IILD - TEEN-ADULT & INF/ PER μCi/Sec)	GES ANT				
	Г			1					
				-					
		C-14	0.	-					
		CR-51	4 68E+06	-					
		MN-54	1.38E+09						
		FE-59	2.75E+08	-					
	_	CO-57	1.89E+08	-					
		CO-58	3.80E+08	-					
		CO-60	2.15E+10	-					
		ZN-65	7.43E+08						
		RB-86	9.01E+06	-					
		SR-89	2.17E+04						
		SR-90	5.35E+06						
		Y-91	1.08E+06						
		ZR-95	5.01E+08						
		NB-95	1.36E+08						
		RU-103	1.10E+08						
		RU-106	4.19E+08						
		AG-110	3.58E+09						

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41	OFFSITE DOSE	CALCULATION MANUAL	(ODCM)	470 - (004					
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C-200		ST. LUCIE PLANT							
Ē	NVIRONMENTAL PATHWAY-DOSE CON PATHWAY - GROUND PLANE DEPOSITIO ORGAN DOSE FACTOR	TABLE G-4 VERSION FACTORS R (I) N AGE GROUP - C (SQ. METER - MREM/YF	FOR GASEOUS DISCHARGES HILD - TEEN-ADULT & INFANT R PER μCi/Sec)	3					
	NUCLIE	E WHOLE BODY	7						
	SN-126	5.16E+10	-						
	SB-124	5.98E+08	—						
	SB-125	2.30E+09							
	TE-125	M 1.55E+06	-						
	TE-127	M 8.79E+05							
	TE-129	M 3.85E+07	-						
	I-130	5.53E+06	_						
	I-131	1.72E+07							
	I-132	1.25E+06							
	I-133	2.48E+06							
	I-134	4.50E+05							
	I-135	2.56E+06							
	CS-134	6.99E+09							
	CS-136	1.49E+08							
	CS-137	1.03E+10							
	BA-140	1.68E+08							
	CE-141	1.37E+07							
	CE-144	1.13E+08							

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C-200			ST. LI	JCIE PLANT			
			TAB	LE G-5			
<u>ENVI</u>	RONMENTAL F	ATHWAY-DOS	SE CONVERSIC	ON FACTORS R	I)/P(I) FOR GAS	EOUS_DISCHA	RGES
		PATHWAY	- INHALATION	AGE GRO	UP - INFANT		
		ORGAN DOS	SE FACTOR	(MREM/YR PER	μCi/Cu Meter)		
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY
H-3	0.	4.30E+02	4.30E+02	1.88E+02	4.30E+02	4.30E+02	4.30E+02
C-14	5.04E+03	4.28E+03	4.28E+03	5.98E+02	4.28E+03	4.28E+03	4.28E+03
P-32	2.31E+05	1.35E+04	0.	0.	0.	1.51E+04	8.78E+03
CR-51	0.	0.	1.40E+01	3.99E+00	2.52E+03	5.81E+02	1.75E+01
MN-54	0.	6.93E+03	0.	1.72E+03	2.45E+05	1.35E+04	1.10E+03
FE-59	2.06E+03	4.86E+06	0.	0.	1.78E+05	3.29E+04	1.85E+03
CO-57	0.	1.21E+02	0.	0.	6.47E+04	5.50E+03	1.18E+02
CO-58	0.	1.18E+02	0.	0.	8.79E+05	1.21E+04	1.68E+02
CO-60	· 0.	8.40E+02	0.	0.	5.57E+06	3.28E+04	1.17E+03
ZN-65	5.67E+03	1.81E+04	0.	1.21E+04	1.53E+05	9.35E+03	8.15E+03
RB-86	0.	2.37E+04	0.	0.	0.	2.91E+03	1.03E+04
SR-89	4.31E+04	0.	0.	0.	2.31E+06	6.80E+04	1.24E+03
SR-90	1.32E+07	0.	0.	0.	1.53E+07	1.39E+05	8.06E+05
Y-91	5.98E+04	0.	0.	0.	2.63E+06	7.17E+04	1.60E+03
ZR-95	1.08E+04	2.73E+03	0.	9.48E+03	1.81E+06	1.41E+04	1.95E+03
NB-95	1.28E+03	5.75E+02	0.	1.35E+03	4.77E+05	1.21E+04	3.37E+02
RU-103	1.69E+02	0.	0.	1.02E+03	5.66E+05	1.58E+04	5.85E+01
RU-106	9.31E+03	0.	0.	2.34E+04	1.50E+07	1.76E+05	1.14E+03
AG-110	1.89E+03	1.75E+03	0.	3.44E+03	8.12E+05	5.29E+04	1.04E+03

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C-200		ST. LUCIE PLANT									
EN	TABLE G-5 <u>ENVIRONMENTAL PATHWAY-DOSE CONVERSION FACTORS R(I)/P(I) FOR GASEOUS DISCHARGES</u> PATHWAY - INHALATION AGE GROUP - INFANT										
	ORGAN DOSE FACTOR (MREM/YR PER μCi/Cu Meter)										
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY				
SN-123	3.11E+04	6.45E+02	6.45E+02	0.	3.61E+06	5.99E+04	1.02E+03				
SN-126	2.21E+05	5.85E+03	1.72E+03	0.	1.64E+06	2.23E+04	8.40E+03				
SB-124	5.46E+03	1.03E+02	1.32E+01	0.	4.34E+05	7.11E+04	2.17E+03				
SB-125	1.16E+04	1.25E+02	1.03E+01	0.	3.85E+05	1.76E+04	2.32E+03				
TE-125M	4.54E+02	1.95E+02	1.53E+02	2.17E+03	4.96E+05	1.36E+04	6.16E+01				
TE-127M	2.21E+03	9.83E+02	5.75E+02	8.01E+03	1.68E+05	2.62E+04	2.74E+02				
TE-129M	1.32E+03	5.80E+02	5.08E+02	6.40E+03	1.83E+06	7.32E+04	2.06E+02				
I-130	8.02E+02	2.35E+03	3.05E+05	3.65E+03	0.	1.35E+03	9.25E+02				
I-131	3.63E+04	4.27E+04	1.41E+07	1.07E+04	0.	1.07E+03	2.51E+04				
I-132	2.03E+02	5.70E+02	7.67E+04	9.09E+02	0.	7.11E+01	2.03E+02				
I-133	1.34E+04	1.93E+04	4.66E+06	4.55E+03	0.	2.28E+03	5.87E+03				
I-134	1.13E+02	3.02E+02	4.02E+04	4.82E+02	0.	1.76E-01	1.08E+02				
I-135	4.70E+02	1.22E+03	1.64E+05	1.95E+03	0.	9.18E+02	4.51E+02				
CS-134	4.80E+05	8.25E+05	0.	5.04E+04	1.01E+05	1.37E+03	7.32E+04				
CS-136	6.85E+03	2.56E+04	0.	1.50E+04	2.10E+03	2.04E+03	1.95E+04				
CS-137	6.86E+05	7.31E+05	0.	3.89E+04	9.45E+04	1.32E+03	4.41E+04				
BA-140	5.70E+03	4.27E+00	0.	2.93E+00	1.64E+06	3.88E+03	2.95E+02				
CE-141	2.52E+03	1.55E+03	0.	1.10E+03	5.24E+05	2.06E+04	1.81E+02				
CE-144	4.68E+05	1.82E+05	0.	1.48E+05	1.27E+07	1.61E+05	2.49E+04				

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PROCEDURE NO.: C-200		ST. LUCIE PLANT								
			- · · ·							
<u>ENV</u>	TABLE G-6 <u>ENVIRONMENTAL PATHWAY-DOSE CONVERSION FACTORS R(I)/P(I) FOR GASEOUS DISCHARGES</u> PATHWAY - COWS MILK (CONTAMINATED FORAGE) AGE GROUP - INFANT ORGAN DOSE FACTOR (SQ. METER - MREM/YR PER μi/Sec)									
	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY			
H-3	0.	2.37E+03	2.37E+03	1.04E+03	2.37E+03	2.37E+03	2.37E+03			
C-14	6.55E+05	6.55E+05	6.55E+05	7.55E+04	6.55E+05	6.55E+05	6.55E+05			
P-32	1.82E+10	1.14E+09	0.	0.	0.	2.05E+09	7.05E+08			
CR-51	0.	0.	1.82E+04	6.72E+03	4.04E+04	7.66E+06	3.05E+04			
MN-54	0.	8.96E+06	0.	2.67E+06	0.	2.74E+07	1.71E+06			
FE-59	3.17E+07	7.52E+07	0.	0.	2.09E+07	2.48E+08	2.86E+07			
CO-57	0.	1.36E+06	0.	0.	0.	3.46E+07	2.27E+06			
CO-58	0.	2.55E+07	0.	0.	0.	6.60E+07	6.24E+07			
CO-60	0.	8.73E+07	0.	0.	0.	2.16E+08	2.09E+08			
ZN-65	1.46E+09	4.65E+09	0.	3.11E+09	0.	2.93E+09	2.10E+09			
RB-86	0.	2.77E+09	0.	0.	0.	5.45E+08	1.29E+09			
SR-89	1.47E+10	0.	0.	0.	0.	2.75E+08	4.22E+08			
SR-90	1.65E+11	0.	0.	0.	0.	1.61E+09	4.21E+10			
Y-91	8.12E+04	0.	0.	0.	0.	5.37E+06	2.16E+03			
ZR-95	2.12E+05	9.41E+04	0.	1.86E+04	0.	7.47E+07	5.56E+04			
NB-95	5.49E+05	2.47E+05	0.	4.84E+04	0.	1.98E+08	1.45E+05			
RU-103	8.30E+03	0.	0.	4.16E+03	0.	1.04E+05	2.86E+03			
RU-106	2.01E+05	0.	0.	4.20E+04	0.	1.56E+06	2.46E+04			
AG-110	6.21E+07	5.75E+07	0.	1.13E+08	0.	2.35E+10	3.42E+07			

Note: The units for C-14 and H-3 are (MREM/YR Per $\mu\text{Ci/Cu}.$ Meter)

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C-200			ST. LL	JCIE PLANT			
			TAB	LE G-6			
<u>ENV</u>	IRONMENTAL I	PATHWAY-DOS	E CONVERSIO	N FACTORS R	I)/P(I) FOR GAS	EOUS DISCHA	RGES
)RGAN DOSE F	ACTOR (SQ	METER - MREM			
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY
SN-126	1.75E+09	3.48E+07	1.01E+07	0.	4.97E+06	1.16E+09	5.25E+07
SB-124	2.75E+07	5.19E+05	6.64E+04	0.	2.13E+07	7.78E+08	1.09E+07
SB-125	3.59E+07	3.27E+06	2.93E+06	3.96E+06	2.83E+09	2.43E+08	6.62E+06
TE-125M	1.57E+08	5.30E+07	5.18E+07	7.05E+07	0.	7.57E+07	2.10E+07
TE-127M	5.54E+07	1.93E+07	1.79E+07	2.00E+08	0.	3.24E+08	7.38E+06
TE-129M	5.87E+08	2.02E+08	2.21E+08	2.70E+08	0.	3.54E+08	8.95E+07
I-130	4.54E+05	1.35E+06	1.71E+08	2.09E+06	0.	1.15E+06	5.29E+05
I-131	2.59E+09	3.09E+09	9.94E+11	7.24E+08	0.	1.16E+08	1.81E+09
I-132	1.78E-01	4.76E-01	6.26E+01	7.58E-01	0.	8.93E-02	1.69E-01
I-133	3.75E+07	5.48E+07	1.30E+10	1.29E+07	0.	9.74E+06	1.66E+07
I-134	0.	0.	1.06E-09	0.	0.	0.	0.
I-135	1.49E+04	3.94E+04	5.15E+06	6.26E+04	8.07E-02	4.41E+04	1.44E+04
CS-134	4.43E+10	7.97E+10	0.	4.65E+09	9.12E+09	1.90E+08	6.75E+09
CS-136	2.78E+08	1.10E+09	0.	6.11E+08	8.37E+07	1.25E+08	7.90E+08
CS-137	6.44E+10	7.21E+10	0.	3.66E+09	8.69E+09	1.86E+08	4.14E+09
BA-140	2.45E+08	2.47E+05	0.	1.22E+04	1.51E+05	8.13E+06	1.27E+07
CE-141	2.65E+05	1.62E+05	0.	9.72E+03	0.	7.87E+07	1.90E+04
CE-144	2.10E+07	8.29E+06	0.	5.67E+05	0.	8.66E+08	1.13E+06

Note: The units for C-14 and H-3 are (MREM/YR Per $\mu \text{Ci}/\text{Cu}.$ Meter)

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C-200			ST. LU	JCIE PLANT							
ENV		ATHWAY-DOS	TABI	LE G-7 IN FACTORS R(I)/P(I) FOR GAS	EOUS DISCHA	RGES				
	PATHWAY - GOATS MILK (CONTAMINATED FORAGE) AGE GROUP - INFANT										
	O	RGAN DOSE F/	ACTOR (SQ.	METER - MREM	/YR PER µCi/Se	∋ C)					
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY				
H-3	0.	4.84E+03	4.84E+03	2.11E+03	4.84E+03	4.84E+03	4.84E+03				
C-14	6.55E+05	6.55E+05	6.55E+05	7.75E+04	6.55E+05	6.55E+05	6.55E+05				
P-32	2.19E+10	1.37E+09	0	0.	0.	2.46E+09	8.46E+08				
CR-51	0.	0.	2.19E+03	8.07E+02	4.85E+03	9.19E+05	3.66E+03				
MN-54	0.	1.08E+06	0.	3.20E+05	0.	3.29E+06	2.05E+05				
FE-59	4.12E+05	9.78E+05	0.	0.	2.72E+05	3.23E+06	3.72E+05				
CO-57	0.	1.64E+05	0.	0.	0	4.15E+06	2.72E+05				
CO-58	0.	3.06E+06	0	0.	0.	7.92E+06	7.49E+06				
CO-60	0.	1.05E+07	0	0.	0.	2.59E+07	2.51E+07				
ZN-65	1.76E+08	5.57E+08	0.	3.73E+08	0.	3.51E+08	2.52E+08				
RB-86	0.	3.32E+08	0	0.	0.	6.54E+07	1.55E+08				
SR-89	3.09E+10	0.	0.	0.	0.	5.77E+08	8.87E+08				
SR-90	3.46E+11	0.	0	0.	0.	3.35E+09	8.83E+10				
Y-91	9.74E+03	0.	0.	0.	0	6.45E+05	2.60E+02				
ZR-95	2.54E+04	1.13E+04	0.	2.23E+03	0.	8.95E+06	6.67E+03				
NB-95	6.59E+04	2.97E+04	0.	5.81E+03	0.	2.37E+07	1.75E+04				
RU-103	9.96E+02	0.	0.	4.99E+02	0.	1.24E+04	3.43E+02				
RU-106	2.41E+04	0.	0.	5.04E+03	0.	1.87E+05	2.96E+03				
AG-110	7.45E+06	6.90E+06	0.	1.36E+07	0.	2.81E+09	4.10E+06				

Note: The units for C-14 and H-3 are (MREM/YR Per $\mu\text{Ci/Cu}.$ Meter)

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C-200			ST. LU	JCIE PLANT						
ENI	TABLE G-7									
	PATHWAY	- GOATS MILK	(CONTAMINAT	ED FORAGE)	AGE GRO	JP - INFANT	<u>KGES</u>			
	ORGAN DOSE FACTOR (SQ. METER - MREM/YR PER µCi/Sec)									
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY			
SN-126	2.10E+08	4.17E+06	1.22E+06	0.	5.97E+05	1.40E+08	6.30E+06			
SB-124	3.30E+06	6.22E+04	7.97E+03	0.	2.56E+06	9.33E+07	1.30E+06			
SB-125	4.31E+06	3.92E+05	3.52E+05	4.76E+05	3.40E+08	2.92E+07	7.94E+05			
TE-125M	1.89E+07	6.36E+06	6.21E+06	8.46E+06	0.	9.09E+06	2.52E+06			
TE-127M	6.64E+06	2.31E+06	2.15E+06	2.40E+07	0.	3.88E+07	8.85E+05			
TE-129M	7.05E+07	2.42E+07	2.66E+07	3.23E+07	0.	4.25E+07	1.07E+07			
I-130	5.45E+05	1.61E+06	2.05E+08	2.51E+06	0.	1.38E+06	6.35E+05			
I-131	3.11E+09	3.70E+09	1.19E+12	9.28E+08	0.	1.39E+08	2.17E+09			
I-132	2.13E-01	5.71E-01	7.51E+01	9.10E-01	0.	1.07E-01	2.03E-01			
I-133	4.50E+07	6.57E+07	1.55E+10	1.55E+07	0.	1.17E+07	1.99E+07			
I-134	0.	0.	1.27E-09	0.	0.	0.	0.			
I-135	1.79E+04	4.72E+04	6.18E+06	7.51E+04	2.42E-01	5.29E+04	1.73E+04			
CS-134	1.33E+11	2.39E+11	0.	1.39E+10	2.74E+10	5.69E+08	2.02E+10			
CS-136	8.34E+08	3.29E+09	0.	1.83E+09	2.51E+08	3.74E+08	2.37E+09			
CS-137	1.93E+11	2.16E+11	0.	1.10E+10	2.61E+10	5.59E+08	1.24E+10			
BA-140	2.95E+07	2.96E+04	0.	1.47E+03	1.81E+04	9.76E+05	1.52E+06			
CE-141	3.17E+04	1.95E+04	0.	1.17E+03	0.	9.44+06	2.28E+03			
CE-144	2.52E+06	9.95E+05	0.	6.80E+04	0.	1.04E+08	1.36E+05			

Note: The units for C-14 and H-3 are (MREM/YR Per μ Ci/Cu. Meter)

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C-200		ST. LUCIE PLANT								
		<u> </u>								
				LE G-8						
ENVIRONMENTAL PATHWAT-DOSE CONVERSION FACTORS R(1) FOR GASEOUS DISCHARGES PATHWAY - INHALATION AGE GROUP - CHILD										
			FACTOR (N							
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY			
H3	0.	7.51E+02	7.51E+02	4.96E+02	7.51E+02	7.51E+02	7.51E+02			
C-14	6.25E+03	6.25E+03	6.25E+03	1.58E+03	6.25E+03	6.25E+03	6.25E+03			
P32	6.11E+05	3.57E+04	0.	0.	0.	4.00E+04	2.32E+04			
CR51	0.	0.	2.75E+01	1.06E+01	6.66E+03	1.54E+03	4.63E+01			
MN54	0.	1.83E+04	0.	4.55E+03	6.48E+05	3.58E+04	2.91E+03			
FE59	5.44E+03	1.28E+07	0.	0.	4.70E+05	8.70E+04	4.88E+03			
CO57	0.	3.20E+02	0.	0.	1.71E+05	1.45E+04	3.10E+02			
CO58	0.	1.52E+02	0.	0.	1.13E+06	3.62E+04	2.68E+02			
CO60	0.	1.07E+03	0.	0.	6.92E+06	9.36E+04	1.88E+03			
ZN65	1.50E+04	4.77E+04	0.	3.19E+04	4.03E+05	2.47E+04	2.15E+04			
RB86	0.	6.25E+04	0.	0.	0.	7.70E+03	2.73E+04			
SR89	5.37E+04	0.	0.	0.	2.24E+06	1.69E+05	1.54E+03			
SR90	1.64E+07	0.	0.	0.	1.48E+07	3.45E+05	9.99E+05			
Y91	7.44E+04	0.	0.	0.	2.55E+06	1.78E+05	1.98E+03			
ZR95	1.41E+04	3.28E+03	0.	2.51E+04	2.12E+06	5.74E+04	2.98E+03			
NB95	1.70E+03	7.25E+02	0.	3.58E+03	5.85E+05	3.32E+04	5.33E+02			
RU-103	2.16E+02	0.	0.	2.70E+03	6.33E+05	4.22E+04	8.73E+01			
RU-106	1.15E+04	0.	0.	6.18E+04	1.45E+07	4.37E+05	1.44E+03			
AG110	5.00E+03	4.63E+03	0.	9.10E+03	2.15E+06	1.40E+05	2.75E+03			

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REVISION NO .:	VISION NO.: PROCEDURE TITLE:							
41	4	OFFSI	TE DOSE CALC	ULATION MANU	JAL (ODCM)		180 of 231	
PROCEDURE NO.:								
C-200			ST. LL	JCIE PLANT				
			TAB	E G-8			N. N. A.	
EN		L PATHWAY-DO		ION FACTORS	R(I) FOR GASE	OUS DISCHAR	GES	
		PATHWAY -	INHALATION	AGE GF	ROUP - CHILD			
		ORGAN DOSE	E FACTOR (N	IREM/YR PER μ	Ci/CU. METER)			
			`		,			
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY	
SN-123	3.85E+04	6.44E+02	6.81E+02	0.	3.50E+06	1.49E+05	1.27E+03	
SN-126	5.85E+05	1.55E+04	4.55E+03	0.	4.33E+06	5.88E+04	2.22E+04	
SB-124	1.44E+04	2.72E+02	3.49E+01	0.	1.15E+06	1.88E+05	5.74E+03	
SB-125	3.06E+04	3.30E+02	2.72E+01	0.	1.02E+06	4.66E+04	6.14E+03	
TE 125M	5.62E+02	1.94E+02	1.61E+02	5.74E+03	4.81E+05	3.38E+04	7.62E+01	
TE 127M	5.85E+03	2.60E+03	1.52E+03	2.12E+04	4.44E+05	6.92E+04	7.25E+02	
TE 129M	1.64E+03	5.85E+02	5.40E+02	1.69E+04	1.80E+06	1.82E+05	2.60E+02	
I130	2.12E+03	6.22E+03	8.07E+05	9.66E+03	0.	3.56E+03	2.45E+03	
I131	4.55E+04	4.63E+04	1.54E+07	2.84E+04	0.	2.65E+03	3.50E+04	
I132	5.37E+02	1.51E+03	2.03E+05	2.40E+03	0.	1.88E+02	5.37E+02	
I133	1.68E+04	2.05E+04	5.03E+06	1.20E+04	0.	5.55E+03	8.03E+03	
I134	2.98E+02	7.99E+02	1.06E+05	1.27E+03	0.	4.66E-01	2.85E+02	
I135	1.24E+03	3.23E+03	4.33E+05	5.14E+03	0.	2.43E+03	1.19E+03	
CS-134	6.22E+05	9.95E+05	0.	1.33E+05	1.19E+05	3.77E+03	2.23E+05	
CS-136	1.81E+04	6.77E+04	0.	3.96E+04	5.55E+03	5.40E+03	5.14E+04	
CS-137	8.66E+05	7.99E+05	0.	1.03E+05	1.00E+05	3.41E+03	1.25E+05	
BA-140	7.14E+03	4.66E+00	0.	7.73E+00	1.74E+06	9.92E+03	4.22E+02	
CE-141	3.13E+03	1.57E+03	0.	2.90E+03	5.14E+05	5.44E+04	2.33E+02	
CE-144	5.81E+05	1.82E+05	0.	3.92E+05	1.23E+07	4.00E+05	3.10E+04	

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41	4	OFFSIT	TE DOSE CALC	ULATION MANU	AL (ODCM)		181 of 231				
РКОСЕДИКЕ NO.: C-200			ST. LU	JCIE PLANT							
<u>EN</u>	TABLE G-9 ENVIRONMENTAL PATHWAY-DOSE CONVERSION FACTORS R(I) FOR GASEOUS DISCHARGES PATHWAY - COWS MILK (CONTAMINATED FORAGE) AGE GROUP - CHILD ORGAN DOSE FACTOR (SQ. METER-MREM/YR PER µCI/SEC)										
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY				
H3	0.	1.57E+03	1.57E+03	1.04E+03	1.57E+03	1.57E+03	1.57E+03				
C-14	3.08E+05	3.08E+05	3.08E+05	7.75E+04	3.08E+05	3.08E+05	3.08E+05				
P32	1.82E+10	1.14E+09	0.	0.	0.	2.05E+09	7.05E+08				
CR51	0.	0.	1.82E+04	6.72E+03	4.04E+04	7.66E+06	3.05E+04				
MN54	0.	8.96E+06	0.	2.67E+06	0.	2.74E+07	1.71E+06				
FE59	3.17E+07	7.52E+07	0.	0.	2.09E+07	2.48E+08	2.86E+07				
CO57	0.	1.36E+06	0.	0.	0.	3.46E+07	2.27E+06				
CO58	0.	1.25E+07	0.	0.	0.	7.41E+07	3.76E+07				
CO60	0.	4.22E+07	0.	0.	0.	2.33E+08	1.27E+08				
ZN65	1.46E+09	4.65E+09	0.	3.11E+09	0.	2.93E+09	2.10E+09				
RB86	0.	2.77E+09	0.	0.	0.	5.45E+08	1.29E+09				
SR89	6.92E+09	0.	0.	0.	0.	2.58E+08	1.98E+08				
SR90	1.13E+11	0.	0.	0.	0.	1.52E+09	2.87E+10				
Y91	3.80E+04	0.	0.	0.	0.	5.05E+06	1.01E+03				
ZR95	1.06E+05	4.47E+04	0.	1.86E+04	0.	7.68E+07	3.29E+04				
NB95	2.75E+05	1.18E+05	0.	4.84E+04	0.	2.03E+08	8.63E+04				
RU-103	3.99E+03	0.	0.	4.16E+03	0.	1.05E+05	1.61E+03				
RU-106	9.39E+04	0.	0.	4.20E+04	0.	1.46E+06	1.17E+04				
AG110	6.21E+07	5.75E+07	0.	1.13E+08	0.	2.35E+10	3.42E+07				

Note - the units for C---14 and H----3 are (mrem/yr per $\mu Ci/cu.$ meter)

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41	1	OFFSIT	E DOSE CALCI	JLATION MANU	AL (ODCM)		182 of 231					
PROCEDURE NO .:												
C-200			ST. LU	CIE PLANT								
			TADI	<u> </u>			$\overline{\langle \cdot \rangle / }$					
en'	VIRONMENTAL	PATHWAY-DC		ON FACTORS F	RIII) FOR GASEC	OUS DISCHARG	SES					
	PATHWAY	- COWS MILK (CONTAMINATE	D FORAGE)	AGE GRC	OUP - CHILD						
	ORGAN DOSE FACTOR (SQ. METER-MREM/YR PER µCI/SEC)											
		r		.		, 	r					
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY					
SN-123	0.	0.	0.	0.	0.	0.	0.					
SN-126	1.75E+09	3.48E+07	1.01E+07	0.	4.97E+06	1.16E+09	5.25E+07					
SB-124	2.75E+07	5.19E+05	6.64E+04	0.	2.13E+07	7.78E+08	1.09E+07					
SB-125	3.13E+07	1.41E+06	1.18E+06	3.96E+06	2.83E+09	2.43E+08	5.99E+06					
TE 125M	7.38E+07	2.00E+07	2.07E+07	7.05E+07	0.	7.12E+07	9.84E+06					
TE 127M	5.18E+07	1.78E+07	1.46E+07	2.00E+08	0.	2.99E+08	6.60E+06					
TE 129M	2.77E+08	7.73E+07	8.85E+07	2.70E+08	0.	3.33E+08	4.28E+07					
I130	4.54E+05	1.35E+06	1.71E+08	2.09E+06	0.	1.15E+06	5.29E+05					
I131	1.24E+09	1.27E+09	4.12E+11	7.74E+08	0.	1.09E+08	9.56E+08					
I132	1.78E-01	4.76E-01	6.26E+01	7.58E-01	0.	8.93E-02	1.69E-01					
I133	1.78E+07	2.20E+07	5.30E+09	1.29E+07	0.	8.90E+06	8.63E+06					
I134	0.	0.	1.06E-09	0.	0.	0.	0.					
I135	1.49E+04	3.94E+04	5.15E+06	6.26E+04	8.07E-02	4.41E+04	1.44E+04					
CS-134	2.17E+10	3.65E+10	0.	4.65E+09	4.06E+09	1.97E+08	7.76E+09					
CS-136	2.78E+08	1.10E+09	0.	6.11E+08	8.37E+07	1.25E+08	7.90E+08					
CS-137	3.08E+10	2.98E+10	0.	3.66E+09	3.49E+09	1.81E+08	4.44E+09					
BA-140	1.17E+08	1.02E+05	0.	1.22E+04	6.09E+04	7.75E+06	6.84E+06					
CE-141	1.24E+05	6.22E+04	0.	9.72E+03	0.	7.80E+07	9.26E+03					
CE-144	1.00E+07	3.14E+06	0.	5.67E+05	0.	8.15E+08	5.34E+05					

Note - the units for C---14 and H----3 are (mrem/yr per $\mu\text{Ci/cu.}$ meter)

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41 PROCEDURE NO.:	ł	OFFSI	TE DOSE CALC	ULATION MANU	JAL (ODCM)		183 of 231				
C-200			ST. LU	JCIE PLANT							
<u>EN</u>	TABLE G-10 ENVIRONMENTAL PATHWAY-DOSE CONVERSION FACTORS R(I) FOR GASEOUS DISCHARGES PATHWAY - GOATS MILK (CONTAMINATED FORAGE) AGE GROUP - CHILD ORGAN DOSE FACTOR (SQ. METER-MREM/YR PER µCI/SEC)										
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY				
H3	0.	3.20E+03	3.20E+03	2.11E+03	3.20E+03	3.20E+03	3.20E+03				
C-14	3.08E+05	3.08E+05	3.08E+05	7.75E+04	3.08E+05	3.08E+05	3.08E+05				
P32	2.19E+10	1.37E+09	0.	0.	0.	2.46E+09	8.46E+08				
CR51	0.	0.	2.19E+03	8.07E+02	4.85E+03	9.19E+05	3.66E+03				
MN54	0.	1.08E+06	0.	3.20E+05	0.	3.29E+06	2.05E+05				
FE59	4.12E+05	9.78E+05	0.	0.	2.72E+05	3.23E+06	3.72E+05				
CO57	0.	1.64E+05	0.	0.	0.	4.15E+06	2.72E+05				
CO58	0.	1.50E+06	0.	0.	0.	8.90E+06	4.51E+06				
CO60	0.	5.06E+06	0.	0.	0.	2.80E+07	1.52E+07				
ZN65	1.76E+08	5.57E+08	0.	3.73E+08	0.	3.51E+08	2.52E+08				
RB86	0.	3.32E+08	0.	0.	0.	6.54E+07	1.55E+08				
SR89	1.45E+10	0.	0.	0.	0.	5.43E+08	4.16E+08				
SR90	2.37E+11	0.	0.	0.	0.	3.16E+09	6.02E+10				
Y91	4.56E+03	0.	0.	0.	0.	6.06E+05	1.22E+02				
ZR95	1.27E+04	5.37E+03	0.	2.23E+03	0.	9.22E+06	3.96E+03				
NB95	3.30E+04	1.41E+04	0.	5.81E+03	0.	2.44E+07	1.04E+04				
RU-103	4.79E+02	0.	0.	4.99E+02	0.	1.26E+04	1.94E+02				
RU-106	1.13E+04	0.	0.	5.04E+03	0.	1.75E+05	1.40E+03				
AG110	7.45E+06	6.90E+06	0.	1.36E+07	0.	2.81E+09	4.10E+06				

Note - the units for C---14 and H----3 are (mrem/yr per µCi/cu. meter)

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41	4	OFFSI	TE DOSE CALC	ULATION MANU	JAL (ODCM)		184 of 231				
C-200			ST. LU	JCIE PLANT							
<u>EN</u>	TABLE G-10 ENVIRONMENTAL PATHWAY-DOSE CONVERSION FACTORS R(I) FOR GASEOUS DISCHARGES PATHWAY - GOATS MILK (CONTAMINATED FORAGE) AGE GROUP - CHILD ORGAN DOSE FACTOR (SQ. METER-MREM/YR PER µCI/SEC)										
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY				
SN-123	0.	0.	0.	0.	0.	0.	0.				
SN-126	2.10E+08	4.17E+06	1.22E+06	0.	5.97E+05	1.40E+08	6.30E+06				
SB-124	3.30E+06	6.22E+04	7.97E+03	0.	2.56E+06	9.33E+07	1.30E+06				
SB-125	3.75E+06	1.70E+05	1.43E+05	4.76E+05	3.40E+08	2.92E+07	7.19E+05				
TE 125M	8.85E+06	2.40E+06	2.49E+06	8.46E+06	0.	8.54E+06	1.18E+06				
TE 127M	6.21E+06	2.14E+06	1.75E+06	2.40E+07	0.	3.58E+07	7.92E+05				
TE 129M	3.32E+07	9.27E+06	1.06E+07	3.23E+07	0.	4.00E+07	5.15E+06				
I130	5.45E+05	1.61E+06	2.05E+08	2.51E+06	0.	1.38E+06	6.35E+05				
I131	1.48E+09	1.52E+09	4.94E+11	9.28E+08	0.	1.30E+08	1.15E+09				
I132	2.13E-01	5.71E-01	7.51E+01	9.10E-01	0.	1.07E-01	2.03E-01				
I133	2.14E+07	2.64E+07	6.36E+09	1.55E+07	0.	1.07E+07	1.04E+07				
I134	0.	0.	1.27E-09	0.	0.	0.	0.				
I135	1.79E+04	4.72E+04	6.18E+06	7.51E+04	2.42E-01	5.29E+04	1.73E+04				
CS-134	6.50E+10	1.10E+11	0.	1.39E+10	1.22E+10	5.92E+08	2.33E+10				
CS-136	8.34E+08	3.29E+09	0.	1.83E+09	2.51E+08	3.74E+08	2.37E+09				
CS-137	9.23E+10	8.93E+10	0.	1.10E+10	1.05E+10	5.44E+08	1.33E+10				
BA-140	1.40E+07	1.23E+04	0.	1.47E+03	7.31E+03	9.30E+05	8.21E+05				
CE-141	1.49E+04	7.46E+03	0.	1.17E+03	0.	9.36E+06	1.11E+03				
CE-144	1.20E+06	3.76E+05	0.	6.80E+04	0.	9.78E+07	6.41E+04				

Note - the units for C---14 and H----3 are (mrem/yr per $\mu \text{Ci/cu.}$ meter)

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	4	OFFSIT	E DOSE CALC	ULATION MANU	AL (ODCM)		185 of 231					
C-200			ST. LU	ICIE PLANT								
<u>13</u>	TABLE G-11 ENVIRONMENTAL PATHWAY-DOSE CONVERSION FACTORS R(I) FOR GASEOUS DISCHARGES PATHWAY - MEAT (CONTAMINATED FORAGE) AGE GROUP - CHILD ORGAN DOSE FACTOR (SQ. METER-MREM/YR PER µCI/SEC)											
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY					
H3	0.	2.33E+02	2.33E+02	1.54E+02	2.33E+02	2.33E+02	2.33E+02					
C-14	9.87E+04	9.87E+04	9.87E+04	2.49E+04	9.87E+04	9.87E+04	9.87E+04					
P32	1.74E+09	1.09E+08	0.	0.	0.	1.96E+08	6.73E+07					
CR51	0.	0.	1.58E+03	5.82E+02	3.50E+03	6.63E+05	2.64E+03					
MN54	0.	3.42E+06	0.	1.02E+06	0.	1.05E+07	6.54E+05					
FE59	9.95E+07	2.36E+08	0.	0.	6.55E+07	7.79E+08	8.98E+07					
CO57	0.	2.10E+06	0.	0.	0.	5.33E+07	3.50E+06					
CO58	0.	1.69E+07	0.	0.	0.	1.00E+08	5.10E+07					
CO60	0.	6.77E+07	0.	0.	0.	3.75E+08	2.03E+08					
ZN65	1.33E+08	4.22E+08	0.	2.82E+08	0.	2.66E+08	1.91E+08					
RB86	0.	1.82E+08	0.	0.	0.	3.59E+07	8.50E+07					
SR89	5.04E+08	0.	0.	0.	0.	1.88E+07	1.44E+07					
SR90	1.05E+10	0.	0.	0.	0.	7.02E+08	2.67E+09					
Y91	1.76E+06	0.	0.	0.	0.	2.33E+08	4.69E+04					
ZR95	4.62E+06	1.51E+06	0.	7.47E+05	0.	2.22E+09	1.20E+06					
NB95	2.68E+06	1.15E+06	0.	4.72E+05	0.	1.98E+09	8.41E+05					
RU-103	1.45E+08	0.	0.	1.51E+08	0.	3.81E+09	5.87E+07					
RU-106	4.51E+09	0.	0.	2.02E+09	0.	7.01E+10	5.61E+08					
AG110	2.50E+06	2.31E+06	0.	4.55E+06	0.	9.44E+08	1.38E+06					

Note - the units for C---14 and H----3 are (mrem/yr per μ Ci/cu. meter)

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41	_	OFFSI	TE DOSE CALC	ULATION MANL	JAL (ODC M)		186 of 231						
PROCEDURE NO.:													
C-200			ST. LU										
EN	TABLE G-11 ENVIRONMENTAL PATHWAY-DOSE CONVERSION FACTORS R(I) FOR GASEOUS DISCHARGES PATHWAY - MEAT (CONTAMINATED FORAGE) AGE GROUP - CHILD ORGAN DOSE FACTOR (SQ. METER-MREM/YR PER µCI/SEC)												
	0					0)							
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY						
SN-123	0.	0.	0.	0.	0.	0.	0.						
SN-126	6.92E+09	1.37E+08	4.02E+07	0.	2.41E+06	2.31E+09	1.98E+08						
SB-124	7.40E+06	1.40E+05	1.79E+04	0.	5.74E+06	2.10E+08	2.93E+06						
SB-125	7.66E+07	1.84E+07	1.90E+07	6.47E+07	9.26E+08	1.44E+08	1.08E+07						
TE 125M	5.69E+08	1.54E+08	1.60E+08	5.44E+08	0.	5.49E+08	7.59E+07						
TE 127M	4.40E+08	1.51E+08	1.24E+08	1.70E+09	0.	2.54E+09	5.61E+07						
TE 129M	1.84E+09	5.12E+08	5.87E+08	1.78E+09	0.	2.21E+09	2.84E+08						
I130	8.87E-07	2.63E-06	3.34E-04	4.08E-06	0.	2.25E-06	1.03E-06						
I131	1.58E+07	1.62E+07	5.25E+09	9.86E+06	0.	1.38E+06	1.22E+07						
I132	0.	0.	0.	0.	0.	0.	0.						
I133	6.86E-01	8.47E-01	2.04E+02	4.97E-01	0.	3.43E-01	3.33E-01						
I134	0.	0.	0.	0.	0.	0.	0.						
I135	3.21E-02	2.96E-02	0.	1.12E-02	3.37E-03	6.92E-04	1.32E-02						
CS-134	8.83E+08	1.49E+09	0.	1.89E+08	1.65E+08	8.04E+06	3.16E+08						
CS-136	4.41E+06	1.74E+07	0.	9.69E+06	1.33E+06	1.98E+06	1.25E+07						
CS-137	1.27E+09	1.23E+09	0.	1.51E+08	1.44E+08	7.50E+06	1.84E+08						
BA-140	4.37E+07	3.84E+04	0.	4.59E+03	2.29E+04	6.03E+06	2.57E+06						
CE-141	2.10E+04	1.05E+04	0.	1.65E+03	0.	1.32E+07	1.57E+03						
CE-144	2.38E+06	7.46E+05	0.	1.35E+05	0.	1.94E+08	1.27E+05						

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41	-	OFFSIT	FE DOSE CALC	ULATION MANU	AL (ODCM)		187 of 231				
C-200			ST. LU	ICIE PLANT							
EN	IVIRONMENTAL	<u>- PATHWAY-D(</u>	TABL DSE CONVERSI UITS AND VEGI	E G-12 ION FACTORS F ETABLES	R(I) FOR GASE	<u>OUS DISCHAR(</u> P - CHILD	<u>JES</u>				
ORGAN DOSE FACTOR (SQ. METER-MREM/YR PER µCI/SEC)											
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY				
H3	0.	2.47E+02	2.47E+02	1.63E+02	2.47E+02	2.47E+02	2.47E+02				
C-14	4.04E+04	4.04E+04	4.04E+04	1.02E+04	4.04E+04	4.04E+04	4.04E+04				
P32	4.22E+08	2.64E+07	0.	0.	0.	4.74E+07	1.63E+07				
CR51	0.	0.	4.68E+03	1.73E+03	1.04E+04	1.97E+06	7.83E+03				
MN54	0.	1.98E+07	0.	5.89E+06	0.	6.07E+07	3.78E+06				
FE59	1.48E+07	3.51E+07	0	0.	9.75E+06	1.16E+08	1.34E+07				
CO57	0.	7.53E+05	0.	0.	0	1.91E+07	1.25E+06				
CO58	0.	6.94E+06	0	0.	0.	4.13E+07	2.09E+07				
CO60	0.	2.33E+07	0	0.	0.	1.29E+08	6.98E+07				
ZN65	2.08E+07	6.59E+07	0.	4.41E+07	0	4.15E+07	2.98E+07				
RB86	0.	5.28E+07	0.	0.	0	1.04E+07	2.46E+07				
SR89	4.84E+09	0.	0.	0.	0	1.81E+08	1.39E+08				
SR90	7.79E+10	0.	0.	0.	0.	1.52E+09	1.98E+10				
Y91	2.12E+06	0.	0.	0.	0.	2.82E+08	5.65E+04				
ZR95	4.06E+05	9.87E+04	0.	6.07E+04	0.	1.08E+08	8.81E+04				
NB95	6.20E+04	2.64E+04	0.	1.09E+04	0.	4.58E+07	1.94E+04				
RU-103	2.24E+06	0.	0.	2.34E+06	0.	5.88E+07	9.05E+05				
RU-106	5.19E+07	0.	0.	2.32E+07	0.	8.07E+08	6.46E+06				
AG110	6.87E+05	6.36E+05	0.	1.25E+06	0.	2.59E+08	3.78E+05				

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41	-	OFFSI	TE DOSE CALC	ULATION MANU	JAL (ODCM)		188 of 231						
C-200			ST. LL	JCIE PLANT									
EN		PATHWAY-D	TABL OSE CONVERS	.E G-12 ION FACTORS	R(I) FOR GASE		GES						
 I	PATHWAY - FRESH FRUITS AND VEGETABLES AGE GROUP - CHILD												
4	0	RGAN DOSE F	ACTOR (SQ.	METER-MREM/	YR PER µCl/SE	C)							
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY						
SN-123	1.71E-05	2.14E-07	2.26E-07	0.	0.	8.50E-06	4.21E-07						
SN-126	3.87E+08	7.68E+06	2.25E+06	0.	1.75E+06	3.44E+08	1.19E+07						
SB-124	1.02E+07	1.93E+05	2.47E+04	0.	7.93E+06	2.89E+08	4.04E+06						
SB-125	1.22E+07	6.99E+05	6.22E+05	2.09E+06	1.04E+09	9.02E+07	2.29E+06						
TE 125M	4.12E+07	1.12E+07	1.16E+07	3.94E+07	0.	3.97E+07	5.49E+06						
TE 127M	2.88E+07	9.90E+06	8.09E+06	1.11E+08	0.	1.65E+08	3.67E+06						
TE 129M	1.56E+08	4.35E+07	4.99E+07	1.51E+08	0.	1.88E+08	2.41E+07						
I130	1.60E+05	4.73E+05	6.02E+07	7.35E+05	0.	4.05E+05	1.86E+05						
I131	1.24E+08	1.27E+08	4.13E+10	7.75E+07	0.	1.09E+07	9.58E+07						
I132	2.26E+01	6.05E+01	7.97E+03	9.65E+01	0.	1.14E+01	2.15E+01						
I133	3.61E+06	4.46E+06	1.08E+09	2.62E+06	0.	1.81E+06	1.75E+06						
I134	4.18E-05	1.14E-04	1.47E-02	1.81E-04	0.	9.89E-08	4.06E-05						
I135	1.64E+04	4.33E+04	5.67E+06	6.89E+04	3.51E-03	4.85E+04	1.59E+04						
CS-134	9.97E+08	1.68E+09	0.	2.14E+08	1.87E+08	9.08E+06	3.57E+08						
CS-136	1.35E+07	5.32E+07	0.	2.96E+07	4.06E+06	6.05E+06	3.83E+07						
CS-137	1.41E+09	1.37E+09	0.	1.68E+08	1.60E+08	8.34E+06	2.04E+08						
BA-140	1.70E+08	1.56E+05	0.	1.78E+04	8.87E+04	2.08E+08	9.96E+06						
CE-141	1.17E+05	5.84E+04	0.	9.13E+03	0.	7.33E+07	8.69E+03						
CE-144	9.23E+06	2.89E+06	0.	5.22E+05	0.	7.51E+08	4.92E+05						

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41 PROCEDURE NO.:	-	OFFSI	TE DOSE CALC	ULATION MANU	JAL (ODCM)		189 of 231					
C-200			ST. LU	JCIE PLANT								
E	TABLE G-13 ENVIRONMENTAL PATHWAY-DOSE CONVERSION FACTORS R(I) FOR GASEOUS DISCHARGES PATHWAY - INHALATION AGE GROUP - TEENAGER ORGAN DOSE FACTOR (MREM/YR PER µCI/CU. METER)											
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY					
H3	0.	8.48E+02	8.48E+02	1.07E+03	8.48E+02	8.48E+02	8.48E+02					
C-14	4.58E+03	4.53E+03	4.53E+03	3.42E+03	4.53E+03	4.58E+03	4.53E+03					
P32	1.32E+06	7.72E+04	0.	0.	0.	8.64E+04	5.02E+04					
CR51	0.	0.	5.95E+01	2.28E+01	1.44E+04	3.32E+03	1.00E+02					
MN54	0.	3.96E+04	0.	9.84E+03	1.40E+06	7.74E+04	6.30E+03					
FE59	1.18E+04	2.78E+07	0.	0.	1.02E+06	1.88E+05	1.06E+04					
CO57	0.	6.92E+02	0.	0.	3.70E+05	3.14E+04	6.71E+02					
CO58	0.	1.76E+02	0.	- 0.	1.37E+06	9.52E+04	2.34E+02					
CO60	0.	1.24E+03	0.	0.	8.56E+06	2.35E+05	1.65E+03					
ZN65	3.24E+04	1.03E+05	0.	6.90E+04	8.72E+05	5.34E+04	4.66E+04					
RB86	0.	1.35E+05	0.	0.	0. ·	1.66E+04	5.90E+04					
SR89	3.87E+04	0.	0.	0.	2.50E+06	3.54E+05	1.11E+03					
SR90	1.18E+07	0.	0.	0.	1.66E+07	7.24E+05	7.23E+05					
Y91	5.38E+04	0.	0.	0.	2.86E+06	3.74E+05	1.44E+03					
ZR95	1.09E+04	3.63E+03	0.	5.42E+04	2.56E+06	1.33E+05	2.54E+03					
NB95	1.36E+03	8.24E+02	0.	7.74E+03	7.17E+05	8.80E+04	4.62E+02					
RU-103	1.63E+02	0.	0.	5.83E+03	7.51E+05	9.44E+04	7.32E+01					
RU-106	8.40E+03	0.	0.	1.34E+05	1.64E+07	9.28E+05	1.06E+03					
AG110	1.08E+04	1.00E+04	0.	1.97E+04	4.64E+06	3.02E+05	5.94E+03					

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	41	4	OFFSI	TE DOSE CALC	ULATION MANU	JAL (ODCM)		190 of 231				
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	C-200			51. LU	JCIE PLANT		·					
				TABL	.E G-13							
	<u>EN</u>	<u>IVIRONMENTAI</u>	<u>L PATHWAY-DO</u>	DSE CONVERS	ION FACTORS	R(I) FOR GASE	DUS DISCHAR	<u>GES</u>				
			PATHWAY - IN	HALATION	AGE GRO	UP - TEENAGE	र					
	ORGAN DOSE FACTOR (MREM/YR PER μ CI/CU. METER)											
	NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY				
	SN-123	2.79E+04	6.14E+02	4.92E+02	0.	3.91E+06	3.13E+05	9.20E+02				
	SN-126	1.26E+06	3.34E+04	9.84E+03	0.	9.36E+06	1.27E+05	4.80E+04				
	SB-124	3.12E+04	5.89E+02	7.55E+01	0.	2.48E+06	4.06E+05	1.24E+04				
	SB-125	6.61E+04	7.13E+02	5.87E+01	0.	2.20E+06	1.01E+05	1.33E+04				
	TE 125M	4.07E+02	1.86E+02	1.17E+02	1.24E+04	5.36E+05	7.08E+04	5.53E+01				
	TE 127M	1.26E+04	5.62E+03	3.29E+03	4.58E+04	9.60E+05	1.50E+05	1.57E+03				
	TE 129M	1.19E+03	5.64E+02	3.90E+02	3.66E+04	2.03E+06	3.84E+05	1.92E+02				
	I130	4.58E+03	1.34E+04	1.74E+06	2.09E+04	0.	7.69E+03	5.29E+03				
	I131	3.37E+04	4.72E+04	1.39E+07	6.14E+04	0.	5.96E+03	2.82E+04				
	I132	1.16E+03	3.26E+03	4.38E+05	5.19E+03	0.	4.06E+02	1.16E+03				
	I133	1.23E+04	2.06E+04	3.83E+06	2.60E+04	0.	1.00E+04	6.34E+03				
	I134	6.45E+02	1.73E+03	2.30E+05	2.75E+03	0.	1.01E+00	6.16E+02				
	I135	2.69E+03	6.99E+03	9.36E+05	1.11E+04	0.	5.25E+03	2.58E+03				
	CS-134	4.83E+05	1.10E+06	0.	2.88E+05	1.44E+05	8.96E+03	5.44E+05				
	CS-136	3.91E+04	1.46E+05	0.	8.56E+04	1.20E+04	1.17E+04	1.11E+05				
	CS-137	6.42E+05	8.24E+05	0.	2.22E+05	1.18E+05	7.68E+03	3.03E+05				
	BA-140	5.30E+03	4.85E+00	0.	1.67E+01	2.02E+06	2.12E+04	3.42E+02				
	CE-141	2.27E+03	1.52E+03	0.	6.26E+03	5.83E+05	1.14E+05	1.74E+02				
	CE-144	4.19E+05	1.74E+05	0.	8.48E+05	1.38E+07	8.40E+05	2.24E+04				

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	_	OFFSI	TE DOSE CALC	ULATION MANU	JAL (ODCM)		191 of 231				
C-200			ST. LU	JCIE PLANT							
TABLE G-14 ENVIRONMENTAL PATHWAY-DOSE CONVERSION FACTORS R(I) FOR GASEOUS DISCHARGES PATHWAY - COWS MILK (CONTAMINATED FORAGE) AGE GROUP - TEENAGER ORGAN DOSE FACTOR (SQ. METER-MREM/YR PER µCI/SEC)											
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY				
H3	0.	9.93E+02	9.93E+02	1.26E+03	9.93E+02	9.93E+02	9.93E+02				
C-14	1.25E+05	1.25E+05	1.25E+05	9.39E+04	1.25E+05	1.25E+05	1.25E+05				
P32	2.21E+10	1.38E+09	0.	0.	0.	2.48E+09	8.54E+08				
CR51	0.	0.	2.21E+04	8.15E+03	4.90E+04	9.29E+06	3.69E+04				
MN54	0.	1.09E+07	0.	3.23E+06	0.	3.33E+07	2.07E+06				
FE59	3.84E+07	9.12E+07	0.	0.	2.53E+07	3.01E+08	3.47E+07				
CO57	0.	1.65E+06	0.	. 0.	0.	4.19E+07	2.75E+06				
CO58	0.	8.10E+06	0.	0.	0.	1.10E+08	1.85E+07				
CO60	0.	2.73E+07	0.	0.	0.	3.27E+08	6.23E+07				
ZN65	1.77E+09	5.63E+09	0.	3.77E+09	0.	3.55E+09	2.55E+09				
RB86	0.	3.35E+09	0.	0.	0.	6.61E+08	1.56E+09				
SR89	2.80E+09	0.	0.	0.	0.	3.03E+08	8.03E+07				
SR90	8.29E+10	0.	0.	0.	3.38E+06	1.76E+09	2.05E+10				
Y91	1.54E+04	0.	0.	0.	0.	5.93E+06	4.12E+02				
ZR95	4.78E+04	2.84E+04	0.	2.25E+04	0.	1.15E+08	1.60E+04				
NB95	1.24E+05	7.46E+04	0.	5.87E+04	0.	3.05E+08	4.21E+04				
RU-103	1.69E+03	0.	0.	5.04E+03	0.	1.32E+05	7.56E+02				
RU-106	3.83E+04	0.	0.	5.09E+04	0.	1.73E+06	4.81E+03				
AG-110	7.53E+07	6.97E+07	0.	1.37E+08	0.	2.84E+10	4.14E+07				

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C-200			ST. LU	ICIE PLANT						
<u>13</u>	OTHEOGIE FERMIT TABLE G-14 ENVIRONMENTAL PATHWAY-DOSE CONVERSION FACTORS R(I) FOR GASEOUS DISCHARGES PATHWAY - COWS MILK (CONTAMINATED FORAGE) AGE GROUP - TEENAGER ORGAN DOSE FACTOR (SQ. METER-MREM/YR PER µCI/SEC)									
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY			
SN-123	0.	0.	0.	0.	0.	0.	0.			
SN-126	2.12E+09	4.21E+07	1.24E+07	0.	6.03E+06	1.41E+09	6.37E+07			
SB-124	3.33E+07	6.29E+05	8.05E+04	0.	2.59E+07	9.43E+08	1.32E+07			
SB-125	3.45E+07	9.58E+05	5.05E+05	4.80E+06	3.43E+09	2.95E+08	6.82E+06			
TE 125M	3.00E+07	1.08E+07	8.47E+06	8.55E+07	0.	8.39E+07	3.98E+06			
TE 127M	6.02E+07	2.11E+07	1.59E+07	2.43E+08	0.	3.02E+08	7.45E+06			
TE 129M	1.13E+08	4.18E+07	3.61E+07	3.27E+08	0.	3.93E+08	1.78E+07			
I130	5.51E+05	1.63E+06	2.07E+08	2.53E+06	0.	1.40E+06	6.41E+05			
I131	5.12E+08	7.24E+08	2.09E+11	9.38E+08	0.	1.37E+08	4.31E+08			
I132	2.16E-01	5.76E-01	7.59E+01	9.19E-01	0.	1.08E-01	2.05E-01			
I133	7.33E+06	1.24E+07	2.26E+09	1.56E+07	0.	9.02E+06	3.83E+06			
I134	0.	0.	1.29E-09	0.	0.	0.	0.			
I135	1.81E+04	4.77E+04	6.24E+06	7.58E+04	9.79E-02	5.34E+04	1.75E+04			
CS-134	9.44E+09	2.28E+10	0.	5.63E+09	2.76E+09	2.63E+08	1.06E+10			
CS-136	3.37E+08	1.33E+09	0.	7.41E+08	1.02E+08	1.51E+08	9.58E+08			
CS-137	1.28E+10	1.72E+10	0.	4.43E+09	2.28E+09	2.29E+08	6.04E+09			
BA-140	4.84E+07	5.95E+04	0.	1.48E+04	3.98E+04	9.16E+06	3.11E+06			
CE-141	5.05E+04	3.39E+04	0.	1.18E+04	0.	9.18E+07	3.89E+03			
CE-144	4.10E+06	1.68E+06	0.	6.87E+05	0.	9.65E+08	2.17E+05			

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C-200			ST. LU	JCIE PLANT								
				F O 4F								
EN EN	ENVIRONMENTAL PATHWAY-DOSE CONVERSION FACTORS R(I) FOR GASEOUS DISCHARGES											
<u><u>her</u></u>	PATHWAY - G	OATS MILK (CO	ONTAMINATED	FORAGE)	AGE GROL	JP - TEENAGER	200					
	C	DRGAN DOSÈ F	ACTOR (SQ.	METER-MREM/	YR PER µCl/SE	C)						
			1		F	1	•					
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY					
H3	0.	2.03E+03	2.03E+03	2.56E+03	2.03E+03	2.03E+03	2.03E+03					
C-14	1.25E+05	1.25E+05	1.25E+05	9.39E+04	1.25E+05	1.25E+05	1.25E+05					
P32	2.65E+10	1.66E+09	0.	0.	0.	2.98E+09	1.03E+09					
CR51	0.	0.	2.65E+03	9.78E+02	5.88E+03	1.11E+06	4.43E+03					
MN54	0.	1.30E+06	0.	3.88E+05	0.	3.99E+06	2.49E+05					
FE59	4.99E+05	1.19E+06	0.	0.	3.29E+05	3.91E+06	4.51E+05					
CO57	0.	1.98E+05	0.	0.	0.	5.03E+06	3.30E+05					
CO58	0.	9.72E+05	0.	0.	0.	1.31E+07	2.22E+06					
CO60	0.	3.28E+06	0.	0.	0.	3.93E+07	7.48E+06					
ZN65	2.13E+08	6.76E+08	0.	4.52E+08	0.	4.26E+08	3.06E+08					
RB86	0.	4.02E+08	0.	0.	0.	7.93E+07	1.88E+08					
SR89	5.87E+09	0.	0.	0.	0.	6.37E+08	1.69E+08					
SR90	1.74E+11	0.	0.	0.	4.05E+05	3.68E+09	4.30E+10					
Y91	1.85E+03	0.	0.	0.	0.	7.11E+05	4.94E+01					
ZR95	5.74E+03	3.41E+03	0.	2.70E+03	0.	1.38E+07	1.93E+03					
NB95	1.49E+04	8.96E+03	0.	7.05E+03	0.	3.66E+07	5.05E+03					
RU-103	2.03E+02	0.	0.	6.05E+02	0.	1.58E+04	9.08E+01					
RU-106	4.59E+03	0.	0.	6.11E+03	0.	2.08E+05	5.78E+02					
AG110	9.04E+06	8.36E+06	0.	1.64E+07	0.	3.41E+09	4.97E+06					

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C-200			ST. LU	JCIE PLANT			2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2				
TABLE G-15 ENVIRONMENTAL PATHWAY-DOSE CONVERSION FACTORS R(I) FOR GASEOUS DISCHARGES PATHWAY - GOATS MILK (CONTAMINATED FORAGE) AGE GROUP - TEENAGER ORGAN DOSE FACTOR (SQ. METER-MREM/YR PER μCI/SEC)											
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY				
SN-123	0.	0.	0.	0.	0.	0.	0.				
SN-126	2.54E+08	5.05E+06	1.48E+06	0.	7.23E+05	1.69E+08	7.64E+06				
SB-124	4.00E+06	7.54E+04	9.66E+03	0.	3.10E+06	1.13E+08	1.58E+06				
SB-125	4.14E+06	1.15E+05	6.06E+04	5.77E+05	4.12E+08	3.54E+07	8.19E+05				
TE 125M	3.61E+06	1.29E+06	1.02E+06	1.03E+07	0.	1.01E+07	4.78E+05				
TE 127M	7.23E+06	2.52E+06	1.91E+06	2.92E+07	0.	3.63E+07	8.94E+05				
TE 129M	1.35E+07	5.02E+06	4.34E+06	3.92E+07	0.	4.72E+07	2.13E+06				
I130	6.61E+05	1.96E+06	2.49E+08	3.04E+06	0.	1.68E+06	7.69E+05				
I131	6.15E+08	8.68E+08	2.50E+11	1.13E+09	0.	1.64E+08	5.17E+08				
I132	2.59E-01	6.92E-01	9.11E+01	1.10E+00	0.	1.30E-01	2.46E-01				
I133	8.79E+06	1.49E+07	2.71E+09	1.88E+07	0.	1.08E+07	4.59E+06				
I134	0.	0.	1.55E-09	0.	0.	0.	0.				
I135	2.17E+04	5.73E+04	7.49E+06	9.10E+04	2.94E-01	6.41E+04	2.10E+04				
CS-134	2.83E+10	6.83E+10	0.	1.69E+10	8.27E+09	7.88E+08	3.19E+10				
CS-136	1.01E+09	3.99E+09	0.	2.22E+09	3.05E+08	4.54E+08	2.87E+09				
CS-137	3.84E+10	5.16E+10	0.	1.33E+10	6.85E+09	6.88E+08	1.81E+10				
BA-140	5.81E+06	7.14E+03	0.	1.78E+03	4.78E+03	1.10E+06	3.73E+05				
CE-141	6.06E+03	4.07E+03	0.	1.41E+03	0.	1.10E+07	4.66E+02				
CE-144	4.92E+05	2.02E+05	0.	8.24E+04	0.	1.16E+08	2.61E+04				

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			TABL	-E G-16			
<u> </u>		L PATHWAY-DU	AMINATED FO	ION FACTORS P	AGE GROUP -	TEENAGER	<u>3E3</u>
		PRGAN DOSE F	ACTOR (SO	METER-MREM/			
)	
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY
H3	0.	1.93E+02	1.93E+02	2.44E+02	1.93E+02	1.93E+02	1.93E+02
C-14	5.23E+04	5.23E+04	5.23E+04	3.94E+04	5.23E+04	5.23E+04	5.23E+04
P32	2.76E+09	1.73E+08	0.	0.	0.	3.10E+08	1.07E+08
CR51	0.	0.	2.50E+03	9.22E+02	5.55E+03	1.05E+06	4.18E+03
MN54	0.	5.42E+06	0.	1.61E+06	0.	1.66E+07	1.04E+06
FE59	1.58E+08	3.74E+08	0.	0.	1.04E+08	1.24E+09	1.42E+08
CO57	0.	3.33E+06	0.	0.	0.	8.45E+07	5.54E+06
CO58	0.	1.44E+07	0.	0.	0.	1.94E+08	3.27E+07
CO60	0.	5.73E+07	0.	0.	0.	6.87E+08	1.31E+08
ZN65	2.11E+08	6.69E+08	0.	4.47E+08	0.	4.21E+08	3.03E+08
RB86	0.	2.89E+08	0.	0.	0.	5.69E+07	1.35E+08
SR89	2.66E+08	0.	0.	0.	0.	2.89E+07	7.64E+06
SR90	1.01E+10	0.	0.	0.	2.79E+08	1.02E+09	2.49E+09
Y91	9.34E+05	0.	0.	0.	0.	3.59E+08	2.49E+04
ZR95	2.67E+06	1.24E+06	0.	1.18E+06	0.	4.20E+09	7.61E+05
NB95	1.58E+06	9.51E+05	0.	7.48E+05	0.	3.88E+09	5.37E+05
RU-103	8.05E+07	0.	0.	2.40E+08	0.	6.28E+09	3.60E+07
RU-106	2.40E+09	0.	. 0.	3.20E+09	0.	1.09E+11	3.02E+08
AG110	3.97E+06	3.67E+06	0.	7.21E+06	0.	1.50E+09	2.18E+06

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C-200			ST. LU	JCIE PLANT								
	<u> </u>			E C 16								
		PATHWAY-DC		ION FACTORS I		OUS DISCHAR	3FS					
<u></u>	PATHWAY - MEAT (CONTAMINATED FORAGE) AGE GROUP - TEENAGER											
	ORGAN DOSE FACTOR (SQ. METER-MREM/YR PER μ CI/SEC)											
			``````````````````````````````````````		•	,	·					
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY					
SN-123	0.	0.	0.	0.	0.	0.	0.					
SN-126	1.10E+10	2.18E+08	6.38E+07	0.	3.82E+06	3.66E+09	3.14E+08					
SB-124	1.17E+07	2.21E+05	2.84E+04	0.	9.11E+06	3.32E+08	4.64E+06					
SB-125	5.01E+07	1.31E+07	1.02E+07	1.03E+08	1.47E+09	2.25E+08	7.60E+06					
TE 125M	3.03E+08	1.08E+08	8.55E+07	8.63E+08	0.	8.47E+08	4.02E+07					
TE 127M	6.68E+08	2.34E+08	1.77E+08	2.69E+09	0.	3.35E+09	8.28E+07					
TE 129M	9.78E+08	3.63E+08	3.13E+08	2.83E+09	0.	3.41E+09	1.53E+08					
I130	1.41E-06	4.16E-06	5.30E-04	6.47E-06	0.	3.57E-06	1.64E-06					
I131	8.54E+06	1.21E+07	3.48E+09	1.56E+07	0.	2.28E+06	7.19E+06					
I132	0.	0.	0.	0.	0.	0.	0.					
I133	3.69E-01	6.26E-01	1.14E+02	7.88E-01	0.	4.55E-01	1.93E-01					
134	0.	0.	0.	0.	0.	0.	0.					
I135	5.08E-02	4.69E-02	0.	1.78E-02	5.34E-03	1.10E-03	2.08E-02					
CS-134	5.03E+08	1.21E+09	0.	3.00E+08	1.47E+08	1.40E+07	5.66E+08					
CS-136	6.99E+06	2.76E+07	0.	1.54E+07	2.11E+06	3.14E+06	1.99E+07					
CS-137	6.92E+08	9.31E+08	0.	2.40E+08	1.24E+08	1.24E+07	3.27E+08					
BA-140	2.37E+07	2.93E+04	0.	7.28E+03	1.95E+04	9.19E+06	1.53E+06					
CE-141	1.12E+04	7.51E+03	0.	2.61E+03	0.	2.03E+07	8.61E+02					
CE-144	1.28E+06	5.23E+05	0.	2.14E+05	0.	3.00E+08	6.76E+04					

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C-200			ST. LU	JCIE PLANT					
TABLE G-17   ENVIRONMENTAL PATHWAY-DOSE CONVERSION FACTORS R(I) FOR GASEOUS DISCHARGES   PATHWAY - FRESH FRUITS AND VEGETABLES   AGE GROUP - TEENAGER   ORGAN DOSE FACTOR   (SQ. METER-MREM/YR PER µCI/SEC)									
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY		
H3	0.	2.09E+02	2.09E+02	2.64E+02	2.09E+02	2.09E+02	2.09E+02		
C-14	2.18E+04	2.18E+04	2.18E+04	1.64E+04	2.18E+04	2.18E+04	2.18E+04		
P32	6.81E+08	4.27E+07	0.	0.	0.	7.66E+07	2.64E+07		
CR51	0.	0.	7.56E+03	2.79E+03	1.68E+04	3.18E+06	1.27E+04		
MN54	0.	3.20E+07	0.	9.52E+06	0.	9.80E+07	6.11E+06		
FE59	2.39E+07	5.67E+07	0.	0.	1.57E+07	1.87E+08	2.16E+07		
CO57	0.	1.22E+06	0.	0.	0.	3.09E+07	2.02E+06		
CO58	0.	6.01E+06	0.	0.	0.	8.12E+07	1.37E+07		
CO60	0.	2.01E+07	0.	0.	0.	2.41E+08	4.58E+07		
ZN65	3.35E+07	1.06E+08	0.	7.12E+07	0.	6.70E+07	4.82E+07		
RB86	0.	8.52E+07	0.	0.	0.	1.68E+07	3.97E+07		
SR89	2.61E+09	0.	0.	0.	0.	2.83E+08	7.48E+07		
SR90	7.61E+10	0.	0.	0.	2.41E+08	2.31E+09	1.88E+10		
Y91	1.15E+06	0.	0.	0.	0.	4.41E+08	3.06E+04		
ZR95	2.35E+05	8.19E+04	0.	9.81E+04	0.	1.92E+08	5.61E+04		
NB95	3.72E+04	2.24E+04	0.	1.76E+04	0.	9.14E+07	1.26E+04		
RU-103	1.27E+06	0.	0.	3.77E+06	0.	9.87E+07	5.66E+05		
RU-106	2.82E+07	0.	0.	3.75E+07	0.	1.28E+09	3.54E+06		
AG110	1.11E+06	1.03E+06	0.	2.02E+06	0.	4.19E+08	6.10E+05		

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C-200			ST. LU	JCIE PLANT						
TABLE G-17   ENVIRONMENTAL PATHWAY-DOSE CONVERSION FACTORS R(I) FOR GASEOUS DISCHARGES   PATHWAY - FRESH FRUITS AND VEGETABLES   AGE GROUP - TEENAGER   ORGAN DOSE FACTOR (SQ. METER-MREM/YR PER µCI/SEC)										
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY			
SN-123	9.25E-06	1.53E-07	1.22E-07	0.	0.	1.33E-05	2.28E-07			
SN-126	6.25E+08	1.24E+07	3.64E+06	0.	2.83E+06	5.55E+08	1.94E+07			
SB-124	1.65E+07	3.12E+05	3.99E+04	0.	1.28E+07	4.67E+08	6.53E+06			
SB-125	1.73E+07	5.97E+05	3.48E+05	3.38E+06	1.68E+09	1.45E+08	3.40E+06			
TE 125M	2.23E+07	7.99E+06	6.30E+06	6.36E+07	0.	6.24E+07	2.96E+06			
TE 127M	4.46E+07	1.55E+07	1.18E+07	1.80E+08	0.	2.23E+08	5.51E+06			
TE 129M	8.46E+07	3.14E+07	2.71E+07	2.45E+08	0.	2.95E+08	1.33E+07			
I130	2.58E+05	7.64E+05	9.72E+07	1.19E+06	0.	6.55E+05	3.00E+05			
I131	6.84E+07	9.66E+07	2.79E+10	1.25E+08	0.	1.83E+07	5.76E+07			
I132	3.65E+01	9.77E+01	1.29E+04	1.56E+02	0.	1.84E+01	3.47E+01			
I133	1.98E+06	3.36E+06	6.10E+08	4.23E+06	0.	2.44E+06	1.04E+06			
I134	6.75E-05	1.83E-04	2.38E-02	2.92E-04	0.	1.60E-07	6.56E-05			
I135	2.65E+04	7.00E+04	9.15E+06	1.11E+05	5.67E-03	7.84E+04	2.57E+04			
CS-134	5.79E+08	1.40E+09	0.	3.45E+08	1.69E+08	1.61E+07	6.52E+08			
CS-136	2.18E+07	8.60E+07	0.	4.78E+07	6.56E+06	9.77E+06	6.19E+07			
CS-137	7.83E+08	1.05E+09	0.	2.72E+08	1.40E+08	1.41E+07	3.70E+08			
BA-140	9.38E+07	1.21E+05	0.	2.88E+04	7.73E+04	3.19E+08	6.04E+06			
CE-141	6.32E+04	4.24E+04	0.	1.47E+04	0.	1.15E+08	4.86E+03			
CE-144	5.03E+06	2.06E+06	0.	8.43E+05	0.	1.19E+09	2.67E+05			

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EN	TABLE G-18   ENVIRONMENTAL PATHWAY-DOSE CONVERSION FACTORS R(I) FOR GASEOUS DISCHARGES											
PATHWAY - INHALATION AGE GROUP - ADULT												
	ORGAN DOSE FACTOR (MREM/YR PER $\mu$ CI/CU. METER)											
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY					
H3	0.	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03					
C-14	1.82E+04	3.42E+04	3.42E+03	3.42E+03	3.42E+03	3.42E+03	3.42E+03					
P32	1.32E+06	7.72E+04	0.	0.	0.	8.64E+04	5.02E+04					
CR51	0.	0.	5.95E+01	2.28E+01	1.44E+04	3.32E+03	1.00E+02					
MN54	0.	3.96E+04	0.	9.84E+03	1.40E+06	7.74E+04	6.30E+03					
FE59	1.18E+04	2.78E+07	0.	0.	1.02E+06	1.88E+05	1.06E+04					
CO57	0.	6.92E+02	0.	0.	3.70E+05	3.14E+04	6.71E+02					
CO58	0.	1.58E+03	0.	0.	9.28E+05	1.06E+05	2.07E+03					
CO60	0.	1.15E+04	0.	0.	5.98E+06	2.85E+05	1.48E+04					
ZN65	3.24E+04	1.03E+05	0.	6.90E+04	8.72E+05	5.34E+04	4.66E+04					
RB86	0.	1.35E+05	0.	0.	0.	1.66E+04	5.90E+04					
SR89	3.04E+05	0.	0.	0.	1.40E+06	3.50E+05	8.72E+03					
SR90	9.92E+07	0.	0.	0.	9.60E+06	7.22E+05	6.10E+06					
Y91	4.62E+05	0.	0.	0.	1.70E+06	3.85E+05	1.24E+04					
ZR95	1.07E+05	3.44E+04	0.	5.42E+04	1.78E+06	1.50E+05	2.33E+04					
NB95	1.41E+04	7.82E+03	0.	7.74E+03	5.06E+05	1.04E+05	4.21E+03					
RU-103	1.53E+03	0.	0.	5.83E+03	5.06E+05	1.10E+05	6.58E+02					
RU-106	6.91E+04	0.	0.	1.34E+05	9.44E+06	9.12E+05	8.72E+03					
AG110	1.08E+04	1.00E+04	0.	1.97E+04	4.64E+06	3.02E+05	5.94E+03					

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			TABL	.E G-18						
<u>  E</u>	<u>IVIRONMENTAI</u>	<u>PATHWAY-DC</u>	<u>DSE CONVERS</u>	ION FACTORS F	R(I) FOR GASE	<u> DUS DISCHARC</u>	<u> JES</u>			
	PATHWAY - INHALATION AGE GROUP - ADULT									
ORGAN DOSE FACTOR (MREM/YR PER $\mu$ CI/CU. METER)										
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY			
SN-123	2.42E+05	5.33E+03	4.53E+03	0.	2.30E+06	3.14E+05	7.86E+03			
SN-126	1.26E+06	3.34E+04	9.84E+03	0.	9.36E+06	1.27E+05	4.80E+04			
SB-124	3.12E+04	5.89E+02	7.55E+01	0.	2.48E+06	4.06E+05	1.24E+04			
SB-125	6.61E+04	7.13E+02	5.87E+01	0.	2.20E+06	1.01E+05	1.33E+04			
TE 125M	3.42E+03	1.58E+03	1.05E+03	1.24E+04	3.14E+05	7.06E+04	4.67E+02			
TE 127M	1.26E+04	5.62E+03	3.29E+03	4.58E+04	9.60E+05	1.50E+05	1.57E+03			
TE 129M	9.76E+03	4.67E+03	3.44E+03	3.66E+04	1.16E+06	3.83E+05	1.58E+03			
I130	4.58E+03	1.34E+04	1.74E+06	2.09E+04	0.	7.69E+03	5.29E+03			
I131	2.52E+04	3.58E+04	1.19E+07	6.14E+04	0.	6.28E+03	2.05E+04			
I132	1.16E+03	3.26E+03	4.38E+05	5.19E+03	0.	4.06E+02	1.16E+03			
I133	8.64E+03	1.49E+04	2.93E+06	2.60E+04	0.	8.72E+03	4.54E+03			
I134	6.45E+02	1.73E+03	2.30E+05	2.75E+03	0.	1.01E+00	6.16E+02			
I135	2.69E+03	6.99E+03	9.36E+05	1.11E+04	0.	5.25E+03	2.58E+03			
CS-134	3.74E+05	8.48E+05	0.	2.88E+05	9.76E+04	1.04E+04	7.29E+05			
CS-136	3.91E+04	1.46E+05	0.	8.56E+04	1.20E+04	1.17E+04	1.11E+05			
CS-137	4.78E+05	6.22E+05	0.	2.22E+05	7.53E+04	8.40E+03	4.29E+05			
BA-140	3.90E+04	4.90E+01	0.	1.67E+01	1.27E+06	2.18E+05	2.57E+03			
CE-141	1.99E+04	1.35E+04	0.	6.26E+03	3.62E+05	1.20E+05	1.53E+03			
CE-144	3.43E+06	1.43E+06	0.	8.48E+05	7.78E+06	8.16E+05	1.84E+05			

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	-	OFFSITE DOSE CALCULATION MANUAL (ODCM)								
C-200			ST. LU	ICIE PLANT						
TABLE G-19 <u>ENVIRONMENTAL PATHWAY-DOSE CONVERSION FACTORS R(I) FOR GASEOUS DISCHARGES</u> PATHWAY - COWS MILK (CONTAMINATED FORAGE)   AGE GROUP - ADULT   ORGAN DOSE FACTOR   (SQ. METER-MREM/YR PER µCI/SEC)										
NUCLIDE	BONE	BONE LIVER THYROID KIDNEY LUNG GI-LLI								
H3	0.	9.73E+02	9.73E+02	9.73E+02	9.73E+02	9.73E+02	9.73E+02			
C-14	3.63E+05	7.28E+04	7.28E+04	7.28E+04	7.28E+04	7.28E+04	7.28E+04			
P32	1.71E+10	1.07E+09	0.	0.	0.	1.92E+09	6.62E+08			
CR51	0.	0.	1.71E+04	6.32E+03	3.80E+04	7.20E+06	2.86E+04			
MN54	0.	8.41E+06	0.	2.50E+06	0.	2.58E+07	1.61E+06			
FE59	2.98E+07	7.06E+07	0.	0.	1.96E+07	2.33E+08	2.69E+07			
CO57	0.	1.28E+06	0.	0.	0.	3.25E+07	2.13E+06			
CO58	0.	4.72E+06	0.	0.	0.	9.56E+07	1.06E+07			
CO60	0.	1.65E+07	0.	0.	0.	3.08E+08	3.62E+07			
ZN65	1.37E+09	4.36E+09	0.	2.92E+09	0.	2.75E+09	1.98E+09			
RB86	0.	2.60E+09	0.	0.	0.	5.12E+08	1.21E+09			
SR89	1.46E+09	0.	0.	0.	0.	2.33E+08	4.17E+07			
SR90	4.70E+10	0.	0.	0.	0.	6.37E+08	1.15E+10			
Y91	8.60E+03	0.	0.	0.	0.	4.73E+06	2.31E+02			
ZR95	3.18E+04	1.75E+04	0.	1.75E+04	0.	1.05E+08	6.95E+03			
NB95	8.26E+04	4.59E+04	0.	4.55E+04	0.	2.79E+08	1.80E+04			
RU-103	1.02E+03	0.	0.	3.91E+03	0.	1.19E+05	4.41E+02			
RU-106	2.04E+04	0.	0.	3.95E+04	0.	1.32E+06	2.58E+03			
AG110	5.84E+07	5.40E+07	0.	1.06E+08	0.	2.20E+10	3.21E+07			

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41		OFFSI	TE DOSE CALC	ULATION MANU	JAL (ODCM)		202 of 231
PROCEDURE NO.:							
C-200			ST. Ll	JCIE PLANT			
E		_ PATHWAY-DO	TABL	E G-19 ION FACTORS			GES
	PAIHWAY	BGAN DOSE F	CONTAMINATE	:DFURAGE) METER-MREM/			
						.0)	
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY
SN-123	0.	0.	0.	0.	0.	0.	0.
SN-126	1.65E+09	3.27E+07	9.56E+06	0.	4.67E+06	1.09E+09	4.94E+07
SB-124	2.58E+07	4.87E+05	6.24E+04	0.	2.00E+07	7.31E+08	1.02E+07
SB-125	2.64E+07	6.06E+05	2.99E+05	3.72E+06	2.66E+09	2.29E+08	5.23E+06
TE 125M	1.63E+07	5.91E+06	4.91E+06	6.63E+07	0.	6.50E+07	2.18E+06
TE 127M	4.63E+07	1.63E+07	1.21E+07	1.88E+08	0.	2.11E+08	5.72E+06
TE 129M	6.06E+07	2.27E+07	2.09E+07	2.53E+08	0.	3.04E+08	9.61E+06
I130	4.27E+05	1.26E+06	1.61E+08	1.96E+06	0.	1.08E+06	4.97E+05
I131	2.96E+08	4.25E+08	1.39E+11	7.27E+08	0.	1.12E+08	2.43E+08
I132	1.67E-01	4.47E-01	5.88E+01	7.12E-01	0.	8.39E-02	1.59E-01
I133	4.00E+06	6.94E+06	1.33E+09	1.21E+07	0.	6.10E+06	2.12E+06
I134	0.	0.	9.98E-10	0.	0.	0.	0.
I135	1.40E+04	3.70E+04	4.84E+06	5.88E+04	7.58E-02	4.14E+04	1.36E+04
CS-134	5.66E+09	1.35E+10	0.	4.36E+09	1.45E+09	2.36E+08	1.10E+10
CS-136	2.61E+08	1.03E+09	0.	5.74E+08	7.87E+07	1.17E+08	7.43E+08
CS-137	7.39E+09	1.01E+10	0.	3.44E+09	1.14E+09	1.95E+08	6.62E+09
BA-140	2.69E+07	3.38E+04	0.	1.15E+04	1.93E+04	5.70E+07	1.78E+06
CE-141	2.91E+04	1.97E+04	0.	9.13E+03	0.	7.52E+07	2.23E+03
CE-144	2.15E+06	8.97E+05	0.	5.32E+05	0.	7.26E+08	1.15E+05

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41 PROCEDURE NO.:	4	OFFSI	FE DOSE CALC	ULATION MANU	AL (ODCM)		203 of 231			
C-200			ST. LU	JCIE PLANT						
<u>E</u> 1	TABLE G-20 <u>ENVIRONMENTAL PATHWAY-DOSE CONVERSION FACTORS R(I) FOR GASEOUS DISCHARGES</u> PATHWAY - GOATS MILK (CONTAMINATED FORAGE) AGE GROUP - ADULT ORGAN DOSE FACTOR (SQ. METER-MREM/YR PER μCI/SEC)									
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY			
H3	0.	1.99E+03	1.99E+03	1.99E+03	1.99E+03	1.99E+03	1.99E+03			
C-14	3.63E+05	7.28E+04	7.28E+04	7.28E+04	7.28E+04	7.28E+04	7.28E+04			
P32	2.05E+10	1.29E+09	0.	0.	0.	2.31E+09	7.94E+08			
CR51	0.	0.	2.05E+03	7.58E+02	4.56E+03	8.64E+05	3.43E+03			
MN54	0.	1.01E+06	0.	3.00E+05	0.	3.09E+06	1.93E+05			
FE59	3.87E+05	9.18E+05	0.	0.	2.55E+05	3.03E+06	3.50E+05			
CO57	0.	1.54E+05	0.	0.	0.	3.90E+06	2.55E+05			
CO58	0.	5.67E+05	0.	0.	0.	1.15E+07	1.27E+06			
CO60	0.	1.98E+06	0.	0.	0.	3.70E+07	4.34E+06			
ZN65	1.65E+08	5.24E+08	0.	3.50E+08	0.	3.30E+08	2.37E+08			
RB86	0.	3.12E+08	0.	0.	0.	6.15E+07	1.45E+08			
SR89	3.06E+09	0.	0.	0.	0.	4.89E+08	8.76E+07			
SR90	9.87E+10	0.	0.	0.	0.	1.32E+09	2.41E+10			
Y91	1.03E+03	0.	0.	0.	0.	5.68E+05	2.77E+01			
ZR95	3.82E+03	2.10E+03	0.	2.10E+03	0.	1.26E+07	8.34E+02			
NB95	9.92E+03	5.51E+03	0.	5.46E+03	0.	3.34E+07	2.17E+03			
RU-103	1.23E+02	0.	0.	4.69E+02	0.	1.43E+04	5.30E+01			
RU-106	2.45E+03	0.	0.	4.73E+03	0.	1.58E+05	3.10E+02			
AG110	7.00E+06	6.48E+06	0.	1.27E+07	0.	2.64E+09	3.85E+06			

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41		OFFSI	TE DOSE CALC	ULATION MANU	IAL (ODCM)		204 of 231
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C-200			ST. LL	JCIE PLANT			
			TABL	E G-20			
<u>E1</u>		L PATHWAY-DO	<u>DSE CONVERS</u>	ION FACTORS F	R(I) FOR GASE	OUS DISCHAR	<u>SES</u>
	FAIRWAT -	BOATS WILK (		DFORAGE)			
	C	INGAN DOGL F	ACTON (SQ.		ΠΥΓΕΝμοιίος		
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY
SN-123	0.	0.	0.	0.	0.	0.	0.
SN-126	1.97E+08	3.92E+06	1.15E+06	0.	5.61E+05	1.31E+08	5.92E+06
SB-124	3.10E+06	5.85E+04	7.49E+03	0.	2.40E+06	8.77E+07	1.22E+06
SB-125	3.16E+06	7.28E+04	3.58E+04	4.47E+05	3.19E+08	2.74E+07	6.29E+05
TE 125M	1.96E+06	7.10E+05	5.89E+05	7.95E+06	0.	7.81E+06	2.62E+05
TE 127M	5.57E+06	1.94E+06	1.47E+06	2.26E+07	0.	2.52E+07	6.86E+05
TE 129M	7.27E+06	2.72E+06	2.51E+06	3.04E+07	0.	3.65E+07	1.15E+06
I130	5.12E+05	1.52E+06	1.93E+08	2.36E+06	0.	1.30E+06	5.96E+05
I131	3.56E+08	5.10E+08	1.67E+11	8.72E+08	0.	1.34E+08	2.92E+08
I132	2.00E-01	5.36E-01	7.06E+01	8.55E-01	0.	1.01E-01	1.91E-01
I133	4.80E+06	8.32E+06	1.60E+09	1.45E+07	0.	7.32E+06	2.54E+06
I134	0.	0.	1.20E-09	0.	0.	0.	0.
I135	1.68E+04	4.44E+04	5.80E+06	7.05E+04	2.28E-01	4.97E+04	1.63E+04
CS-134	1.70E+10	4.04E+10	0.	1.31E+10	4.34E+09	7.06E+08	3.30E+10
CS-136	7.84E+08	3.09E+09	0.	1.72E+09	2.36E+08	3.52E+08	2.23E+09
CS-137	2.22E+10	3.03E+10	0.	1.03E+10	3.42E+09	5.83E+08	1.99E+10
BA-140	3.23E+06	4.05E+03	0.	1.38E+03	2.32E+03	6.84E+06	2.13E+05
CE-141	3.49E+03	2.36E+03	0.	1.10E+03	0.	9.02E+06	2.68E+02
CE-144	2.58E+05	1.08E+05	0.	6.39E+04	0.	8.71E+07	1.38E+04

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41		OFFSI	TE DOSE CALC	ULATION MANU	JAL (ODCM)		205 of 221
PROCEDURE NO .:							203 01 231
C-200			ST. LU	ICIE PLANT			
<u>EN\</u>		L PATHWAY-DO		E G-21			<u>Ses</u>
	PAINW	AT - WEAT (COI		METED MDEM			
	L L	RGAN DOSE F	ACTOR (SQ.		ΤΚ ΡΕΚ μοι/δε	.0)	
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY
H3	0.	4.13E+02	4.13E+02	4.13E+02	4.13E+02	4.13E+02	4.13E+02
C-14	3.33E+05	6.67E+04	6.67E+04	6.67E+04	6.67E+04	6.67E+04	6.67E+04
P32	4.67E+09	2.93E+08	0.	0.	0.	5.25E+08	1.81E+08
CR51	0.	0.	4.23E+03	1.56E+03	9.38E+03	1.78E+06	7.07E+03
MN54	0.	9.18E+06	0.	· 2.73E+06	0.	2.81E+07	1.75E+06
FE59	2.67E+08	6.33E+08	0.	0.	1.76E+08	2.09E+09	2.41E+08
CO57	0.	5.64E+06	0.	0.	0.	1.43E+08	9.38E+06
CO58	0.	1.83E+07	0.	0.	0.	3.70E+08	4.09E+07
CO60	0.	7.55E+07	0.	0.	0.	1.41E+09	1.66E+08
ZN65	3.56E+08	1.13E+09	0.	7.57E+08	0.	7.13E+08	5.12E+08
RB86	0.	4.89E+08	0.	0.	0.	9.64E+07	2.28E+08
SR89	3.03E+08	0.	0.	0.	0.	4.84E+07	8.67E+06
SR90	1.25E+10	0.	0.	0.	0	1.45E+09	3.05E+09
Y91	1.14E+06	0.	0.	0.	0.	6.26E+08	3.05E+04
ZR95	3.78E+06	1.67E+06	0.	2.01E+06	0.	8.30E+09	8.26E+05
NB95	2.30E+06	1.28E+06	0.	1.27E+06	0.	7.75E+09	5.02E+05
RU-103	1.06E+08	0.	0.	4.06E+08	0.	1.24E+10	4.59E+07
RU-106	2.80E+09	0.	0.	5.41E+09	0.	1.81E+11	3.54E+08
AG110	6.71E+06	6.21E+06	0.	1.22E+07	0.	2.53E+09	3.69E+06

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41 PROCEDURE NO.:	-	OFFSI	TE DOSE CALC	ULATION MANU	JAL (ODCM)		206 of 231
C-200			ST. LU	JCIE PLANT			
EN	IVIRONMENTAL PATHWA C	<u>- PATHWAY-DO</u> AY - MEAT (COI ORGAN DOSE F	TABL DSE CONVERS NTAMINATED F ACTOR (SQ.	E G-21 ION FACTORS   ORAGE) METER-MREM/	<b>R(I) FOR GASE(</b> AGE GROUF YR PER μCI/SE	DUS DISCHAR( P - ADULT C)	GES
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY
SN-123	0.	0.	0.	0.	0.	0.	0.
SN-126	1.86E+10	3.69E+08	1.08E+08	0.	6.46E+06	6.19E+09	5.33E+08
SB-124	1.99E+07	3.75E+05	4.80E+04	0.	1.54E+07	5.62E+08	7.85E+06
SB-125	6.65E+07	1.58E+07	1.29E+07	1.74E+08	2.49E+09	3.80E+08	1.05E+07
TE 125M	3.59E+08	1.30E+08	1.08E+08	1.46E+09	0.	1.43E+09	4.81E+07
TE 127M	1.13E+09	3.93E+08	2.96E+08	4.56E+09	0.	5.11E+09	1.39E+08
TE 129M	1.14E+09	4.29E+08	3.95E+08	4.79E+09	0.	5.76E+09	1.82E+08
I130	2.38E-06	7.05E-06	8.96E-04	1.10E-05	0.	6.04E-06	2.77E-06
I131	1.08E+07	1.55E+07	5.06E+09	2.65E+07	0.	4.07E+06	8.85E+06
I132	0.	0.	0.	0.	0.	0.	0.
I133	4.40E-01	7.63E-01	1.47E+02	1.33E+00	0.	6.71E-01	2.33E-01
I134	0.	0.	0.	0.	0.	0.	0.
I135	8.60E-02	7.94E-02	0.	3.01E-02	9.04E-03	1.86E-03	3.53E-02
CS-134	6.58E+08	1.57E+09	0.	5.08E+08	1.68E+08	2.74E+07	1.28E+09
CS-136	1.18E+07	4.67E+07	0.	2.60E+07	3.56E+06	5.31E+06	3.36E+07
CS-137	8.73E+08	1.19E+09	0.	4.06E+08	1.35E+08	2.30E+07	7.82E+08
BA-140	2.88E+07	3.63E+04	0.	1.23E+04	2.07E+04	6.87E+07	1.90E+06
CE-141	1.41E+04	9.52E+03	0.	4.41E+03	0.	3.63E+07	1.08E+03
CE-144	1.46E+06	6.10E+05	0.	3.62E+05	0.	4.93E+08	7.83E+04

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41	-	OFFSI	TE DOSE CALC	ULATION MANU	IAL (ODCM)		207 of 231
C-200			ST. LU	JCIE PLANT			
EN	VIRONMENTAL PATHWA C	<u>- PATHWAY-D(</u> \Y - FRESH FRI )RGAN DOSE F	TABL <u>DSE CONVERSI</u> JITS AND VEGE ACTOR (SQ.	.E G-22 ION FACTORS F ETABLES METER-MREM/	<b><u>R(I) FOR GASE(</u> AGE GROUI</b> YR PER μCI/SE	<u>DUS DISCHAR(</u> P - ADULT (C)	<u>JES</u>
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY
H3	0.	4.02E+02	4.02E+02	4.02E+02	4.02E+02	4.02E+02	4.02E+02
C-14	1.25E+05	2.50E+04	2.50E+04	2.50E+04	2.50E+04	2.50E+04	2.50E+04
P32	1.04E+09	6.51E+07	0.	0.	0.	1.17E+08	4.02E+07
CR51	0.	0.	1.15E+04	4.25E+03	2.56E+04	4.85E+06	1.93E+04
MN54	0.	4.87E+07	0.	1.45E+07	0.	1.49E+08	9.31E+06
FE59	3.64E+07	8.64E+07	0.	0.	2.40E+07	2.85E+08	3.29E+07
CO57	0.	1.85E+06	0.	0.	0.	4.70E+07	3.08E+06
CO58	0.	6.89E+06	0.	0.	0.	1.40E+08	1.54E+07
CO60	0.	2.38E+07	0.	0.	0.	4.46E+08	5.23E+07
ZN65	5.11E+07	1.62E+08	0.	1.09E+08	0.	1.02E+08	7.34E+07
RB86	0.	1.30E+08	0.	0.	0.	2.56E+07	6.06E+07
SR89	2.67E+09	0.	0.	0.	0.	4.26E+08	7.64E+07
SR90	8.49E+10	0.	0.	0.	0.	2.14E+09	2.07E+10
Y91	1.26E+06	0.	0.	0.	0.	6.92E+08	3.37E+04
ZR95	2.93E+05	9.82E+04	0.	1.49E+05	0.	3.34E+08	6.38E+04
NB95	4.87E+04	2.71E+04	0.	2.68E+04	0.	1.64E+08	1.06E+04
RU-103	1.50E+06	0.	0.	5.75E+06	0.	1.76E+08	6.49E+05
RU-106	2.95E+07	0.	0.	5.71E+07	0.	1.91E+09	3.74E+06
AG110	1.69E+06	1.56E+06	0.	3.08E+06	0.	6.38E+08	9.30E+05

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	-	OFFSI	TE DOSE CALC	ULATION MANU	JAL (ODCM)		208 of 231
C-200			ST. LU	JCIE PLANT			
<u>E</u>	VIRONMENTAL	_ PATHWAY-DO	TABL	E G-22	R(I) FOR GASE		<u>SES</u>
	<b>PATHWA</b> C	NY - FRESH FRU DRGAN DOSE F	JITS AND VEGI ACTOR (SQ.	ET <b>ABLES</b> METER-MREM/	<b>AGE GROUI</b> YR PER μCI/SE	<b>P - ADULT</b> C)	
NUCLIDE	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	WHOLE BODY
SN-123	1.00E-05	1.66E-07	1.41E-07	0.	0.	2.04E-05	2.45E-07
SN-126	9.52E+08	1.89E+07	5.54E+06	0.	4.31E+06	8.46E+08	2.94E+07
SB-124	2.52E+07	4.75E+05	6.08E+04	0.	1.95E+07	7.12E+08	9.94E+06
SB-125	2.58E+07	7.23E+05	4.03E+05	5.14E+06	2.56E+09	2.22E+08	5.10E+06
TE 125M	2.38E+07	8.65E+06	7.17E+06	9.69E+07	0.	9.51E+07	3.19E+06
TE 127M	6.75E+07	2.36E+07	1.77E+07	2.73E+08	0.	3.06E+08	8.32E+06
TE 129M	8.93E+07	3.34E+07	3.08E+07	3.73E+08	0.	4.49E+08	1.42E+07
I130	3.93E+05	1.16E+06	1.48E+08	1.81E+06	0.	9.98E+05	4.58E+05
I131	7.78E+07	1.12E+08	3.65E+10	1.91E+08	0.	2.94E+07	6.38E+07
I132	5.57E+01	1.49E+02	1.96E+04	2.38E+02	0.	2.80E+01	5.29E+01
I133	2.13E+06	3.69E+06	7.10E+08	6.44E+06	0.	3.24E+06	1.13E+06
I134	1.03E-04	2.79E-04	3.63E-02	4.45E-04	0.	2.43E-07	9.99E-05
I135	4.04E+04	1.07E+05	1.40E+07	1.70E+05	8.65E-03	1.19E+05	3.91E+04
CS-134	6.82E+08	1.62E+09	0.	5.26E+08	1.74E+08	2.84E+07	1.33E+09
CS-136	3.32E+07	1.31E+08	0.	7.29E+07	9.99E+06	1.49E+07	9.43E+07
CS-137	8.90E+08	1.22E+09	0.	4.14E+08	1.37E+08	2.34E+07	7.98E+08
BA-140	1.03E+08	1.35E+05	0.	4.39E+04	7.38E+04	6.65E+08	6.77E+06
CE-141	7.16E+04	4.85E+04	0.	2.25E+04	0.	1.85E+08	5.49E+03
CE-144	5.19E+06	2.17E+06	0.	1.29E+06	0.	1.75E+09	2.78E+05

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41	OFFSITE DOSE CALCU	LATION MANUAL (OI	DCM) 209 of 231
ROCEDURE NO.:			209 01 231
C-200	ST. LUC		
	TABL	E M-1	
electing the Appro r:	priate Long Term (X/Q) for	Dose Calculations Inv	olving Noble Gases
(1) Total Body	dose from instantaneous re	eleases	
(2) Skin dose fr	om instantaneous releases	5	
(3) Gamma air	dose (cumulative)		
(4) Beta air dos	e (cumulative)		
TYPE OF DOS CALCULATION	E LIMITING RANGE N (miles)	LIMITING Sector	(X/Q) VALUE sec/m ³
Instantaneous	0.97	NW	1.6 X 10 ⁻⁶
1/31 days	0.97		
Quarterly Yearly	0.97	1. Normally $(X/Q) = 1$	.6 X 10° sec/m°
12 Consecutive months	e 0.97	data for time of co	ncern.
Annual Report	t 0.97	N/A	Note-1
The (X/Q) ha occurred duri the limiting (> and may occ 97 miles Corresp and 0.9 the ave	NOTI s to be calculated based o ing the period of interest. (/Q) will be determined from ur in any sector. conds to the minimum site of miles was chosen for all graging is done for quarter	<u>E 1</u> n actual meteorologica The sector of interest i m the actual meteorolo boundary distance in t other sectors for ease	al data that s N/A because ogical data the north direction e of calculations when

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C-200		ST. LUCIE PLANT		
		TABLE M-2		
Selecting the Approp	oriate Long Term	(X/Q) _D or (D/Q) for Do	ose	
Calculations Involvir	ng Radioiodines &	8 D Particulates for:		
(1) Inhalation				
(2) Tritium (All g	gas pathways)			
(3) Ground Plar	ne _			
TYPE OF DOSE CALCULATION	LIMITING RANGE (miles)	LIMITING SECTOR (OL)	(X/Q) _D sec/m ³	(D/Q) 1/m ²
Instantaneous	0.97	NW	B 1.3 X 10 ⁻⁶	
		WNW		8.2 X 10 ⁻⁹
Annual Report	0.97	А	A, B	
	0.97	A	State Landson	A
1/31 days, Qtr. yearly,	0.97	NW	В 1.3 X 10 ⁻⁶	
Annual Total Dose	0.97	WNW		8.2 X 10 ⁻⁹

(OL) Over land areas only

(A) To be determined by reduction of actual met data occurring during each quarter

(B) For Tritium in the Milk Animal Pathway, the (X/Q)_D value should be that of the respective controlling sector and range where the Milk Animal is located as per Table M-3. Example: If a cow was located at 4.25 miles in NW sector, use the (X/Q)_D for 4.25 miles NW.

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C-200	ST. LUCIE PLANT	

## TABLE M-3

Selecting the Appropriate Long Term (D/Q) for Dose Calculations Involving Radioiodines and 8D Particulates for Grass-Cow-Milk or Grass-Goat-Milk:

TYPE OF DOSE CALCULATION	LIMITING RANGE	LIMITING SECTOR	(D/Q) Value 1/m²
Release Rate	A	A	A
1/31 Days	В	В	В
Quarterly - Yearly	В	В	В
Annual (Calendar Year)	В	В	В
Annual Report	С	С	С

A. The worst cow or goat as per locations from land census. If no milk animal in any sector, assume a cow at 4.25 miles in the highest (D/Q) sector over land.

- B. The historical (D/Q) of all land sectors with the worst cow or goat from each sector as reported in the Land Census. A 4.25 mile cow should be assumed in the worst sector over land when no milk animal is reported.
- C. The highest (D/Q) at a milk animal location of all milk animals reported in the Land Census Report. (If no milk animals within 5 miles a 4.25 mile cow should be assumed in the sector having the highest (D/Q) at 4.25 miles over land). Actual Met Data should be used for the selection of the worst case milk animal and for the dose calculations. If both goat and milk animals are reported inside 5 miles, dose calculations should be performed on each animal and the higher dose animal contribution should be used.

The historical wind frequency fractions for each sector are listed in Table M-8.

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41			OFFSITE DOSE CALULATION MANUAL (ODCM)										f 231
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C-200					ST.	LUCIE F	LANT						
	_			TERF	TAIN COI	ABLE M-	4 ON FACTO	<u>ORS</u>					7
Florida Po St. Lucie I Hutchinso Dames ar	wer & Jnit 1 n Isla nd Mo	& Light Compai and, Florida pore Job No: 4년	ny 598 - 112			Terra Perio Base	in Correc d of Reco Distance	tion Facto ord: 8/29/ in Miles/I	ors (PUFF 77 to 8/31 Kilometers	- / STRAI 1/78 s	GHT LINE	Ξ)	
		DESIGN											]
		DISTANCE	.25	.75	1.25	1.75	2.25	2.75	3.25	3.75	4.25	4.75	
SEUT	JR	MILES	.40	1.21	2.01	2.82	3.62	4.42	5.23	6.03	6.84	7.64	
NNE	<u>.</u>	0.	1.906	1.576	1.465	1.404	1.338	1.318	1.334	1.386	1.346	1.338	1
NE		0.	1.887	1.581	1.461	1.391	1.310	1.259	1.164	1.128	1.101	1.116	]
ENE		0.	1.452	1.230	1.122	1.081	1.047	1.033	.941	.941	.906	.902	
E		0.	1.662	1.425	1.277	1.193	1.151	1.123	1.097	1.121	1.123	1.122	1
ESE	:	0.	1.690	1.483	1.328	1.260	1.246	1.190	1.134	1.094	1.032	.968	
SE		0.	1.818	1.691	1.470	1.427	1.435	1.361	1.366	1.331	1.279	1.239	
SSE		0.	1.812	1.586	1.370	1.302	1.270	1.263	1.229	1.193	1.171	1.151	1
S		0.	1.398	1.321	1.125	1.083	1.108	1.127	1.073	1.063	1.047	1.024	
SSM	V	0.	1.534	1.411	1.296	1.192	1.205	1.132	1.135	1.116	1.077	1.060	
SW		0.	1.685	1.492	1.294	1.233	1.200	1.222	1.160	1.160	1.198	1.196	
WSV	v	0.	1.620	1.333	1.210	1.173	1.082	1.091	1.099	1.056	1.034	1.004	
W		0.	1.651	1.415	1.290	1.218	1.154	1.099	1.081	1.067	1.093	1.083	
WNV	V	0.	1.720	1.430	1.267	1.185	1.150	1.133	1.125	1.085	1.033	1.045	
NW		0.	1.681	1.407	1.257	1.173	1.119	1.078	1.063	.995	.998	.978	
NNV	V	0.	1.739	1.488	1.316	1.212	1.172	1.122	1.135	1.080	1.099	1.091	
N		0.	1.816	1.524	1.389	1.285	1.257	1.263	1.285	1.267	1.231	1.213	

Note 1: Any interpolations between stated mileages will be done by log-log

EVISION NO.:	PROCEDURE T	TITLE:								PA	GE:
41			OFFSI	TE DOSE	CALULAT	ION MAN	UAL (ODC	CM)		/	213 of 231
ROCEDURE NO .:										ſ	210 01 201
C-200				S	T. LUCIE	PLANT				ند م	
		HIS	TORICAL	. LONG TE	TABLE M <u>ERM - (X/C</u>	-5 2) (Freque	ency corre	ected)		<u> </u>	
	T€	errain / Red	circulation	Adjusted	Prog	ram ANNX	OQ9 Ver	sion - 11/1	8/76		
Florida Pov St. Lucie U Hutchinsor Dames and	wer & Light Co Init 1 า Island, Florid d Moore Job N	ompany la lo: 1.4598	3 - 112		Aver Perio Base	age Annu od of Recc Distance	al Relative ord: 9/1/76 in Miles/K	Concentr to 8/31/7 (ilometers	ation (sec/ 8	'cubic met	er)
AFFECTED SECTOR	DESIGN DISTANCE MILES	.25 .40	.75	1.25	1.75	2.25 3.62	2.75 4.42	3.25 5.23	3.75 6.03	4.25 6.84	4.75 7.64
NNE	0.	1.1E-05	1.7E-06	7.8E-07	4.5E-07	3.1E-07	2.2E-07	1.7E-07	1.5E-07	1.2E-07	1.0E-07
NE	0.	1.3E-05	2.1E-06	8.9E-07	5.1E-07	3.4E-07	2.4E-07	1.7E-07	1.4E-07	1.1E-07	9.8E-08
ENE	0.	9.3E-06	1.4E-06	6.2E-07	3.7E-07	2.5E-07	1.9E-07	1.3E-07	1.1E-07	8.8E-08	7.5E-08
E	0.	9.8E-06	1.6E-06	6.5E-07	3.7E-07	2.5E-07	1.8E-07	1.4E-07	1.2E-07	9.9E-08	8.4E-08
ESE	0.	1.2E-05	1.9E-06	8.1E-07	4.8E-07	3.2E-07	2.4E-07	1.8E-07	1.4E-07	1.1E-07	9.0E-08
SE	0.	1.4E-05	2.4E-06	9.7E-07	5.7E-07	4.0E-07	2.9E-07	2.3E-07	1.9E-07	1.4E-07	1.2E-07
SSE	0.	1.1E-05	1.7E-06	7.3E-07	4.3E-07	2.9E-07	2.1E-07	1.6E-07	1.3E-07	1.1E-07	9.1E-08
S	0.	6.2E-06	1.0E-06	4.2E-07	2.5E-07	1.8E-07	1.4E-07	1.0E-07	8.0E-08	6.6E-08	5.5E-08
SSW	0.	5.7E-06	9.0E-07	4.0E-07	2.3E-07	1.6E-07	1.1E-07	8.9E-08	7.0E-08	5.7E-08	4.8E-08
0111				0.05.07	2 2 5 07	1.6E-07	1.1E-07	8.6E-08	7.0E-08	6.0E-08	5.1E-08
SW	0.	6.1E-06	9.4E-07	3.9E-07	Z.ZE-07	1.02.07					
WSW	0. 0.	6.1E-06 7.3E-06	9.4E-07 1.1E-06	3.9E-07 4.6E-07	2.2E-07 2.7E-07	1.7E-07	1.3E-07	1.0E-07	8.0E-08	6.5E-08	5.4E-08
WSW W	0. 0. 0.	6.1E-06 7.3E-06 7.6E-06	9.4E-07 1.1E-06 1.2E-06	3.9E-07 4.6E-07 5.2E-07	2.7E-07 2.9E-07	1.7E-07 2.0E-07	1.3E-07 1.3E-07	1.0E-07 1.0E-07	8.0E-08 8.4E-08	6.5E-08 7.2E-08	5.4E-08 6.1E-08
WSW WSW WNW	0. 0. 0. 0.	6.1E-06 7.3E-06 7.6E-06 1.4E-05	9.4E-07 1.1E-06 1.2E-06 2.1E-06	3.9E-07 4.6E-07 5.2E-07 9.1E-07	2.7E-07 2.9E-07 5.2E-07	1.7E-07 2.0E-07 3.4E-07	1.3E-07 1.3E-07 2.6E-07	1.0E-07 1.0E-07 2.0E-07	8.0E-08 8.4E-08 1.5E-07	6.5E-08 7.2E-08 1.2E-07	5.4E-08 6.1E-08 1.0E-07
WSW WSW WNW NW	0. 0. 0. 0. 0.	6.1E-06 7.3E-06 7.6E-06 1.4E-05 1.6E-05	9.4E-07 1.1E-06 1.2E-06 2.1E-06 2.4E-06	3.9E-07 4.6E-07 5.2E-07 9.1E-07 1.0E-06	2.2E-07 2.7E-07 2.9E-07 5.2E-07 5.9E-07	1.7E-07 2.0E-07 3.4E-07 3.9E-07	1.3E-07 1.3E-07 2.6E-07 2.8E-07	1.0E-07 1.0E-07 2.0E-07 2.1E-07	8.0E-08 8.4E-08 1.5E-07 1.7E-07	6.5E-08 7.2E-08 1.2E-07 1.4E-07	5.4E-08 6.1E-08 1.0E-07 1.2E-07
WSW WSW WNW NW NW	0. 0. 0. 0. 0. 0.	6.1E-06 7.3E-06 7.6E-06 1.4E-05 1.6E-05 1.5E-05	9.4E-07 1.1E-06 1.2E-06 2.1E-06 2.4E-06 2.2E-06	3.9E-07 4.6E-07 5.2E-07 9.1E-07 1.0E-06 9.6E-07	2.2E-07 2.7E-07 2.9E-07 5.2E-07 5.9E-07 5.5E-07	1.7E-07 2.0E-07 3.4E-07 3.9E-07 3.6E-07	1.3E-07 1.3E-07 2.6E-07 2.8E-07 2.6E-07	1.0E-07 1.0E-07 2.0E-07 2.1E-07 2.0E-07	8.0E-08 8.4E-08 1.5E-07 1.7E-07 1.6E-07	6.5E-08 7.2E-08 1.2E-07 1.4E-07 1.3E-07	5.4E-08 6.1E-08 1.0E-07 1.2E-07 1.2E-07

Number of Valid Observations = 17135 Number of Invalid Observations = 385 Note 1 - Any interpolations between stated mileages will be done by log-log

Number of Calms Lower Level = 95 Number of Calms Upper Level = 0

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DCEDURE NO .:										-	· · ·
C-200				S	T. LUCIE	PLANT			•		
					TABLE M	-6					<
		HISTORIC	AL LONG	<u>S TERM D</u>	EPLETED	<u>- (X/Q)_D (</u>	Frequenc	y correcte	<u>ed)</u>		1994 - La 199
	Τe	errain / Re	circulation	Adjusted	Prog	ram ANNX	(OQ9 Ver	sion - 11/1	8/76		
Florida Pov	ver&LightCo	mnany		-	_						
St Lucie II	init 1	mpany				nual Rola	itive Conce	antration D	) hatalaa	ec/cubic r	notor)
Hutchinson	Island Florid	19		/ F	Period of R		1/76 to 8/3	1/78			netery
Dames and	1 Moore Joh N	10. 4598 -	112	F	Rase Dista	nce in Mile	s/Kilomet	are			
Dames and		10. 4030 -	112	L				515			
AFFECTED	DESIGN DISTANCE	.25	.75	1.25	1.75	2.25	2.75	3.25	3.75	4.25	4.75
320101	MILES	.40	1.21	2.01	2.82	3.62	4.42	5.23	6.03	6.84	7.64
NNE	0.	1.1E-05	1.6E-06	6.6E-07	3.8E-07	2.4E-07	1.7E-07	1.3E-07	1.1E-07	9.2E-08	7.6E-08
NE	0.	1.2E-05	1.7E-06	7.6E-07	4.3E-07	2.8E-07	1.9E-07	1.4E-07	1.1E-07	8.6E-08	7.4E-08
ENE	0.	8.9E-06	1.2E-06	5.3E-07	3.0E-07	2.0E-07	1.4E-07	1.0E-07	8.4E-08	6.6E-08	5.6E-08
E	0.	9.1E-06	1.3E-06	5.6E-07	3.1E-07	2.1E-07	1.5E-07	1.1E-07	9.1E-08	7.5E-08	6.3E-08
ESE	0.	1.2E-05	1.6E-06	6.9E-07	3.9E-07	2.6E-07	1.9E-07	1.4E-07	1.1E-07	8.5E-08	6.7E-08
SE	0.	1.3E-05	2.0E-06	8.2E-07	4.7E-07	3.3E-07	2.3E-07	1.8E-07	1.3E-07	1.1E-07	9.0E-08
SSE	0.	1.1E-05	1.6E-06	6.3E-07	3.5E-07	2.4E-07	1.8E-07	1.4E-07	1.0E-07	8.2E-08	6.8E-08
· S	0.	5.9E-06	9.1E-07	3.6E-07	2.1E-07	1.4E-07	1.1E-07	7.7E-08	6.2E-08	5.0E-08	4.1E-08
SSW	0.	5.4E-06	8.0E-07	3.4E-07	1.9E-07	1.3E-07	8.9E-08	6.9E-08	5.5E-08	4.3E-08	3.6E-08
SW	0.	5.7E-06	8.4E-07	3.4E-07	1.8E-07	1.2E-07	9.2E-08	6.7E-08	5.3E-08	4.6E-08	3.8E-08
WSW	0.	7.0E-06	9.6E-07	4.0E-07	2.2E-07	1.4E-07	1.0E-07	8.0E-08	6.1E-08	5.0E-08	4.0E-08
			4 4 - 00	4 45 07	245.07	1.6E-07	1 1E-07	8.2E-08	6.4E-08	5.5E-08	4.4E-08
W	0.	7.3E-06	1.1E-06	4.46-07	2.40-07	1.02-07	1.12.07				
W WNW	0. 0.	7.3E-06 1.3E-05	1.1E-06 1.9E-06	4.4E-07 7.9E-07	4.4E-07	2.9E-07	2.0E-07	1.6E-07	1.2E-07	9.3E-08	7.8E-08
W WNW NW	0. 0. 0.	7.3E-06 1.3E-05 1.5E-05	1.9E-06 2.1E-06	4.4E-07 7.9E-07 8.9E-07	4.4E-07 4.9E-07	2.9E-07 3.1E-07	2.0E-07 2.3E-07	1.6E-07 1.7E-07	1.2E-07 1.3E-07	9.3E-08 1.0E-07	7.8E-08 8.5E-08
W WNW NW NW	0. 0. 0. 0.	7.3E-06 1.3E-05 1.5E-05 1.4E-05	1.9E-06 2.1E-06 2.1E-06	4.4E-07 7.9E-07 8.9E-07 8.3E-07	4.4E-07 4.9E-07 4.5E-07	2.9E-07 3.1E-07 2.9E-07	2.0E-07 2.3E-07 2.0E-07	1.6E-07 1.7E-07 1.6E-07	1.2E-07 1.3E-07 1.2E-07	9.3E-08 1.0E-07 1.0E-07	7.8E-08 8.5E-08 8.6E-08

Number of Invalid Observations = 385Number of Calms Upper Level = 0Note 1 - Any interpolations between stated mileages will be done by log-log

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REVISION NO .:	PROCEDURE T	PROCEDURE TITLE:									GE: T	
41		OFFSITE DOSE CALULATION MANUAL (ODCM)								1	045-5004	
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C-200		ST. LUCIE PLANT										
TABLE M-7												
HISTORICAL LONG TERM - (D/Q) (Frequency corrected)												
TERRAIN / RECIRCULATION ADJUSTED PROGRAM ANNXOQ9 VERSION - 11/18/76												
Florida Power & Light Company												
St. Lucie Unit 1												
Hutchinson Island, Florida Period of Record: 9/1/76 to 8/31/78											,	
Dames and Moore Job No: 4598 - 112 Base Distance in Miles/Kilometers												
AFFECTED	DESIGN											
SECTOR		.25	.75	1.25	1.75	2.25	2.75	3.25	3.75	4.25	4.75	
NNE		.40 6.5E-08	0.3E-00	3.7E-09	2.02 2.1E-09	3.02 1 3⊑_09	4.42 9.0⊑_10	5.23 6.8E-10	5.03 5.5E-10	0.04 4 3E-10	7.04 3.5E-10	
NE	0.	6.0E-08	8 9E-09	3.5E-09	1 9E-09	1.3E-03	8 1E-10	5.6E-10	4 3E-10	3 3E-10	2.8E-10	
FNF	0.	3 2E-08	4 8E-09	1.9E-09	1.0E-00	6.6F-10	4.6E-10	3.0E-10	2 4F-10	1.9E-10	1.5E-10	
E	0.	3.0E-08	4.6E-09	1.8E-09	9.5E-10	6.0E-10	4.2E-10	3.1E-10	2.5E-10	2.0E-10	1.6E-10	
ESE	0.	3.7E-08	5.8E-09	2.3E-09	1.2E-09	8.0E-10	5.4E-10	3.9E-10	3.0E-10	2.2E-10	1.7E-10	
SE	0.	6.4E-08	1.0E-08	4.0E-09	2.1E-09	1.4E-09	9.7E-10	7.2E-10	5.6E-10	4.3E-10	3.5E-10	
SSE	0.	6.2E-08	9.5E-09	3.6E-09	2.0E-09	1.2E-09	8.7E-10	6.4E-10	4.9E-10	3.9E-10	3.1E-10	
S	0.	4.2E-08	7.0E-09	2.6E-09	1.4E-09	9.5E-10	6.9E-10	4.9E-10	3.8E-10	3.0E-10	2.5E-10	
SSW	0.	3.4E-08	5.4E-09	2.2E-09	1.1E-09	7.5E-10	5.0E-10	3.7E-10	2.9E-10	2.3E-10	1.8E-10	
SW	0.	4.5E-08	7.0E-09	2.6E-09	1.5E-09	9.0E-10	6.6E-10	4.6E-10	3.6E-10	3.0E-10	2.5E-10	
WSW	0.	5.3E-08	7.7E-09	3.0E-09	1.6E-09	1.0E-09	7.3E-10	5.5E-10	4.1E-10	3.3E-10	2.6E-10	
W	0.	5.0E-08	7.5E-09	3.0E-09	1.6E-09	9.8E-10	6.7E-10	5.0E-10	3.8E-10	3.2E-10	2.6E-10	
WNW	0.	8.8E-08	1.3E-08	4.9E-09	2.6E-09	1.7E-09	1.1E-09	8.7E-10	6.6E-10	5.1E-10	4.2E-10	
NW	0.	8.2E-08	1.2E-08	4.7E-09	2.5E-09	1.6E-09	1.1E-09	7.9E-10	5.8E-10	4.7E-10	3.8E-10	
NNW	0.	8.2E-08	1.2E-08	4.6E-09	2.4E-09	1.5E-09	1.1E-09	8.1E-10	5.9E-10	4.8E-10	4.0E-10	
Ν	0.	5.1E-08	7.3E-09	2.9E-09	1.5E-09	9.8E-10	7.1E-10	5.4E-10	4.2E-10	3.2E-10	2.7E-10	

Number of Valid Observations = 17135 Number of Invalid Observations = 385

Number of Calms Lower Level = 95 Number of Calms Upper Level = 0

Note 1 - Any interpolations between stated mileages will be done by log-log
REVISION NO .:		PROCEDURE TITLE:					PAGE.	PAGE:	
41		OFFSITE DOSE CALCULATION MANUAL (ODCM)			CM)	6 . 6			
PROCEDURE NC	D.:					· · · Z1	0 01 23 1		
C-20		S	T. LUCIE I	PLANT					
	•		-					$\frac{1}{\sqrt{2}}$	
			•	TABLE M	-8		· · · · ·	and a start of the second s Second second	
Joint Wind Fr	requency	Distributio	n C	ata Period	: Septemb	er 1, 1976 -	August 31	, 1978	
All Winds				St. I	Lucie Unit 2	2			
Data Source:	On-Site	;		Hute	chinson Isla	and, Florida	li		
Wind Sensor	Height '	10.00 Mete	rs	Flor	ida Power	& Light Co.			
Table Genera	ated: 12/	05/78.07.4	12.18.	Dar	nes and Mo	oore Job No	o: 4598 - 1	12 - 27	
		Wind	Speed Cat	tegories (M	eters per S	econd)			
WIND SECTOR	0.0-	1.5-	3.0- 5.0	5.0- 7.5	7.5-	>10.0	TOTAL ¹	MEAN	
<u>SECTOR</u>	71	206	318	7.5	3	0	669		
NNE	.43	1.25	1.92	.43	.02	0.00	4.05	3.32	
	62	292	385	128	0	0	867	343	
	.38	1.77	2.33	.77	0.00	0.00	5.25	0.40	
ENE	60	334	505	158	0	0	1057	3.51	
	.36	2.02	3.06	.96	0.00	0.00	6.40		
E	.42	2.15	3.09	.46	0.00	0.00	6.11	3.25	
ECE	115	684	744	72	1	0	1616	2.04	
ESE	.70	4.14	4.50	.44	.01	0.00	9.78	3.04	
SE	183	660	749	28	0	0	1620	2.88	
	1.11	3.99	4.53	.17	0.00	0.00	9.81	2.00	
SSE	129	579	656	93			1458	3.10	
	./0	3.50	3.97	.50	.01	0.00	0.02		
S	44	1 88	2 46	60 60	05	01	5 43	3.36	
	84	372	446	105	33	4	1044		
SSW	.51	2.25	2.70	.64	.20	.02	6.32	3.48	
CIA/	129	440	336	106	14	0	1025	2 10	
300	.78	2.66	2.03	.64	.08	0.00	6.20	5.10	
wsw	155	320	186	29	5	0	695	2.59	
	.94	1.94	1.13	.18	.03	0.00	4.21		
W	1/4 1.05	267	119 72	37	2	0 00	599 3.63	2.43	
	203	304	172	17	0	0.00	696	0.04	
WNW	1.23	1.84	1.04	.10	0.00	0.00	4.21	2.34	
	143	518	424	50	0	0	1135	2.85	
	.87	3.14	2.57	.30	0.00	0.00	6.87	2.05	
NNW	85	379	535	70		0	1070	3.22	
	.51	2.29	3.24	.42	.01	0.00	6.46		
N	.55	1.17	3.21	.90	.03	0.00	5.86	3.69	
CALM	95	1					95	CALM	
	.57						.57		
TOTAL	1920	6214	7023	1287	73	5	16522	3,10	
	11.62	37.61	42.51	7.79	.44	.03	100.00	0.10	
NUMBER OF	VALID OF	BSERVATIC	NS 1652	2 94.30 F	PCT. Ke	v XXX N	umber of Oc	currences	

NUMBER OF INVALID OBSERVATIONS 988 TOTAL NUMBER OF OBSERVATIONS 17520 100.00 PCT.

.

5.70 PCT.

XXX Percent Occurrences

¹ - Totals below are given in <u>hours</u> & percent for wind frequency by sectors

END OF APPENDIX A

SION NO.:	PROCEDURE TITLE:					PAGE:	
41		OFFSITE DOSE CALCULATION MANUAL (ODCM)					
CEDURE NO.:							
C-200		ST. LUCIE PLANT					
			3				
		RADIOLOGICAL ENVIRONMEN	- FAL SURVEII	LANCE		· · · · · · · · · · · · · · · · · · ·	
		(Page 1 of 4	)				
		ST. LUCIE PLA	NT				
		Key to Sample Loo	cations				
PATHWAY	LOCATION	DESCRIPTION	SAMPLES COLLECTED	SAMPLE COLLECTION FREQUENCY	APPROXIMATE DISTANCE (miles)	DIRECTION SECTOR	
Direct Radiation	N-1	North of Blind Creek	TLD	Quarterly	1	N	
<b>Direct Radiation</b>	NNW-5	Frederick Douglas Beach Entrance	TLD	Quarterly	4.8	NNW	
Direct Radiation	NNW-10	Coast Guard Station	TLD	Quarterly	8.7	NNW	
Direct Radiation	NW-5	Indian River Drive at Rio Vista Drive	TLD	Quarterly	5.4	NW	
Direct Radiation	NW-10	Intersection of SR 68 and 33rd St	TLD	Quarterly	9.6	NW	
Direct Radiation	WNW-2	Cemetery South of 7107 Indian River Drive	TLD	Quarterly	2.3	WNW	
Direct Radiation	WNW-5	US-1 at SR 712	TLD	Quarterly	5.1	WNW	
Direct Radiation	WNW-10	SR 70, Just West of I-95	TLD	Quarterly	10	WNW	
Direct Radiation	W-2	Power Line - 77609 Indian River Drive	TLD	Quarterly	2	W	
Direct Radiation	W-5	Oleander and Sager Streets	TLD	Quarterly	5.4	W	
Direct Radiation	W-10	I-95 and SR 709	TLD	Quarterly	10.3	W	
<b>Direct Radiation</b>	WSW-2	8503 Indian River Drive	TLD	Quarterly	1.8	WSW	
<b>Direct Radiation</b>	WSW-5	Prima Vista Blvd. at Yacht Club	TLD	Quarterly	5.6	WSW	
Direct Radiation	WSW-10	Del Rio and Davis Streets	TLD	Quarterly	10	WSW	
Direct Radiation	SW-2	9205 Indian River Drive	TLD	Quarterly	2	SW	
<b>Direct Radiation</b>	SW-5	FPL Walton Svc Ctr	TLD	Quarterly	4.5	SW	
Direct Radiation	SW-10	Port St. Lucie Blvd. and Cairo Road	TLD	Quarterly	10.2	SW	
Direct Radiation	SSW-2	10307 Indian River Drive	TLD	Quarterly	2.6	SSW	

EVISION NO.:	PROCEDURE TITLE:					PAGE:	
41	OFFSITE DOSE CALCULATION MANUAL (ODCM)					218 of 231	
ROCEDURE NO .:							
C-200		ST. LUCIE PI	LANT				
	APPENDIX B <u>RADIOLOGICAL ENVIRONMENTAL SURVEILLANCE</u> (Page 2 of 4)						
		ST. LUCIE PLA Key to Sample Loc	NT cations				
PATHWAY	LOCATION	DESCRIPTION	SAMPLES COLLECTED	SAMPLE COLLECTION FREQUENCY	APPROXIMATE DISTANCE (miles)	DIRECTION SECTOR	
<b>Direct Radiation</b>	SSW-5	Port St. Lucie Blvd. and US 1	TLD	Quarterly	6	SSW	
<b>Direct Radiation</b>	SSW-10	Pine Valley and Westmoreland Roads	TLD	Quarterly	8	SSW	
<b>Direct Radiation</b>	S-5	13189 Indian River Drive	TLD	Quarterly	5.2	S	
<b>Direct Radiation</b>	S-10	US 1 and Palm City Ave	TLD	Quarterly	10.8	S	
<b>Direct Radiation</b>	S/SSE-10	Indian River Drive and Quail Run Lane	TLD	Quarterly	9.9	SSE	
<b>Direct Radiation</b>	SSE-5	North of Entrance to Miramar	TLD	Quarterly	5.1	SSE	
<b>Direct Radiation</b>	SSE-10	Elliot Museum	TLD	Quarterly	10.2	SSE	
Direct Radiation	SE-1	South of Cooling Canal	TLD	Quarterly	1	SE	
Direct Radiation	*H-32	U. of Florida - 1FAS Entomology Lab Vero Beach	TLD	Quarterly	18.1	NNW	
Airborne	H08	FPL Substation - Weatherbee Road	Radioiodine & Particulates	Weekly	6	WNW	
Airborne	*H12	FPL Substation - SR 76, Stuart	Radioiodine & Particulates	Weekly	12	S	
Airborne	H14	Onsite - near south property line	Radioiodine & Particulates	Weekly	1	SE	
Airborne	H30	Power Line - 7609 Indian River Drive	Radioiodine & Particulates	Weekly	2	W	

* Denotes Control Sample

REVISION NO .:	PROCEDURE	PROCEDURE TITLE: P						
41		OFFSITE DOSE CALCULATION MANUAL (ODCM)						
PROCEDURE NO .:								
C-200		ST. LUCIE PL	ANT		: 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
	APPENDIX B RADIOLOGICAL ENVIRONMENTAL SURVEILLANCE (Page 3 of 4)							
		ST. LUCIE PLA Key to Sample Loc	NT ations					
PATHWAY	LOCATION	DESCRIPTION	SAMPLES COLLECTED	SAMPLE COLLECTION FREQUENCY	APPROXIMATE DISTANCE (miles)	DIRECTION SECTOR		
Airborne	H34	Onsite - At Meteorological Tower	Radioiodine & Particulates	Weekly	0.5	N		
Waterborne	H15	Atlantic Ocean vicinity of public beaches east side of Route A1A	Surface Water (ocean) Sediment from shoreline	Weekly Semi-Annually	< 1	ENE/E/ESE		
Waterborne	*H59	Near south end of Hutchinson Island	Surface Water (ocean) Sediment from shoreline	Monthly Semi-Annually	10-20	S/SSE		
Food Products	H15	Ocean side vicinity of St. Lucie Plant (NOTE 1)	Crustacea Fish	Semi-Annually Semi-Annually	<1	ENE/E/ESE		
Food Products	H51	Offsite near north property line	Broad Leaf vegetation	Monthly (when available)	1	N/NNW		

* Denotes Control Sample

REVISION NO.:	PROCEDURE	E TITLE:			P	AGE:
41	OFFSITE DOSE CALCULATION MANUAL (ODCM)					
PROCEDURE NO.:						· · · · ·
C-200		ST. LUCIE P	LANT		۰ ب	
APPENDIX B <u>RADIOLOGICAL ENVIRONMENTAL SURVEILLANCE</u> (Page 4 of 4)						
		ST. LUCIE PLA Key to Sample Lo	ANT cations			
PATHWAY	LOCATION	DESCRIPTION	SAMPLES COLLECTED	SAMPLE COLLECTION FREQUENCY	APPROXIMATE DISTANCE (miles)	DIRECTION SECTOR
Food Products	H52	Offsite near south property line	Broad leaf vegetation	Monthly (when available)	1	S/SSE
Food Products	*H59	Near south end of Hutchinson Island	Crustacea Fish Broad leaf vegetation	Semi-Annually Semi-Annually Monthly	10-20	S/SSE

# * Denotes control sample

It is the policy of Florida Power & Light Company (FPL) that the St. Lucie 1 & 2 Radiological Environmental Monitoring Programs are conducted by the State of Florida Department of Health (DOH) and Bureau of Radiation Control (BRC), pursuant to an Agreement between FPL and DOH and; that coordination of the Radiological Environmental Monitoring Programs with DOH and compliance with the Radiological Environmental Monitoring Programs are between FPL and DOH and; that coordination of the Radiological Environmental Monitoring Programs with DOH and compliance with the Radiological Environmental Monitoring Programs with DOH and compliance with the Radiological Environmental Monitoring Programs with DOH and compliance with the Radiological Environmental Monitoring Programs with DOH and compliance with the Radiological Environmental Monitoring Programs with DOH and compliance with the Radiological Environmental Monitoring Programs with DOH and compliance with the Radiological Environmental Monitoring Programs with DOH and compliance with the Radiological Environmental Monitoring Programs with DOH and compliance with the Radiological Environmental Monitoring Programs with DOH and compliance with the Radiological Environmental Monitoring Programs with DOH and compliance with the Radiological Environmental Monitoring Programs with DOH and compliance with the Radiological Environmental Monitoring Programs with DOH and compliance with the Radiological Environmental Monitoring Programs with DOH and compliance with the Radiological Environmental Monitoring Programs with DOH and compliance with the Radiological Environmental Monitoring Programs with DOH and compliance with the Radiological Environmental Monitoring Programs with DOH and Compliance With the Radiological Environmental Monitoring Programs with DOH and Compliance With the Radiological Environmental Monitoring Programs with DOH and Compliance With the Radiological Environmental Monitoring Programs with Programs with Programs with Programs with Programs with Programs w

# <u>NOTE 1</u>

These samples may be collected from or supplemented by samples collected from the plant intake canal if the required analyses are unable to be performed due to unavailability or inadequate quantity of sample from the ocean side location.

# END OF APPENDIX B

		PROCEDURE TITLE:		PAGE:	
41		OFFSITE DO	SE CALCULATION MANUAL (ODCM)		
ROCEDURE	Ю.:			221 of 231	
C-2	00		ST. LUCIE PLANT		
	<u></u>	<u>ST. LUCIE SU</u>	APPENDIX B-1 IPPLEMENTAL REMP SAMPLING (Page 1 of 3)		
			NOTE		
<u> </u>	pproximat	e Distance fror	n plant in miles		
athway:	Direct Exp	osure via TLD			
Sampling	and Colle	ection Frequer	<b>cy:</b> Quarterly Collection		
Name	Sector	Distance *	Description	<u> </u>	
H-08	WNW	6	FPL Substation (White City Sub) Wea	therbee Rd	
H-09	SSW	7	FPL Substation (Jensen Sub) US-1 South of St		
			Lucie County Line		
H-12	S	12	FPL Substation (Stuart Sub), SR-76, V	Vest of Stuart	
	-		by High School		
H-14	SE	1	South Site Property Line		
H-33	ESE	<1	On-site North of Intake Canal West of Dunes		
H-34	 N	0.5	On-site, Meteorology Tower		
	NE	<1	Utility Pole, A1A, East of TAB		
и <b>п-</b> би и	SIM	<1	Canal Dredging Spoils Mound		
H-61 &	300	-			
H-61 & H-62	500				
H-60 H-61 & H-62	Airborne F and Colle	Radioiodines ar	nd Particulates <b>ncy:</b> Samples Collected Weekly; 1. lodine - Gamma-Spec Analysis 2. Particulate - Gross Beta and Cor Gamma-Spec Analysis	mposite	
H-60 H-61 & H-62 Pathway: A Sampling	Airborne F and Colle Sector	Radioiodines ar	nd Particulates <b>ncy:</b> Samples Collected Weekly; 1. lodine - Gamma-Spec Analysis 2. Particulate - Gross Beta and Cor Gamma-Spec Analysis Description	mposite	
H-60 H-61 & H-62 Pathway: A Sampling Name H-09	Airborne F and Colle Sector SSW	Radioiodines ar ection Frequer Distance *	nd Particulates ncy: Samples Collected Weekly; 1. lodine - Gamma-Spec Analysis 2. Particulate - Gross Beta and Cor Gamma-Spec Analysis Description FPL Substation (Jensen Sub), US-1 S Lucie County Line	mposite outh of St.	
H-60 H-61 & H-62 Pathway: J Sampling Name H-09 H-32	Airborne F and Colle Sector SSW	Radioiodines an ection Frequer	nd Particulates ncy: Samples Collected Weekly; 1. lodine - Gamma-Spec Analysis 2. Particulate - Gross Beta and Cor Gamma-Spec Analysis Description FPL Substation (Jensen Sub), US-1 S Lucie County Line HRS Entomology Lab., East of US-1	mposite outh of St. Vero Beach	

	· ľ	ROGEDORE IIILE:	PAGE: 1
4	1	OFFSITE DOS	SE CALCULATION MANUAL (ODCM)
OCEDURE	NO.:		
C-2	00		ST. LUCIE PLANT
		<u>ST. LUCIE SU</u>	APPENDIX B-1 PPLEMENTAL REMP SAMPLING (Page 2 of 3)
*	Approxima	te Distance fro	<u>NOTE</u> m plant in miles.
athway:	Waterborn	e, Surface Wa	ter
<b>ampling</b> nalysis	and Colle	ction Frequen	cy: Monthly Collection; Gamma-Spec and Tritium
Name	Sector	Distance *	Description
H-13	NNW/N	<1	On-site, North Bank of Big Mud Creek, Between Pump Station and Meteorology Tower
H-36	NE/ENE	<1	On-site Discharge Canal West Side A1A 5/6/96
11-50			On-site, Discharge Canal, Near Bridge
athway:	Waterborn	e, Sediment	On-site, Discharge Canal, Near Bridge
athway: ampling Name	Waterborn and Colle	e, Sediment ction Frequen	On-site, Discharge Canal, Near Bridge
athway: ampling <u>Name</u> H-13	Waterborn and Colle Sector NNW/N	e, Sediment ction Frequen Distance *	On-site, Discharge Canal, Near Bridge
athway: ampling Name H-13 H-16	Waterborn and Colle Sector NNW/N	e, Sediment ction Frequent Distance * <1 1	On-site, Discharge Canal, Near Bridge
athway: ampling Name H-13 H-16 H-19	Waterborn and Colle Sector NNW/N N SE	e, Sediment ction Frequen Distance * <1 1 1	On-site, Discharge Canal, Near Bridge         On-site, Discharge Canal, Near Bridge         Incy: Semi-Annual Collection and Gamma-Spec Anal         Consite, North Bank of Big Mud Creek, Between         Pump Station and Meteorology Tower         Ocean Covered Sand, Beach Opposite Blind         Creek, North of Discharge Canal         Ocean Covered Sand, Beach South of Intake         Canal
athway: ampling Name H-13 H-16 H-19 H-36	Waterborn and Colle Sector NNW/N N SE NE/ENE	e, Sediment ction Frequent Distance ² <1 1 1 1 1 1	On-site, Discharge Canal, Near Bridge         Incy: Semi-Annual Collection and Gamma-Spec Anal         Incy: Semi-Annual Collection and Meteorology Tower         Incy: Incy: Semi-Annual Collection and Meteorology Tower         Incy: Incy
athway: ampling Name H-13 H-16 H-19 H-36 athway: ampling	Waterborn and Colle Sector NNW/N N SE NE/ENE Waterborn and Colle	e, Sediment ction Frequent Distance * <pre>     Cline     Cline</pre>	On-site, Discharge Canal, Near Bridge <b>Description</b> On-site, North Bank of Big Mud Creek, Between Pump Station and Meteorology Tower Ocean Covered Sand, Beach Opposite Blind Creek, North of Discharge Canal Ocean Covered Sand, Beach South of Intake Canal On-site, Discharge Canal, West Side A1A
athway: ampling Name H-13 H-16 H-19 H-36 athway: ampling Name	Waterborn and Colle Sector NNW/N N SE NE/ENE Waterborn and Colle	e, Sediment ction Frequent Distance * <pre>     Cline *     Cline *     Cline *     Cline *     Cline *     Cline *     Distance * </pre>	On-site, Discharge Canal, Near Bridge         Incy: Semi-Annual Collection and Gamma-Spec Anal         On-site, North Bank of Big Mud Creek, Between         Pump Station and Meteorology Tower         Ocean Covered Sand, Beach Opposite Blind         Creek, North of Discharge Canal         Ocean Covered Sand, Beach South of Intake         Canal         On-site, Discharge Canal, West Side A1A
athway: ampling Name H-13 H-16 H-19 H-36 athway: ampling Name H-15	Waterborn and Colle Sector NNW/N N SE NE/ENE Waterborn and Colle Sector	e, Sediment ction Frequent Distance * <pre>     Click</pre> Click Picture * Click	On-site, Discharge Canal, Near Bridge         Incy: Semi-Annual Collection and Gamma-Spec Anal         Con-site, North Bank of Big Mud Creek, Between         Pump Station and Meteorology Tower         Ocean Covered Sand, Beach Opposite Blind         Creek, North of Discharge Canal         Ocean Covered Sand, Beach South of Intake         Canal         On-site, Discharge Canal, West Side A1A
athway: ampling Name H-13 H-16 H-19 H-36 athway: ampling Name H-15 H-16	Waterborn and Colle Sector NNW/N N SE NE/ENE Waterborn and Colle Sector NE/ENE N	e, Sediment ction Frequent Distance * <pre>     Comparison     Comparison</pre>	On-site, Discharge Canal, Near Bridge         Incy: Semi-Annual Collection and Gamma-Spec Anal         Con-site, North Bank of Big Mud Creek, Between         Pump Station and Meteorology Tower         Ocean Covered Sand, Beach Opposite Blind         Creek, North of Discharge Canal         Ocean Covered Sand, Beach South of Intake         Canal         On-site, Discharge Canal, West Side A1A

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	41		OFFSITE DOS	E CALCULATION MANUAL (ODCM)	
PROCED	URE NO	D.:		, , , , , , , , , , , , , , , , , , ,	223 of 231
	C-20	0		ST. LUCIE PLANT	
			ST. LUCIE SUP	APPENDIX B-1 PLEMENTAL REMP SAMPLING (Page 3 of 3)	
	* A	pproxima	ate Distance from	NOTE plant in miles.	
	# A 	Ithough t ample av	the Name remain vailability.	s the same, the locations can vary wil	h
Pathw Sampl	ay: lı ing a	ngestion, Ind Colle	Garden Crop	<b>y:</b> Annual Collection and Gamma-Spe	ec Analysis
Nam	e #	Secto	r Distance *	Description	
H-4	1	W	2	Private Residence, Indian River Dr.	
Nam	ing a e # ∣	Secto	r Distance *	y: Annual Collection and Gamma-Spe	ec Analysis
H-2	23	W	5	Vicinity of US-1 and Easy St.	
			ENI	D OF APPENDIX B-1	

<b>REVISION NO.:</b>	PROCED	JRE TITLE:			PAGE:
41	, I	OFFSITE DOSE CALCULATION MANUAL (ODCM)			004 -5 004
PROCEDURE N	IO.:				
C-2(	00	ST. LUCIE PLANT			
RA		NVIRONMENTAL SA		PORT OF THE GROUNDWATER PROTECTION IN	
			(Page	e 1 of 2)	
			( -0 -	· · · · · · · · · · · · · · · · · · ·	
			ST. LUC	IE PLANT	
			Key to Sam	ple Locations	
	PSLID			LOCATION DESCRIPTION	
H70	GIS-MW-ES	Tritium / Gamma	Quarterly	West of A1A: between the discharge canal and Ga	ite "B"
H71	GIS-MW-EI	Tritium / Gamma	Quarterly	West of A1A; between the discharge canal and Ga	ite "B"
H72	GIS-MW-SI	Tritium / Gamma	Quarterly	South of Intake canal and the adjacent access road	d
H73	GIS-MW-SWS	Tritium / Gamma	Quarterly	S/W corner of Intake canal and the adjacent acces	s road
H74	GIS-MW-SWI	Tritium / Gamma	Quarterly	S/W corner of Intake canal and the adjacent acces	s road
H75	GIS-MW-WI	Tritium / Gamma	Quarterly	West of plant site and intake canal; South of switch	iyard
H76	H76	Tritium / Gamma	Quarterly	North of Simulator; South of Big Mud Creek	
H77	H77	Tritium / Gamma	Quarterly	East of Barge Slip; By LU bldg	
H78	H78	Tritium / Gamma	Quarterly	South of North Warehouse	
H79	H79	Tritium / Gamma	Quarterly	West of A1A and East of Parking Lot	
t is the pol	icy of Florida Pov	ver & Light Company	(FPL) that the St.	Lucie 1 & 2 Radiological Environmental Monitoring F	rograms are
conducted '	by the State of F	lorida Department of I	Health (DOH) and	Bureau of Radiation Control (BRC), pursuant to an A	Agreement

between FPL and DOH and; that coordination of the Radiological Environmental Monitoring Programs with DOH and compliance with the Radiological Environmental Monitoring Program Controls are the responsibility of the Nuclear Plant Support Services Department.

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REVISION NO .:	PROCEDURE TITLE:	PAGE:
41	OFFSITE DOSE CALCULATION MANUAL (ODCM)	
PROCEDURE NO .:		225 of 231
C-200	ST. LUCIE PLANT	
RADIOL	APPENDIX B-2 OGICAL ENVIRONMENTAL SAMPLING IN SUPPORT ( GROUNDWATER PROTECTION INITIATIVE (Page 2 of 2)	DF THE
Until further notice performed in supp discretion of the C	e, sample collection points, sampling periodicity, and analy port of the Groundwater Protection INITIATIVE (NEI 07-07 Chemistry Manager.	vses to be ) shall be at the
	END OF APPENDIX B-2	
,		









REVISION NO .:			PROCEDURE TITLE:	PAGE:			
	41		OFFSITE DOSE CALCULATION MANUAL (ODCM)	000 06 00 1			
PROCED	PROCEDURE NO .:			230 01 23 1			
	C-200		ST. LUCIE PLANT				
DE	APPENDIX D DESCRIPTION OF THE INTERLABORATORY COMPARISON PROGRAM (ICP) (Page 1 of 2)						
The Si shall p	tate of articipa	Florida ate in a	, Department of Health-Bureau of Radiation Control (BF n INTERLABORATORY COMPARISON PROGRAM.	RC) Laboratory			
1.	The sa	ample r	natrices and analytical methods shall be:				
	A.	Gamm particu	a isotopic on a filter sample simulating airborne radioio late collection.	dine and			
	В.	Gamm	a isotopic on a water sample simulating a surface wate	r grab sample.			
	C.	Gamm	na isotopic on either sediment (or soil) or broad leaf veg	etation.			
1			NOTE				
		Step	os D, E and F reference NRC IR 99-04, PMAI 99-0716.				
	D.	Gross	Beta on an Air Filter matrix.				
	E.	Tritium	n in water, using method employed in REMP.				
	F.	Gamm sample within	na isotopic on a water sample (above) is used for milk n es are being obtained per land use census identified mi 5 miles of the plant site.	natrix if milk Ik animals			
2.	The s	ource o	f samples for this program:				
	Α.	A Fed Drinkir	eral Government Laboratory Program (e.g., DOE-MAPI ng Water Program)	EP, EPA Safe			
	В.	A Stat NIST t meet t	e, Federal, or private (commercial) laboratory capable o traceable samples. To be eligible, a Commercial Labor he FPL Quality Assurance criteria of "Quality Related".	of providing atory shall			
	C.	For Ga sample provid vendo FPL pe quanti	amma Analysis only, a FPL Nuclear Site Laboratory ma e matrices using known quantities of radioactivity from i ed by a FPL Contract Laboratory currently approved as r. These prepared matrices may be prepared by the ve ersonnel, but shall not exceed the participant(s) form ar ties for allowed radioactivity.	y prepare sotopes PC-1 Level endor, or by nd/or license			
3.	Analy: presci	sis of N ribed Ll	latrix samples shall be capable of achieving ODCM Tab _Ds on a blank sample.	ble 4.12-1			

REVISIO	N NO.:	PROCEDURE TITLE:	PAGE:
	41	OFFSITE DOSE CALCULATION MANUAL (ODCM)	
PROCED	OURE NO.:		231 07 231
	C-200	ST. LUCIE PLANT	
n	ESCOLDTION		
<u> </u>	ESCRIPTION	(Page 2 of 2)	<u>2RAIVI (ICP)</u>
		(1 dgc 2 01 2)	
4.	Results within	n 20% of expected shall be considered acceptable. Re	sults
	exceeding 20	1% but within 35% require a description of probable cau	se and actions
	considered N	of Acceptable: the Matrix shall be replaced and reanaly	y 55 % are
			200.
5.	The frequence	y for performing the interlaboratory comparison program	n shall be
	annually with	a maximum of 15 months between comparisons of sim	ilar matrices.
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### FLORIDA POWER & LIGHT COMPANY ST. LUCIE UNITS 1 AND 2 ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT JANUARY 1, 2013 THROUGH DECEMBER 31, 2013

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#### L-2014-053

ENCLOSURE 3 C-200, OFFSITE DOSE CALCULATION MANUAL REVISION 39 (PCR 1842056), REVISION 40 (PCR 1791994) AND REVISION 41 (PCR 1839250) MARKED UP PAGES (13 PAGES)

Cabinets/SEA/Action Tracking/A010/01842056 Manage Non Controlled Documents 01842056 25 Starts With Name Description Print Print Size Modified Ж C-200 Minor Change Markup.pdf 0 A (8.5X11) 2/26/2013 3:40 PA BONN 721 KB Acrobat PDF editorial change No 🟝 C-200.pdf A (8.5X11) 3/13/2013 8:41 AM AMBE 0 2.02 MB Acrobat PDF issued procedure No

				P3.20F4
		ST. LUC	IE PLAN	Procedure No. C-200
entation ment.	FPL	CHEMISTRY PROC SAFETY	COPERATING	Current Revision No 38
led index or docu INITIAL	Title: OFFSITE	E DOSE CAL (OD	CULATIO	N MANUAL
contro	Responsible Departme	nt: CHEMISTRY	<u></u>	
o tha	REVISION SUMMARY	•		
applicable) w	Revision 38 - Incorport from 2700 MWt to 3020 Unit 2 EPUI LAR. (Aut	ated PCR 1792615 to u ) MWt for Unit 2 as mod hor: Don Pendagast)	pdate Rated Therma ified for EPU conditi	al Power in Section 1.25 ons per EC 249985 and th
(if a	Revision 37 - Incorport Section 1.25 from 2700	ated PCR 1747213 for E MWt to 3020 MWt for U	EC 246569. Change Jnit 1. (Author: J. Fi	ed Rated Thermal Power ir iori)
	Revision 36 - Incorpora NPSS-HP-WP-002 to n	ated PCR 1744039 to cl ew procedure number f	nange procedure rei EV-SR-104-1001.(/	ference number from Author: B. Wooldridge)
	Revision 35 - Incorpora	ated PCR 563880 to up	date procedure refe	rences. (Author: P. Otis)
	<b>Revision 34</b> - Incorpora Reg guide 1.21. (Autho	ated PCR 1609718 to a pr: B. Vogel)	dd C-14 dose factor	s to comply with Rev 2 of
	Revision 33 - Incorpora other minor enhanceme	ated PCR 10-1701 to ac ents. (Author: Bruce Vo	ld east settling pond gel)	l justification paper and
	Revision 32 - Incorpora remp. (Author: Bruce	ated PCR 09-2349 to ac √ogel)	ld four Site Boundar	y Groundwater Wells to th
	Rev. 39- Inc. W/sumple Collect Broad leaf ver	op. PCR 1843( icn-frequency jetation,	for Crusta	cecc, Fish, and
	Revision	Approved By	Approval Date	UNIT #
	0	C.M. Welhy	04/27/82	DOCT PROCEDURE DOCN C-200 SYS
	38	B. Hughes	10/05/12	STATUS COMPLETED REV 38

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VISION NO .:	PROCEDURE	TITLE.			P	AGE:
38		OFFSITE DOSE CALCULATION	ON MANUAL (C	DCM)		218 of 230
C-200		ST. LUCIE PL	ANT		-	. : 
		APPENDIX E RADIOLOGICAL ENVIRONMENT (Page 3 of 4)	3 AL SURVEILL	ANCE		
		ST. LUCIE PLA Key to Sample Loc	NT ations			
PATHWAY	LOCATION	DESCRIPTION	SAMPLES COLLECTED	SAMPLE COLLECTION FREQUENCY	APPROXIMATE DISTANCE (miles)	DIRECTION SECTOR
Airborne	H34	Onsite - At Meteorological Tower	Radioiodine & Particulates	Weekly	0.5	N
Waterborne	H15	Atlantic Ocean vicinity of public beaches east side of Route A1A	Surface Water (ocean) Sediment from shoreline	Weekly Semi-Annually	< 1	ENE/E/ESE
Waterborne	*H59	Near south end of Hutchinson Island     Surface Water (ocean)     Monthly       Sediment from shoreline     10-20		10-20	S/SSE	
Food Products	H15	Ocean side vicinity of St. Lucie Plant (NOTE 1)	Crustacea Fish	Semi-Annually Semi-Annually	<1	ENE/E/ESE
Food Products	H51	Offsite near north property line	Broad Leaf vegetation	Monthly (when available)	1	N/NNW

Denotes Control Sample

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EVISION NO .:	PROCEDURE	TITLE:			P	AGE:			
38 ROCEDURE NO.:	-	OFFSITE DOSE CALCUL	ATION MANUAL (C	DCM)		219 of 230			
C-200 ST. LUCIE PLANT									
		APPEN RADIOLOGICAL ENVIRONM (Page 4 ST. LUCIE Key to Sample	DIX B <u>IENTAL SURVEILL</u> of 4) PLANT e Locations	ANCE					
PATHWAY	PATHWAY LOCATION DESCRIPTION SAMPLES COLLECTION DISTANCE DIRECTION COLLECTED ERECUENCY (miles)								
Food Products	H52	H52 Offsite near south property line Broad leaf Monthly 1 vegetation (when available)							
Food Products	•H59	*H59 Near south end of Hutchinson Island Effort Semi-Annually 10-20 vegetation Monthly							

* Denotes control sample

It is the policy of Florida Power & Light Company (FPL) that the St. Lucie 1 & 2 Radiological Environmental Monitoring Programs are conducted by the State of Florida Department of Health (DOH) and Bureau of Radiation Control (BRC), pursuant to an Agreement between FPL and DOH and; that coordination of the Radiological Environmental Monitoring Programs with DOH and compliance with the Radiological Environmental Monitoring Program Controls are the responsibility of the Nuclear Plant Support Services Department.

### NOTE 1

These samples may be collected from or supplemented by samples collected from the plant intake canal if the required analyses are unable to be performed due to unavailability or inadequate guantity of sample from the ocean side location.

END OF APPENDIX B

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Cabinets/U8/Action Tracking/A010/01791994 Manage Non Controlled Documents 01791994

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1 – <u>Name</u>	Links	Size	Format	<u>Description</u>	Print	Print Size A	lodified
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🖄 1-AOP-06.03.pdf	0	154 KB	Acrobat PDF	Issued Procedure	No	A (8.5X11)	6/25/2013 6::
之 1-AOP-06.04.pdf	0	121 KB	Acrobat PDF	Issued Procedure	No	A (8.5X11)	6/25/2013 6:1
1-NOP-25.01.pdf	0	139 KB	Acrobat PDF	Issued Procedure	No	A (8.5X11)	6/25/2013 6:
🔁 1-NOP-25.02.pdf	0	252 KB	Acrobat PDF	Issued Procedure	No	A (8.5X11)	6/25/2013 6:
🔁 1-NOP-25.06.pdf	0	145 KB	Acrobat PDF	Issued Procedure	No	A (8.5X11)	6/25/2013 6:3
之 1-NOP-25.08.pdf	0	100 KB	Acrobat PDF	'Issued Procedure	No	A (8.5X11)	6/25/2013 6:3
🖾 2-AOP-06.03.pdf	0	187 KB	Acrobat PDF	Issued Procedure	No	A (8.5X11)	6/25/2013 6:3
2-AOP-06.04.pdf	0	160 KB	Acrobat PDF	Issued Procedure	No	A (8.5X11)	6/25/2013 6:5
2-NOP-25,01.pdf	0	161 KB	Acrobat PDF	Issued Procedure	No	A (8.5X11)	6/25/2013 6:
左 2-NOP-25.02.pdf	0	155 KB	Acrobat PDF	Issued Procedure	No	A (8.5X11)	6/25/2013 6::
Z-NOP-25.06.pdf	0	239 KB	Acrobat PDF	Issued Procedure	No	A (8.5X11)	6/25/2013 6:5
🚔 2-NOP-25.08.pdf	0	114 KB	Acrobat PDF	Issued Procedure	No	A (8.5X11)	6/25/2013 6:5
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🔁 CG-59.pdf	0	391 KB	Acrobat PDF	Issued Procedure	No	A (8.5X11)	6/25/2013 6:5
COP-05.11.pdf	0	142 KB	Acrobat PDF	Issued Procedure	No	A (8.5X11)	6/25/2013 6:3
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All reco accorda approve 6.14, sl that dire and Su	ords of review ance with RM ed changes to nall be submi ectly impleme rveillances a	vs performed for changes to the ODCM shall be maintained in I-AA-100-1000, Processing Quality Assurance Records. All ORG the ODCM, with required documentation of the changes per TS tted to the NRC in the Annual Effluent Release Report. Procedures ent, administer or supplement the requirements of the ODCM Controls re:	5
•	CY-SL-102-0	104. Processing Aerated Liquid Waste	
· ~ ~	• <i>\$</i> \$-102-010 <del>SOP-01:0</del> 6, 1	s Processing Gaseous Wastes	
	<del>30P-05:02</del> , N	Met Tower Data Processing	
c	-CPP-18,2		
•	COP-05.04, (	Chemistry Department Surveillances and Parameters	
•	COP-07.05, I	Process Monitor Setpoints	
•	The Radiolog Florida as pe Number EV-S	ical Environmental Monitoring Program is performed by the State of r FPL Juno Nuclear Plant Services Corporate Environmental Procedu SR-104-1001.	ire
•	The licensee Groundwater Energy Institu	also performs environmental monitoring per EV-AA-01, Fleet Protection Program, in order to meet the objectives of the Nuclear ute's Industry Initiative (NEI 07-07).	
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C-200		ST.	LUCIE PLAN	T	
I	IOACTIVE	TAE EFFLUEN (Pa	BLE 3.3-14 NT MONITOR age 1 of 4)	SETPOINT BAS	<u>sis</u>
ODCM Effluent Gas (	Channels	CHANNEL ID	BASIS DOCUMENT	ALERT SETPOINT [®]	HIGH SETPOINT [®]
1PV LOW RANGE GAS		01-05	• C-200 ⁴	5 x Bkg. ⁹	Allotted % Of Site Limit ⁹
1FHB LOW RANGE GAS	S	04-05	C-200ª	5 x Bkg. ^q	Allotted % Of Site Limit ^e
2A PV PIG LOW RANGE	EGAS	423	C-200 ^a	б x Bkg. ^q	Allotted % Of Site
2B PV PIG LOW RANGE	E GAS	433	C-200 ^a	5 x Bkg.	Limit ^e For Plant Vent #2
2FHB LOW RANGE GA	S	413	C-200 ^a	5 x Bkg.	Allotted % Of Site Limit ⁹
SGBDB LOW RANGE G	AS	45-6	C-200 ⁸	5 x Bkg.	Allotted % Of Site Limit ⁹
1 CONDENSER AIR EJI	ECTOR	35	C-200	2 x Bkg. ^b	3 x Bkg.
2 CONDENSER AIR EJI	ECTOR	403	C-200	2 x Bkg. ^b	3 x Bkg.
1 BATCH GAS EFFLUE	NT	42	C-200 ^a	As Per <del>COP-01.05</del>	As Per COP_01_06ª,h
2 BATCH GAS EFFLUE	NT	203	C-200*	As Per COP 01.06	As Per COP-01.06 ^{e,h}
<u>2PV WRGM</u> Low Range Gas Mid Range Gas High Range Gas	<u>Chan</u> 621 622 623	624 ^p	- C-200 ⁹	C <b>Y-SL-/02-0</b> 5 x Bkg. ^P uCi/sec	Allotted % Of Site
<u>2A ECCS WRGM</u> Low Range Gas Mid Range Gas High Range Gas	<u>Chan</u> 601 602 603	604 ^P	: C-200ª	0.75 x High ^P uCi/sec	Allotted % Of Site Limit ^P uCi/sec
<u>2B ECCS WRGM</u> Low Range Gas Mid Range Gas High Range Gas	<u>Chan</u> 611 612 613	614 ^P	C-200ª	0.75 x High ^P uCi/sec	Allotted % Of Site Limit ^P uCl/sec
ODCM Related Particula	ate Channels	CHANNEL	BASIS	ALERT	HIGH
			DUCUMENT	SEIPOINT°	10 000 ODM ^C
TEUR PARTICULATE		04.04	FUSAR	5000 CPN	10,000 CPWI
A DU DIO DADTICULA		424	ELICAD	5000 CPM	10,000 CPWP
2A FV FIG FAR HUULA	TE	421	FUOAR	5000 CPM	10,000 CPW
20 FV FIG PARTICULA		431	FUSAR		10,000 CPWI
CODD DADTICULATE		411	ELIGAD	5000 CPM	10,000 CPNI
OUD PARTICULATE		45-4	L FUSAK		

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			In the Chann HIGH GAS a uCl/se rate. S these	case of lets Mo SETPC Ind 2B c base Since the channe	f Unit 2 Pl nitoring th DINT in uC PIG LOW d on the u ney are m els does n	ant Ven ne Plant Ci/sec is ' RANGE ICI/cc at onitoring ot receiv	t there Vent. equiva E GAS the ma the ma ye the sa ye their	are 3 ( The wi lent to channe aximun ame re own a	DDCM de rang 2A PV el 624 i n exper lease p llotted	Efflu ge cl PIG uses cted point % of	ent Gas hannel 63 LOW R the equi process (i.e., ead the Site	24 ANGE ivalent flow ch of Limit).
			4.	The signal "Allotte discus part of	gnificance ed % of Si sion (Mid this discu	of an C te Limit and Hig ission):	DCM I ' HIGH h Nobl	Effluen Setpoi e Gas	t Gas ( int requ Accide	Chan uires nt Cl	inel that i further hannels i	has a are not
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		(% of :	SP = Site Lin	nit) .	(above)	<u>uCi</u> x sec	350,00	100 00 uCi/	sec =	of S	ite Limit	<u></u> %

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•	CY-SL-102-0	104, Processing Aerated Liquid Waste						
•	COP-01.06,	Processing Gaseous Wastes						
•	COP-05.02, I	Met Tower Data Processing						
•	COP-05.04, Chemistry Department Surveillances and Parameters							
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777	The Radiolog Florida as pe Number EV-9	ical Environmental Monitoring Program is p r FPL Juno Nuclear Plant Services Corpora SR-104-1001.	performed by ate Environm	the State of ental Procedure				
•	The licensee Groundwater Energy Institu	also performs environmental monitoring pe Protection Program, in order to meet the o ute's Industry Initiative (NEI 07-07).	er EV-AA-01, bjectives of t	Fleet he Nuclear				
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ODCM Related lodie		CHANNEL	BASIS	ALERT	HIGH	
		ID	DOCUMENT	SETPOINT [®]	SETPOINT	
1PV IODINE		01-03	FUSAR	5000 CPM	10,000 CPM°	
1FHB IODINE		04-03	FUSAR	5000 CPM	10,000 CPM°	1
2A PV PIG IODINE		422	FUSAR	5000 CPM	10,000 CPM ^c	
2B PV PIG IODINE		432	FUSAR	5000 CPM	10,000 CPM ^c	
2FHB IODINE		412	FUSAR	5000 CPM	10,000 CPM°	
SGBDB IODINE		45-5	FUSAR	5000 CPM	10,000 CPM°	
		CHANNEL	BASIS		НСН	I
ODCM Related Liqu	ld Channels	ID	DOCUMENT	SETPOINT	SETPOINT	
1A S/G BLOWDOWN		44	C-200	2 x Bkg.	2.E-04 uCi/ml ^{f.m}	
1B S/G BLOWDOWN		45	C-200	2 x Bkg.	2.E-04 uCi/ml ^{f.m}	ł
2A S/G BLOWDOWN		121	C-200	2 x Bkg.	2.E-04 uCl/ml ^m	i I
2B S/G BLOWDOWN		122	' C-200	2 x Bkg.	2.E-04 uCi/ml ^m	
1 BATCH LIQUID EFF	LUENT	. R6627	C-200	As Per CY-SL-102- 0104	As Per CY-SL-102- 0104 ⁿ	
2 BATCH LIQUID EFF	LUENT	301	C-200	As Per CY-SL-102- 0104	As Per CY-SL-102- 0104"	
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wontor channels n	ot listed are	covered pe	er <del>GGH-04-08</del>	CY-SL-	- 104-0112	
TABLE NOTATION	<u>S</u>	1	DARGO	SS-MOTT	ON SE POU	TS
a - ODCM Control	l 3.11.2.1a	DE	TERMIN	ATTON O	F PROCE	55
b - ODCM Table 4	4.11-1 Note	(7) P.P	40 17-10	~ mop 1	TO R SETA	DIN
c - ODCM Control	l 3.11.2.1.b					
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e - Setpoints may	be rounded	for analog	and digital di	splay input limital	tions.	1
f - The channel s	etpoint to be	in cpm eq	uivalent to thi	is activity		
g - per ODCM Me	thodology S	tep 2.2.2				
h - Batch Gaseou Plant Vent (PV	s Release R /) Release H	ate and Ma IIGH setpoi	aximum activi ints should no	ty limits shall be u ot be exceeded.	used such that	
i, j, k, and I not used	d in notation	for clarity				
-		2				
			, 	······································		

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38	PROCEDURE TITLE:		
PROCEDURE NO.:		30 of 23	0
C-200	ST. LUCIE PLANT		
R	TABLE 3.3-14           ADIOACTIVE EFFLUENT, MONITOR S           (Page 4 of 4)	ETPOINT BASIS	
TABLE NOTATION	<u>IS</u> (continued)		
o - (continued)	,		
The NORMAN ALERT/High <del>* OOP-07:05)</del> ( #059 (the MA Vent.	- value for the Common Channel 624 u Alarms should be based on the equivale iCi/cc of the Low Range Channel #621 XIMUM process ft3/minute flow rate the	Ci/sec indication and ent uCi/sec of the 5 x Bkg (us and RIM 26-90 Monitor Item at could occur in the Unit 2 Pla	e ant
The ACCIDE switching (at display a uCl Range Chanr Item #060 6,6 LOCA Safety	NT value for the Common Channel 624 a preset activity value) input from the Lo sec value based on receiving activity uo hel 622 (OR from the High Range Chan 600 ft3/minute (use <del>COR 07.05)</del> flow rat Injection sequence.	's uCl/sec is based on the Ski ow Range Channel to calculat Cl/cc input from either the Mic nel 623) and RIM 26-90 Moni re that is expected during a	id te / tor
During an AC 2-HVE-6B, 2- 2-HVE-10B to flow rate that new Setpoints actual Plant V the Effluent C Setpoints will not utilize Ch	CIDENT you have to access the runnin HVE-7A, 2-HVE-7B, 2-HVE-8A, 2-HVE- o determine actual Plant Vent exhaust fl should be inserted into Plant Vent #2 S is for Alert and High Alarms in units of un (ent exhaust flow during the Accident. I hannel 624 uCi/sec indication and exist not be valid for a new flow rate. This is annel 624 indication for calculating off-s	g status of 2-HVE-6A, -8B, 2-HVE-10A and low rate ft3/minute. This is th ikid's Monitor Item #060 with Ci/sec calculated by using the If fan operating status change ting Alert and High Alarm is the reason that EPIP-09 doe site dose.	e e es, es
<ul> <li>During an out slightly above less than the Containment</li> </ul>	age, the Low Range gas activity ALER1 outage anticipated activity levels, but s High Alarm Setpoint. Examples of outa Main Purge and venting the S/G priman	F Alarm Setpoint may be set t hall always be set to a value ge activities are initiating a y side bowls.	0
USAR - Channel The setp 3.11.2.1 does noted.	listed FUSAR, but not required by ODC oints are used to provide alarm well be b Site Dose Rate Limit. The inoperabil involve an ACTION statement unless 1	CM Control 3.3.10 Table 3.3-1 fore exceeding ODCM Contro ity of a FUSAR channel abov TS (Technical Specification) is	13. ol e s
2 x Bkg., 3 x Bkg., is the ap evaluate	5 x Bkg. etc., denotes the number of tin propriate Alarm Setting (These type of d to insure alarm sensitivity is maintaine	nes the normal channel readi setpoints should be periodica ed as per <del>COP-07.03.</del> ¥	ng ally

i.

			P	139250
	TREACER		·····	
38	OFF		(ODCM)	PAGE:
PROCEDURE NO .:		· · · ·	(,	99 of 230
C-200		ST. LUCIE PLANT		
		METHODOLOGY SECTION		
2.2 <u>Determining</u> Establishing	<u>the Tot</u> Setpoir	al Body and Skin Dose Rates for Noble hts for Effluent Monitors (continued)	e Gas Rel	eases And
1. (conti	nued)			
A.	(contir	nued)		
	sum o never Auxilia points short p Chemi calcula based percer engine portior	f the total percent allocated to the above be allowed to exceed 100 percent. The ry Building Exhaust are not ODCM req beriodic fan surveillance runs. This allo istry Procedure <del>COP-07:05, Process M</del> istry Supervisor approval is required. <del>Co</del> ation steps to calculate a Noble Gas Re on the methodology steps described b at allotment will be converted into the re bering unit of uCi/cc that will be equivalent of the site limit.	re Release e ECCS R juired mor tited to eac boation is o lonitor Sel OOP-07-05 elease Ra elow. A r elease poi ent to the	e Points shall Reactor hitored release ch to cover controlled per points where provides to Setpoint elease point's nt's indicating allocated
	1.	Obtain the release point's <u>maximum er</u> release rate (V) in Cubic Feet per Mine Effluent Supervisor.	<u>xpected</u> p ute (cfm) f	rocess flow from the
/	2.	Obtain the release point's percent of si from the Chemistry Supervisor.	ite limit all	otment (PA)
	3.	Substitute:the release point's V and P/ equation(s) to obtain the Release Poin desired engineering unit (uCi/cc or uCi	A values ii it's Setpoi i/sec).	nto the below nt (SP) in the
	SP = uCi/cc	<u>3.5E+05 uCi x 60 sec x min x f</u> sec min V ft3 283	<u>t3 x F</u> 17 cc 10	<u>^A</u> D0%
	SP = uCi/cc	uCi/cc which is the TAB SETPOINT for O Channels that ha Limit" declared as	LE 3.3-14 DCM Efflu ve a "Allo s their HIC	HIGH lent Gas tted % of Site 3H SETPOINT.
	SP = uCi/cc	<u>3.5E+05 uCi x <b>PA</b></u> sec 100%		
	SP = uCl/cc	uCi/cc		

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# CY-SL-104-0112, DETERMINATION OF

PROCESS RADIATION IMONITOR SETPOINTS