THREE MILE ISLAND NUCLEAR STATION

STATION HEALTH PYHSICS PROCEDURE 1621.2

RELEASING RADIOACTIVE LIQUID WASTE FROM UNIT #2

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Unit 1 Staff Recommends Approval

Approval N/A Date —

Cognizant Dept. Head

Unit 2 Staff Recommends Approval

Approval N/A Date —

Cognizant Dept. Head

Unit 1 PORC Recommends Approval

N/A Date —

Chairman of PORC

Unit 2 PORC Recommends Approval

R P Warren Date 1/5/79

V. Chairman of PORC

Unit 1 Superintendent Approval

N/A Date —

Unit 2 Superintendent Approval

J B Lynch Date 1/5/79

Manager Generation Quality Assurance Approval N/A Date 194 358

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THREE MILE ISLAND NUCLEAR STATION

STATION HEALTH PHYSICS PROCEDURE 1621.2

RELEASING RADIOACTIVE LIQUID WASTE FROM UNIT 2

1.0 PURPOSE

This procedure describes the regulations applicable to radioactive liquid discharges to unrestricted areas and the monitoring programs designed to ensure compliance with these regulations.

2.0 DISCUSSION

2.1 In releasing radioactive effluents to the Susquehanna River, it is necessary to keep the resulting dose to man and lower biota as low as reasonably achievable. Therefore, radioactive liquids discharged from the plant are analyzed so that releases will meet Technical Specifications. WDL R-1311 monitors liquid radioactive waste prior to entering the Mechanical Draft Cooling Tower effluent. RM-L7 monitors liquid radioactive waste after dilution by the effluent from the Mechanical Draft Cooling Tower (MDCT).

2.2 The instantaneous concentrations of radioactive effluents from Unit to the environment shall not exceed the 10CFR20, Appendix B, unrestricted area MPC's.

2.2.1 The total curies released should not exceed 2.5 Ci per calendar quarter per waste producing reactor. (Exclusive of tritium and noble gases) This limit can be increased to 10 Ci per calendar quarter per waste producing reactor, however, this requires notification of the Nuclear Regulatory Commission within 30 days.

2.2.2 Specific chemical parameters must also be verified on each release of the Waste Evaporator Test Tank or Neutralizing Tank (pH, Boron, conductivity, alkalinity, solids, and iron).

2.3 Analyses performed will be in accordance with the Environmental Technical Specifications.

3.0 REFERENCES

3.1 FSAR, Unit-2

3.2 10CFR20

3.3 10CFR50

3.4 2104-1.11

3.5 2104-4.1 thru 4.6

3.6 Environmental Technical Specifications

3.7 HPP 1720 thru 1722

3.8 HPP 1629, HPP 1625, and HPP 1675

3.9 SCP 1900, SCP 1901, SCP 1913, SCP 1918, SCP 1929, SCP 1930, SCP 1950, SCP 1951, SCP 1958.

3.10 Industrial Waste Permit No. 2270204

3.11 Victoreen Tech. Manual

3.12 HPP 1629.2

4.0 EQUIPMENT

4.1 GeLi detection system

4.2 Liquid Scintillation detection system

4.3 Sampling container

4.4 Beckman Wide-Beta

5.0 OPERATING INSTRUCTIONS

Prior to the release of liquid to the station effluent from the Waste Evaporator Condensate Test Tanks A or B, the Neutralizing Tanks or any other tank containing radioactive material; Liquid Release Permit must be obtained.

NOTE: In these OPERATING INSTRUCTIONS the item number of section 5 will refer to the identically numbered section of the Permit.

5.1 The Shift Supervisor initiates the request for release and is responsible to provide items (1) thru (3) .

5.2 The appropriate box is checked to indicate the specific tank to be sampled, analyzed and released.

5.3 In order that no additional liquid is added to the tanks before the dump is complete, the tank is isolated, and a DO NOT OPERATE tag is conspiciously placed. The tank level is recorded, and the volume in gallons determined, (conversion charts are kept in the Control Room). The form is then turned over to the Radiation Protection Department for completion of items (4) to (37) .

5.4 The next sequential release number is assigned and recorded in the RECORD OF LIQUID RELEASES LOG (see HPP 1675).

5.5 The appropriate box is checked.

5.6 The Radiation/Chemistry Technician/Jr. will sample the designated tank in accordance with HPP 1629.2, Health Physics Procedure for Liquid Waste Disposal System Sampling, and/or OP 2104-1.11, Nuclear Plant Sampling. The sample collector will record the sample location, date and time of sampling on the container. The sample will be tagged with the appropriate radiation label.

a. If the tank being sampled is a Waste Evaporator Condensate Test Tank or Neutralizing Tank, the Radiation/Chemistry Technician/Jr. will take a one liter of sample and save it for preparation of the weekly proportional composite per HPP 1629.2. The sample collector will sign his initials in the space available.

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b. The Radiation/Chemistry Technician/Jr. will also obtain a one gallon sample of each Waste Evaporator Condensate Test Tank or Neutralizing Tank to be analyzed for tritium and gamma emitting isotopes (GeLi Scan). Immediately upon returning this sample to the lab the Technician/Jr. will add approximately 75 milliliters of concentrated hydrochloric acid to this gallon sample to preclude the possibility of isotopes plating out on the sample container walls. After mixing the sample and acid thoroughly, the sample may then be transferred to the counting container.

C. The Radiation/Chemistry Technician/Jr. will obtain a one liter sample of each Waste Evaporator Condensate Test Tank and/or Neutralizing Tank to be analyzed for pH, conductivity, boron, methyl purple alkalinity, suspended and dissolved solids and total iron.

5.7 The Radiation/Chemistry Technician/Jr. responsible for performing the radiation analyses, and the Radiation Protection Supervisor/Foreman is responsible for approving the data in sections (4) thru (26) . Both sign in the appropriate locations, after completion of the analysis.

5.8 The date and time of each analysis is recorded.

5.9 The estimated volume to be released is calculated by multiplying the volume in the tank from (3) by 3785 cc/gal.

5.10 Perform gross alpha, gross beta, and gamma analyses in accordance with appropriate chemistry procedures. Record the number of the chemistry procedure used to perform the required analysis in this column. Other chemistry parameters must be analyzed for each release as required in (25) .

5.10.1 Gamma Isotopic Analysis - A background must be performed on the counting container to be used for the tank sample analysis. The background sample will have the same sample volume and counttime as the tank sample. Use Demin. water for the background sample liquid. Perform a background subtraction from the analysis result in accordance with chemistry procedure 1958. If the Gamma Analysis is not performed in accordance with chemistry procedure 1958.3, perform steps (11) thru (19) .

5.10.2 Gross Alpha Analysis - The gross α is not performed on each batch, however, will be evaluated in a proportional monthly composite.

5.11 The volume of sample counted is recorded.

5.12 The sample counting time is recorded.

5.13 The gross number of counts, including background, are recorded.

5.14 The background counting time is recorded.

5.15 The total background counts are recorded.

5.16 The net sample count rate is calculated.

$$\left[\frac{(\text{GROSS COUNTS } (13))}{(\text{SAMPLE COUNT TIME } (12))}\right] \left[\frac{(\text{BACKGROUND COUNTS } (15))}{(\text{BACKGROUND COUNT TIME } (14))}\right]$$

5.17 The % counting error (2α) is calculated

$$2 \times 100 \times \sqrt{\frac{(\text{GROSS COUNTS } (13))}{(\text{SAMPLE COUNT TIME } (12))^2} + \frac{(\text{BACKGROUND COUNTS } (15))}{(\text{BACKGROUND COUNT TIME } (14))^2}}$$

$$(\text{NET SAMPLE COUNT RATE } (16))$$

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5.18 The gamma abundance for the energy listed is tabulated for the nuclides expected to be of importance. All significant peaks must be identified. If other nuclides are found, or if gammas other than those tabulated are used for the isotopic quantification, the appropriate gamma abundance shall be obtained from TABLE OF THE ISOTOPES.

5.19 The Specific Activity (SA) is calculated. Refer to appropriate SCP for further information, the efficiency of the counter is obtained from charts in the counting room.

$$S.A. = \frac{(\text{NET SAMPLE COUNT RATE } (16))}{(\text{SAMPLE VOLUME USED})\ (\text{GAMMA ABUNDANCE})\ (2.22\times10^{6})\ (\text{EFFICIENCY OF COUNTER})}$$

(11) (18)

5.20 1% of 10CFR20 MPC's are tabulated. If other nuclides are identified, enter 1% of the appropriate value from 10CFR20, Appendix B, Table 11, Column 2.

5.21 Enter the ratio of (19) to (20) .

5.22 Enter the product of (19) , (9) in cc, and 10^6 to convert to curies.

5.23 Enter the sum of all items in column (21) .

5.24 Enter the sum of all items in column (22) . This is the total estimated curie content in the tank and will be used to insure compliance with the 2.5 curie per quarter per waste producing reactor specification.

5.25 Analyze tank sample for the following parameters and record results: pH, conductivity, boron, methyl alkalinity, suspended and dissolved solids, and iron.

5.25.1 If chemistry analysis indicates a dissolved solids concentration $\geq$ 700 ppm in the tank, a river water sample (RML7) will be taken within 1 hour after release to ensure compliance. If boron concentration is > 125 ppm, dilution flow must be established to ensure < 0.7 ppm at the river water discharge. Dilution flow shall be set to ensure compliance with the above limits.

5.26 The technician who obtains these samples and performs these analyses, signs in the space indicated.

5.27 Record all isotopes (excluding Tritium) identified in the sample by GeLi/MCA analysis.

5.28 Record the specific activity of each isotope listed in (28) . (Values are listed in (19)).

5.29 Record the monitor (WDL-R-1311) sensitivity for each isotope listed in (28) . Values are obtained from Table 1621.2-1.

5.30 Enter the product of (29) x (30) for each isotope listed in (28) .

5.31 Sum the values listed in (31) . This is the expected value of the WDL-R-1311 response (above background).

5.32 Determine WDL-R-1311 Setpoints by: calculating background limitation for 10% error at 99% confidence level. If $\leq$ 0.1 determine high alarm and alert setpoints using equations on page 19.0. If > 0.1, WDL-R-1311 liner shall be decontaminated and setpoints recalculated.

5.33 Determine the dilution factor required based on WDL-R-1311 be dividing the high alarm setpoints by 27 cpm.

NOTE: 27 cpm = $(9.0 \times 10^{7}$ cpm/μCi/cc$)(3.0 \times 10^{-7}$ μCi/cc)

5.34 Obtain from the Shift Supervisor the present MDCT flow in gpm from FR-146, the maximum MDCT flow which could be made available if required, any critical time restrictions in the release time, and the MDCT flow which is to be used in the calculations. The MDCT flow shall by >5000 gpm, and credit shall not be taken in excess of 38,000 gpm, as per Tech Spec limits. The name of the Shift Supervisor supplying this information is to be recorded.

5.35 Minimum MDCT flow (FR-146 Alarm Setpoint) is calculated at 90% of the MDCT Flow recommended in (35d) .

5.36 Deleted

5.37 Deleted

5.38 The dilution factor determined in (23) is divided by 10 and then compared to the D.F. determined in (34) . The maximum of the two is the new dilution factor required.

5.39 The RR Max is computed by dividing the minimum MDCT flow (from 35d by the required D.F. from (39) . This RR max is used in (41) .

NOTE: If RR max is <5.55 gpm notify the Shift Supervisor and Radiation Protection Supervisor.

5.40 Record the value of RR Max. (WDL-FR-1636 Alarm Set Point) chosen in (40) .

5.41 The actual release is calculated as 90% of RR Max from (41) .

5.42 If RR actual is based on MPC/10, liquid waste can be released at a rate greater than or equal to 5 gpm, but less than (42) . Use this range of rates in (47) .

5.43 The estimated time period to complete the tank dump is calculated by dividing the tank volume from (3) by the actual release rate from (42) .

5.44 The estimated reading of WDL-R-1311 is calculated by adding (32) to the background reading of WDL-R-1311.

5.45 The estimated reading of RM-L7 is calculated by dividing (32) by the dilution factor required from (37) or (39), whichever is used plus the background of RM-L7.

5.46 The appropriate data from (41) and (44) are transferred to page one of the permit.

5.47 This section is to assure compliance with the 2.5 curie calendar quarterly limit. The estimated curies to be dumped this release from (24) is multiplied by 100/2.5 = 40 to obtain the percentage of quarterly limit in this release. The total curies released to date in this quarter and the last release number tabulated is obtained from the RECORD OF LIQUID RELEASES LOG, as per HPP 1675. These two percentages are summed. If the sum is greater than 100%, dumping of this tank requires notification of the NRC within 30 days, as per the Environmental Technical Specifications. Radiation Protection responsibilities include filling in all information contained within boxes in parts (50) and (52).

(50) WDL-R-1311 Alarm Setpoint from (33A) and (33B)
WDL-FR-1636 Alarm Setpoint from (41)
FR-146 Alarm Setpoint from (36)
Valve Loading from (42)

(52) WDL-FR-1636 Expected Reading from (42)
WDL-R-1311 Expected Reading from (45)
FR-146 Expected Reading from (35d)
RM-L7 Expected Reading from (46)

5.48 The Radiation Protection Supervisor/Foreman will evaluate the data, check the calculations and recommend the release be approved or disapproved. The Supervisor of Radiation Protection and Chemistry, the Unit Superintendent or designated respresentative will make a similar review and recommendation. The final authority and approval for a liquid release rests with the Shift Supervisor. Then, and only then will the tank be released.

NOTE: Just prior to release of liquid effluent through WDL-V-99, WDL-R-1311 must be proved operable using the installed check source or equivalent.

5.49 Operations is responsible for sections (50) thru (53) The alarms and valves are set as indicated. See Section 6.0 for WDL-R-1311 Setpoint procedure.

NOTE: MDCT Flow should not be changed during release unless absolutely necessary.

5.50 Time and date are filled in when release starts and ends. Tank Level and volume at start and completion of release are filled in. The total gallons of MDCT Flow are calculated by subtracting the MDCT Flow Totalizer reading at start from reading at end of release.

NOTE: Immediately prior to starting release, start the sample flow pump for WDL-R-1311. After terminating the release, stop the sample flow pump for WDL-R-1311.

5.51 Mark the WDL-R-1311, WDL-FR-1636 and FR-146 recorder charts at the beginning and at the end of the release: Flush WDL-R-1311 in accordance with OP.2104-4.2 prior to closing WFL-V-99. After flush of WDL-R-1311, reset as follows:

WDL-R-1311	High Alarm - 4200 cpm	WDL-FR-1636	0 gpm
	Alert - 2100 cpm	FR146	5000 gpm

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5.52 Should the MDCT Flow have to be reduced, the Actual Release rate will have to be re-calculated as per (54) . Results of these changes will be recorded in (53) .

5.53 Shift Supervisor will supply a new MDCT flow. The required dilution flow is from (37) or (39) whichever is used for this release.

5.54 Shift Supervisor will verify that all data from (50) thru (52) are complete and accurate.

5.55 The form is then returned to Radiation Protection for completion, transfer of data to HPP 1675 forms, and filing. Volume is calculated from data in (51).

5.56 The actual quantity of each nuclide released is a product of Specific Activity from (19) the Actual release volume from (51) and 10^6 to convert to curies.

6.0 WDL-R-1311 SETPOINT ADJUST PROCEDURE

6.1 Inform Shift Supervisor that the WDL-R-1311 Setpoints will be changed.

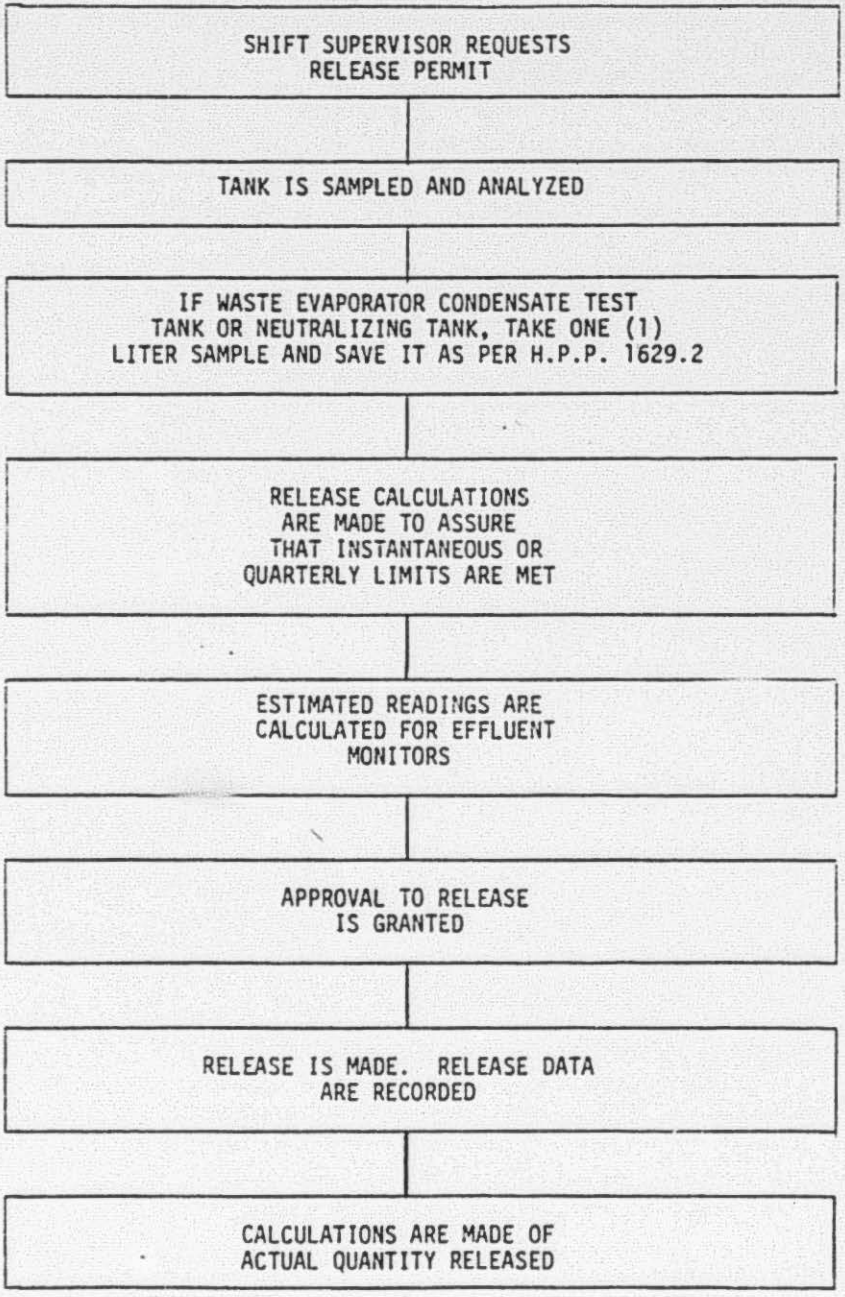
6.2 Place the function switch on the WDL-R-1311 ratemeter in the CAL position.

6.3 Push the alert pushbutton on the front of the ratemeter and, while holding the pushbutton in, set the indicator on the ratemeter to the desired setpoint by turning the adjust knob (labeled "Alert" on front of ratemeter). Release the button.

6.4 Repeat 6.5 using the Hi Alarm pushbutton and the Hi Alarm adjust knob (labeled "Hi" on front of ratemeter).

6.5 Return function switch to operate position.

6.6 Notify the Shift Supervisor that the new setpoints are in effect.


SHIFT SUPERVISOR REQUESTS RELEASE PERMIT
TANK IS SAMPLED AND ANALYZED
IF WASTE EVAPORATOR CONDENSATE TEST TANK OR NEUTRALIZING TANK, TAKE ONE (1) LITER SAMPLE AND SAVE IT AS PER H.P.P. 1629.2
RELEASE CALCULATIONS ARE MADE TO ASSURE THAT INSTANTANEOUS OR QUARTERLY LIMITS ARE MET
ESTIMATED READINGS ARE CALCULATED FOR EFFLUENT MONITORS
APPROVAL TO RELEASE IS GRANTED
RELEASE IS MADE. RELEASE DATA ARE RECORDED
CALCULATIONS ARE MADE OF ACTUAL QUANTITY RELEASED

WDL-R-1311 SENSITIVITIES

TABLE 1621.2-1

Isotope	Sensitivity (CPM/μCi/ml)
NA-24	1.9×10^8
CR-51	1.3×10^7
MN-54	1.0×10^8
CO-58	1.02×10^8
CO-60	1.92×10^8
FE-59	9.62×10^7
ZN-65	4.19×10^7
KR-85M	1.13×10^8
NB-95	1.02×10^8
ZR-95	1.01×10^8
ZR-97	9.93×10^7
I-131	1.27×10^8
XE-133	1.15×10^7
XE-133M	2.11×10^7
XE-135	1.41×10^8
CS-134	2.22×10^8
CS-137	9.03×10^7

For any isotope not listed, use 9.0×10^7 CPM/μCi/ml

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(46) ☐ WDL-T-8A ☐ Other ☐ TANK ISOLATED & "DO NOT OPERATE" Tagged DATE: ____
☐ WDL-T-8B TIME: ____
☐ WDL-T-9A TANK LEVEL ____ ft. VOLUME ____ gal.
☐ WDL-T-9B SIGNED ____

(47) ____ gpm RR MAX (5-20 gpm) ____ minimum estimated time for RELEASE

(48) ESTIMATED CURIES TO BE DUMPED ____ x 40 = ____ % OF QUARTERLY LIMIT
CURIES DUMPED TO DATE THIS QTR. ____ x 40 = ____ % OF QUARTERLY LIMIT
____ LAST RELEASE = INCLUDED TOTAL ____ % OF QUARTERLY LIMIT

(49) ☐ RELEASE RECOMMENDED BY ____ RADIATION PROTECTION SUP/Foreman
☐ RELEASE RECOMMENDED BY ____ SUP OF RAD PROT & CHEM/UNIT SUPERINTENDENT
☐ RELEASE APPROVED BY ____ SHIFT SUPERVISOR

(50) RELEASE DATA:
WDL-R-1311 Setpoint Hi Alarm ____ CPM Alert ____ CPM ____ Initials ____
☐ ____ Initial
WDL-FR-1636 Alarm Setpoint At ____ GPM Warning sign hung on FR-146 in Unit 1 Control Rm
FR-146 Alarm SET POINT AT ____ GPM [Caution Unit 1 making Liquid Release] ☐ Initial
VALVE WDL-V-93A/B 394A/B PLACED TO ____ GPM ☐ ____ Initial
Release Rate ____ Initial

(51) TIME RELEASE STOPPED ____ TIME ____ DATE
TIME RELEASE STARTED ____ TIME ____ DATE
TOTAL TIME OF RELEASE ____ MINUTES
Tank Level at Start of Release ____ ft. ____ gal.
Tank Level at End of Release ____ ft. ____ gal.
Tank Volume Released ____ ft. ____ gal.
MOST EFFLUENT TOTALIZER AT STOP ____ gal.
MOST EFFLUENT TOTALIZER AT START ____ gal.
TOTAL DILUTION FLOW ____ gal.

(52) FLOW AND RADIATION MONITORING RECORDER CHARTS FLUSHED:
WDL-R-1311 Source Check Sat. Before Rel. ☐
WDL-R-1311 Alarm Returned to: Hi-Alarm = 4200 CPM ☐ AT BEGINNING OF RELEASE ☐
Alert Alarm = 2100 CPM ☐ AT END OF RELEASE ☐ Flow Setpoint Returned to Normal ☐
INSTRUMENT READINGS: WDL-R-1311 Flushed ☐

	EXPECTED READING	READING AT START	READING AFTER ¼ COMPLETE	READING AFTER ½ COMPLETE	READING AFTER ¾ COMPLETE	READING AFTER RELEASE COMP.
WDL-FR-1636	gpm					
WDL-R-1311	cpm					
FR-146	gpm					
RM-L7	cpm					

(53) IF CHANGES IN FLOW FROM THE MDCT (OR CHANGES IN THE RELEASE RATE(WDL-V-93A/B 394A/B position) DEVELOP DURING THE RELEASE, CALCULATION OF A NEW RATE AND SETPOINTS MUST BE MADE. THE NEW CALCULATIONS WILL BE COMPUTED ON PAGE 2 OF THIS FORM AND THE FOLLOWING TABLE WILL BE COMPLETED

	START TIME	STOP TIME	TOTAL TIME	*ACTUAL RELEASE RATE	WDL-FR-1636 SET POINT	FR-146 SET POINT	APPROVAL BY SHIFT SUPV.
ORIGINAL							
1st CHANGE							
2nd CHANGE							

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*RELEASE RATE CANNOT BE LESS THAN 5 GPM, MDCT CANNOT BE <1000 or >38000 cpm.

(54) RELEASE DATA COMPLETED BY ____ INITIALS.
ALL DATA REQUIRED ON THIS FORM HAS BEEN COMPLETED. ____ SHIFT SUPERVISOR

FOR UNEXPECTED CHANGES IN THE MDCT FLOW OR ACTUAL RELEASE RATE THE FOLLOWING CALCULATIONS MUST BE RE-COMPUTED BY THE SHIFT SUPERVISOR. THIS NEED ONLY BE DONE IF THE MDCT FLOW IS REDUCE

1. MAXIMUM RELEASE RATE = WDL-FR- 1636 Point

RR - MAX = $\frac{\text{NEW MDCT FLOW GPM} \times (0.9)}{\text{REQUIRED D.F.}}$ = _____ GPM

2. ACTUAL RELEASE RATE = (RR MAX) x (0.9) = _____ GPM

3. MINIMUM FLOW FROM MDCT (FR-146 SETPOINT) = NEW MDCT FLOW x (0.9) = _____ GPM

USE THIS AREA FOR CALCULATIONS:

CHEMISTRY PARAMETERS

Sample Obtained By: _____ Analysis Performed By: _____
Date/Time: _____ Date/Time: _____

	RESULT	LIMIT
pH		4.5 - 9.5 (1)
Conductivity		<10 umho (2)
Boron		125 PPM (3)
Methyl Alkalinity		100 PPM as $CaCO_3$
Suspended Solids		<560 PPM (1)
Dissolved Solids		<700 PPM (1)
Iron		< 7 PPM (1)

1. Limit at tank to insure not exceeding limit of 6-9 pH at plant discharge.
2. Must be<10umho to consider water with a pH less than 6 or greater than 9. If conductivity is > 10umhos, release must be approved by Chemistry Supervisor or his designee with a written evaluation attached to release.
3. Guideline to assure .7 ppm after dilution.

☐ WDL-T-8A (5)
☐ WDL-T-8B
☐ WDL-T-9A
☐ WDL-T-9B
☐ Other

SAMPLE COLLECTED BY (6)
DATE _____ TIME _____
RAD. ANAL. Perf. by: (7)
APPROVED BY: _____

DATE & TIME OF ANALYSIS (8)
ALPHA _____
BETA _____
GAMMA _____
TRITIUM _____

(9) VOLUME IN TANK [ ] cal x 3785 [ ] cc

(50) ACTUAL VOLUME RELEASED _____ ML.

6a Composite Sample Collected By: _____

	(33) COUNT METHOD (Procedure Number)	(11) VOLUME OF SAMPLE USED (ml)	(12) SAMPLE COUNT TIME (MIN)	(13) GROSS COUNTS	(14) BKG COUNT TIME (MIN)	(15) BKG COUNTS	(16) NET SAMPLE COUNT RATE (cpm)	(17) % ERROR 2σ	(18) GAMMA ABUNDANCE @ KEV	(19) SPECIFIC ACTIVITY μCi/ml	(20) MPC 100 μCi/ml	(21) SPECIFIC ACTIVITY / MPC 100	(22) EST QTY TO BE RELEASED CURIES	(57) ACTUAL QTY RELEASED CURIES
									N.A.					
GROSS α									N.A.					
H 3									N.A.		3E-5			
Cr 51									.09 @320		2E-5			
Mn 54									1.00 @835		1E-6			
Co 58									.99 @810		9E-7			
Co 60									1.00 @1332		3E-7			
Zn 65									.47 @1115		1E-6			
Cs 134									.98 @605		9E-8			
Cs 137									.85 @662		2E-7			
I 131									.82 @364		3E-9			
Ba 140									.31 @537		2E-7			
La 140									.96 @1596		2E-7			
Xe 133									.37 @81		3E-8			
Xe 135									.91 @250		3E-8			

REQUIRED BY (23) | CURIES (24)

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17.0

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NAME OF SHIFT SUPERVISOR CONTACTED

(35) CONTACT SHIFT SUPERVISOR FOR FOLLOWING DATA _____
a) PRESENT MDCT FLOW _____ gpm.
b) MAX MDCT FLOW WHICH CAN BE MADE AVAILABLE _____ gpm.
c) TIME AVAILABLE FOR RELEASE _____ min (200 to 1200 min)
d) MDCT Flow to use for CALCULATIONS: _____ gpm (must be > 5000; <38000)

(36) MINIMUM MDCT = FR-145 ALARM SETPOINT = (0.9)(MDCT Flow From (35d))= _____

(39) REVISED CALCULATIONS FOR MPC/10:
(D.F. FROM 23 _____) = _____
10
D.F. FROM (34) _____ MAXIMUM = _____

(40) MAX. RR = (MIN MDCT _____) (36) = _____ GPM = R.R. MAX
(REQUIRED D.F. FROM (39) _____) GO TO (41)

(41) RR MAX. = _____ GPM (5.55 to 50 GPM) = WDL-FR-1625 Alarm Setpoint

(42) RR Actual = (0.9) (RR MAX) = _____ GPM (5 to 45 GPM)

(43) IF RR Actual is based on MPC/10, Liquid Waste can be released at a rate greater than or equal to 5 GPM, but less than (42) . Use this range of rates in (17) .

(44) Estimated time of dump = (Est. Vol. to be dumped from (3) _____ gal) = _____
(_____ GPM-RR-Actual) (42)

(45) Estimated Reading of WDL-R-1311

_____ CPM (From (33)) + _____ CPM (Background) = _____ CPM

(46) Estimated Reading of RM-L7

(_____ CPM (Est Reading of WDL-R-1311) + _____ CPM (RM-L7) = _____ CPM
(Required D.F. From (39))

195 016

(28) Isotopes Identified by Analysis (Exclude 11-3)	(29) Specific Activity (From 19) µCi/ml	(30) Sensitivity of WDL-R-1311 to Each Isotope (From Table 1621.2-1)	(31) Monitor Response (CPM)

(32) Z= Estimated Reading of WDL-R-1311 above background

(33) WDL-R-1311 Setpoint

A. BACKGROUND LIMITATION FOR 10% ERROR

1. $e = 3\sqrt{(\text{Monitor Response}\_\_\_\_) + ((2)(\text{Bkg}\_\_\_\_))} = \_\_\_\_\_$

2. (e_____)/(Monitor Response_____) = [ ]

NOTE: If this is > 0.1, WDL-R-1311 liner shall be decontaminated and set points recalculated.

B. HIGH ALARM

(2) {(Monitor Response_____) + (e_____)} + Bkg_____ = [ ]

C. ALERT

(Monitor Response_____) + (Bkg_____) + (e_____) = [ ]

(34) Required Dilution Factor based on WDL-R-1311

$$\frac{\text{WDL-R-1311 High Alarm}}{27 \text{ cpm}} = [\ ]$$

195 017

TMI DOCUMENTS

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Wilda R. Mullinix, NRC

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