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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Subject: Beaver Valley Power Station, Unit No. 1 and No. 2
BV-1 Docket No. 50-334, License No. DPR-66
BV-2 Docket No. 50-412, License No. NPF-73
Beaver Valley Power Station Emergency Preparedness Plan Implementing Procedures (Volume 2)

In accordance with 10 CFR Part 50.4, this letter forwards recent revisions of the Beaver Valley Power Station Emergency Preparedness Plan Implementing Procedures (Volume 2) to the Nuclear Regulatory Commission. The changes do not decrease the effectiveness of the Plan and the Plan, as changed, continues to meet the requirements of Appendix E of 10 CFR 50. Therefore, 10 CFR Part 50.54(q) requires that these changes be submitted for information only.

There are no regulatory commitments contained in this letter. If there are any questions concerning this submittal, please contact Ms. Susan L. Vicinie, Manager, Emergency Preparedness at 724-682-5767.

Sincerely,

L. William Pearce

Enclosure 1 – Summary of Changes
Enclosure 2 –Procedure revisions

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Reference: NPD3MEP:0239

Enclosure 1
Summary of Changes

Revisions to
Beaver Valley Power Station
Emergency Preparedness Plan Implementing Procedures
(Volume 2)

The following is a brief summary of the changes made to the Emergency Preparedness Plan Implementing Procedures.

EPP/Implementing Procedures:

EPP/IP-1.7 "Emergency Response Organization (ERO) Teams"

Revision 11 standardized the format to be consistent with EP procedures and updated current titles. Steps 8.2.3.2.2, 8.2.3.2.3, 8.4.1.1, 8.4.1.1.1 and 8.4.1.1.3 were clarified. Information regarding the conduct of critiques was added to Attachment A.

EPP/IP-2.7 "Liquid Release Estimate"

Revision 8 corrected a typographical error in Attachment J, Step 1.

EPP/IP-3.3 "Emergency Contamination Control"

Revision 8 standardized the format to be consistent with EP procedures and made editorial title changes.

EPP/IP-5.4 "Emergency Personnel Monitoring"

Revision 9 clarified Step 8.2.1.1 by changing "should" to "shall".

EPP/IMPLEMENTING PROCEDURES - EFFECTIVE INDEX

INSTRUCTIONS

IMPLEMENTING PROCEDURES

1 Series - Activation

EPP/IMPLEMENTING PROCEDURES - EFFECTIVE INDEX

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2.1	Emergency Radiological Monitoring	Revision 10
2.2	Onsite Monitoring for Airborne Release	Revision 12
2.3	Offsite Monitoring for Airborne Release	Revision 13
2.4	Offsite Monitoring for Liquid Release	Revision 8
2.5	Emergency Environmental Monitoring	Revision 11
2.6	Environmental Assessment and Dose Projection Controlling Procedure	Revision 14
2.6.1	Dose Projection - Backup Methods	Revision 11
2.6.2	Dose Projection - ARERAS/MIDAS With FSAR Defaults	Revision 12
2.6.3	Dose Projection - ARERAS/MIDAS With Real-Time Inputs	Revision 12
2.6.4	Dose Projection - ARERAS/MIDAS With Manual Inputs	Revision 13
2.6.5	Alternate Meteorological Parameters	Revision 10
2.6.6	Dose Projections By Hand Calculation - Known Isotopic Release	Revision 6
2.6.7	Dose Assessment Based on Field Measurements	Revision 7
2.6.8	Dose Assessment Based on Environmental Measurements and Samples	Revision 6
2.6.9	Integrated Dose Assessment	Revision 6
2.6.10	Ground Contamination Assessment and Protective Action	Revision 7

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	2.6.12 Dose Projection -ARERAS/MIDAS With Severe Accident Assessment	Revision 9
2.7	Liquid Release Estimate	Revision 8
	2.7.1 Liquid Release Estimate - Computer Method	Revision 9
EPP/IP	**3 Series - Onsite Protective Actions**	
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3.3	Emergency Contamination Control	Revision 8
3.4	Emergency Respiratory Protection	Revision 8
3.5	Traffic and Access Control	Revision 9
EPP/IP	**4 Series - Offsite Protective Actions**	
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EPP/IP	**5 Series - Aid to Personnel**	
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	6 Series - Re-entry/Recovery	
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7.1	Emergency Equipment Inventory and Maintenance Procedure	Revision 14
7.2	Administration of Emergency Preparedness Plan, Drills and Exercises	Revision 9
	8 Series - Fire Fighting	
8.1	Fires in Radiologically Controlled Areas	Revision 11
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9.1	Emergency Public Information Emergency Response Organization Controlling Procedure	Revision 11
9.2	Reserved	
9.3	Activation, Operation and Deactivation of the Emergency Public Information Organization Emergency Operations Facility (EOF)	Revision 4
9.4	Activation, Operation and Deactivation of the Joint Public Information Center (JPIC)	Revision 9
9.5	Activation, Operation and Deactivation of the Penn Power Customer Account Services Department	Revision 7
	10 Series - Corporate Response	
10.1	Emergency Response Organization Corporate Support	Revision 3

EPP/IMPLEMENTING PROCEDURES - EFFECTIVE INDEX

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Annex B -	DELETED	
Annex C -	Major Injury Involving Radioactive Contamination For The Medical Center, Beaver	Revision 9
Annex D -	Procedure for Transferring Radiation Casualties to the Radiation Emergency Response Program (UPMC Presbyterian)	Revision 8
Annex E -	Reserved	

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Beaver Valley Power Station

Unit 1/2

EPP/IP 1.7

EMERGENCY RESPONSE ORGANIZATION (ERO) TEAMS

Document Owner
Manager, Emergency Preparedness

Revision Number	11
Level Of Use	General Skill Reference
Safety Related Procedure	Yes

Beaver Valley Power Station	Procedure Number: EPP/IP 1.7	
Title: EMERGENCY RESPONSE ORGANIZATION (ERO) TEAMS	Unit: 1/2	Level Of Use: General Skill Reference
	Revision: 11	Page Number: i of i

TABLE OF CONTENTS

1.0 PURPOSE

1.1 This procedure provides the guidance for maintaining the Beaver Valley Power Station Emergency Response Organization (ERO) and ERO augmentation.

2.0 SCOPE

2.1 This procedure describes the Beaver Valley Power Station (BVPS) Emergency Response Organization (ERO) Teams including: designations, assignments, responsibility, transfers, overall coordination and ERO expectations.

3.0 REFERENCES AND COMMITMENTS

3.1 References

3.1.1 Beaver Valley Power Station Emergency Preparedness Plan.

3.1.2 NUREG-0654/FEMA-REP-1 "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants."

3.1.3 Title 10, Code of Federal Regulations Part 50, Appendix E.

3.1.4 NPDAP 2.14 "Fitness-For-Duty Program For FirstEnergy Employees at Beaver Valley Power Station".

3.1.5 Condition Reports

3.1.5.1 00-4309

3.1.5.2 01-6025

3.1.5.3 02-00444-6

3.1.5.4 02-10225-1

3.1.5.5 03-02032-06

3.1.5.6 03-02103-03

3.1.5.7 03-02034-03

3.1.5.8 03-02034-10

3.1.5.9 03-02103-02

3.2 Commitments

3.2.1 None

4.0 RECORDS AND FORMS

4.1 Records

4.1.1 None

4.2 Forms

4.2.1 EPP-IP-1.7.F01, On-Call ERO Response Team Transfer Form

5.0 RESPONSIBILITIES

5.1 Manager, Emergency Preparedness

5.1.1 Is responsible for the overall coordination of the ERO Teams and the associated Call-List.

5.2 ERO Members (assigned to a dedicated response team (Red, White, Blue) or ERO Pool personnel (Green))

5.2.1 Are responsible for the actions described in this procedure.

5.3 BVPS Emergency Response Organization

5.3.1 Will consist of three (3) dedicated response teams, each with required designated Primary and Secondary responders, supplemented by designated support (call-tree) personnel. The teams will be identified by colors (i.e., Red, White, Blue).

5.3.1.1 Primary Responders

5.3.1.1.1 Shall report to their emergency facility as soon as possible, and in all instances, within one (1) hour of notification of an Alert, or higher, emergency classification.

5.3.1.2 Secondary Responders

5.3.1.2.1 Shall report to their emergency facility as soon as possible, and in all instances, within two (2) hours of notification of an Alert, or higher, emergency classification.

5.3.1.3 Designated Support (call-tree) Personnel

5.3.1.3.1 Are to report to their emergency facilities as soon as possible following notification.

5.3.1.4 ERO Personnel Not Assigned to One of the Three (3) Dedicated Response Teams

5.3.1.4.1 Will be assigned to the ERO Team Pool, and shall report as soon as possible following notification. The Team Pool will also be identified by color (Green).

5.4 Emergency Preparedness Personnel

5.4.1 Initial team assignments will be determined by Emergency Preparedness personnel. ERO response team transfers shall be approved by the Manager, EP. Temporary transfers are described in Section E.3 of this procedure.

6.0 PRECAUTIONS AND LIMITATIONS

6.1 Precautions

6.1.1 None

6.2 Limitations

6.2.1 None

7.0 PREREQUISITES

7.1 This IP remains in effect at all times to ensure a full state of readiness is maintained.

7.2 All ERO personnel shall be aware of the requirements stipulated in this procedure.

7.3 Transfers of ERO personnel responsibility shall follow the guidance provided in this procedure.

8.0 PROCEDURE

8.1 ERO Team Response Assignments/Responsibilities

8.1.1 Dedicated Response Teams will rotate between the following response categories: On-Call, Stand-By and Back-Up.

8.1.1.1 On-Call responders are those personnel who shall respond immediately when notified. An On-Call team shall consist of Primary Responders, Secondary Responders, and designated support personnel.

8.1.1.2 Stand-By responders have no response responsibility for the week that they are designated as Stand-By. A Stand-By team shall consist of Primary Responders, Secondary Responders, and designated support personnel.

8.1.1.3 Back-Up responders are the designated relief personnel (12-hour shifts) for the On-Call responders. A Back-Up team shall consist of Primary Responders, Secondary Responders, and designated support personnel.

8.1.2 ERO Response Teams shall rotate weekly.

8.1.2.1 Rotation assignments shall be as follows (ERO Rotation Calendar available on BVWeb, EPP Web Page):

- On-Call to Stand-By
- Stand-By to Back-Up
- Back-Up to On-Call

8.1.2.2 Rotation shall occur every Monday at 0800 hours.

8.1.3 On-Call Team Fitness For Duty (FFD) requirements.

8.1.3.1 Personnel designated "On-Call" Primary and Secondary Responders shall adhere to Fitness For Duty (FFD) requirements per NPDAP 2.14.

8.1.3.2 Personnel conducting a call-out must ask the individual "If they have consumed alcohol within the last 5 hours."

8.1.3.2.1 Personnel responding to a call-out must meet FFD requirements.

8.1.3.3 If deemed necessary, FFD testing shall be conducted prior to beginning ERO duties.

8.1.4 ERO personnel shall adhere to the ERO Expectations (Attachment 1).

8.2 Beeper/Responsibility Assignments and Transfers

8.2.1 All personnel assigned to an ERO position as either a Primary or Secondary responder shall be assigned a beeper unless otherwise noted.

8.2.2 On Call personnel arranging transfer of ERO responsibility shall notify Emergency Preparedness per Form EPP-IP-1.7.F01.

8.2.3 Transfer of assignment responsibility for On-Call Team Responders shall fall into three (3) categories.

NOTE:	Individuals shall consult the ERO Call-List to determine the identity of qualified personnel for their ERO position for On Call transfer of responsibility. The ERO Call-List is distributed in paper format and is also available on the Emergency Preparedness Web page (most current list).

NOTE:	If personnel in the On-Call category will not be available for any portion of their one week rotation, they shall arrange for a qualified replacement from the GREEN or Stand-by Team prior to requesting a replacement from the Back-up Team.

8.2.3.1 On-Call Team personnel who will be unavailable to respond for a period of less than 24 hours shall do the following:

NOTE:	Emergency Preparedness DOES NOT need to be informed when a transfer of responsibilities for less than 24 hours occurs.

8.2.3.1.1 Ensure their position is covered by another qualified individual for that ERO position

8.2.3.2 On-Call Team personnel who will be unavailable to respond for a period of greater than 24 hours shall do the following:

8.2.3.2.1 Ensure their position is covered by another qualified individual for that ERO position by completing form EPP-IP-1.7.F01, "On-Call ERO Response Team Transfer Form"

8.2.3.2.2 Mail (or FAX @ PAX 5777) form EPP-IP-1.7.F01, to the Manager, Emergency Preparedness. If during off-normal working hours, contact Emergency Preparedness and provide the information on Attachment 2. Mail (or FAX) a completed document to the Manager, Emergency Preparedness.

8.2.3.2.3 On-Call Team personnel who will be unavailable to respond due to sudden illness (NOI&I) or personal emergency should attempt to locate a replacement. If a replacement can not be located, contact Emergency Preparedness.

8.2.4 All personnel assigned beepers are responsible for maintaining operability of that beeper (i.e., changing batteries when necessary). Personnel shall keep their beepers "on" at all times (and in the audible mode when appropriate) and respond accordingly to ALL beeper activations.

8.3 ERO Activation

8.3.1 Beaver Valley Emergency Response System (BVERS) Notification

NOTE:	BVERS is a computer aided Voice Mail system that will be used to activate the ERO Beepers and accept personnel call backs.

8.3.1.1 Beepers will be activated for ERO notifications with the following Actual Event – On-Call ERO Team phone: 724-643-4370 (or 330-315-4380).

8.3.1.1.1 **Only On-Call ERO Team personnel shall call back into BVERS by dialing 724-643-4370/330-315-4380, as required.**

8.3.1.2 Beeper Holder Response

8.3.1.2.1 Upon calling into BVERS, you will be prompted to enter your Plant Photo I.D. number (e.g.: 0123). *Data entry requires a touch tone phone.* BVERS will then ask you to verify the number by pressing "9" (yes) or "6" (no).

8.3.1.2.2 A message will be provided at this time stating the Unit, time and emergency classification declared and the basis for the declaration.

NOTE: BVERS will have information on all qualified ERO personnel programmed into its data base, and will know who you are and for which ERO position you are currently qualified by your I.D. entry. Personnel calling into BVERS will either access the system immediately, or receive a busy signal. Personnel calling back should be able to access the system within a few minutes.

8.3.1.2.3 BVERS will ask the following questions:

* BVERS will ask if you understand the message by pressing "9" (yes) or "6" (no).
* BVERS will ask if you are Fit For Duty and ask you to acknowledge by pressing "9" (yes) or "6" (no).
* BVERS will ask if you are able to respond and ask you to acknowledge by pressing "9" (yes) or "6" (no).
* BVERS will ask you to enter your Estimated Time of Arrival in minutes (enter your travel time from your location to your emergency facility).
* BVERS will then terminate the connection.

8.3.1.2.4 BVERS will print out reports for the Control Room, Emergency Response Facility, and Joint Public Information Center identifying those personnel who have called in.

8.3.1.2.5 The ERO Team designated as Back-Up does not need to call-in but shall report 12-hours after emergency declaration, unless otherwise notified.

8.3.1.3 If BVERS determines that a specific ERO position has not been staffed, it will activate the individual Beepers for all personnel in that specific ERO position with the following display: **724-643-4370 or 330-315-4380**

8.3.1.3.1 **Any ERO Beeper Holder receiving a Beeper Code of 724-643-4370 or 330-315-4380 SHALL call into BVERS**, answer the questions requested and report to their designated emergency facility. *(This assumes that the On-Call individual is unable to respond.)*

8.3.1.3.1.1 If the ERO position has been filled, any other personnel calling in to respond to the position will be informed that there are no positions available.

8.3.1.3.1.2 If the On-Call individual becomes available, he/she shall call into BVERS and report to their emergency facility.

8.3.1.4 If BVERS determines that a specific ERO position has still not called in, BVERS will perform the following notifications for personnel in that specific ERO position:

* Call the individual PAX phone numbers of personnel in that specific position,
* Call the individual Home phone numbers of personnel in that specific position, and
* Again, activate the individual Beepers for personnel in that specific ERO position.
* This will continue until the ERO position is filled.

8.3.2 ERO Voice Mail System (ERO-VMS) Notification

NOTE:	The ERO-VMS is a typical voice mail system that is used to activate the ERO Beepers and accept personnel call backs **in the event that the primary BVERS system is unavailable.** The ERO-VMS utilizes the ERF switch and has remote accessing features. There is only one beeper call back number for ERO-VMS.

8.3.2.1 Beepers will be activated for ERO notifications with the following Beeper Codes:

* Actual events "9999995080"
* Actual events - Site Inaccessible "0000005080"

8.3.2.1.1 **Only On-Call ERO Team personnel shall call back into the ERO-VMS by dialing 724-682-5080 (PAX 5080).**

8.3.2.1.2 ERO-VMS call-back number is listed on the ERO Call-List.

8.3.2.2 Beeper Holder Response

8.3.2.2.1 The ERO-VMS will inform you that an emergency has been declared and ask that you provide the following information. If you have not consumed alcohol in the last 5 hours, (personnel must verbally provide this information at the sound of the tone):

* Your name (please spell last name)
* ERO position
* Estimated time of arrival (Time of Day, i.e., 2145 Hrs., 0115 Hrs.)

8.3.2.2.2 If you have consumed alcohol in the last 5 hours, contact an alternate for your emergency position.

NOTE: ERO-VMS has a maximum of 4 incoming lines. As a line becomes available, the next call received will be answered. If no lines are available, a busy signal will be received.

8.4 ERO Response During Working and Non-working Hours

8.4.1 Response During Working Hours

8.4.1.1 "On-Call" ERO Personnel (Primary, Secondary and designated Support (Call-Tree) personnel SHALL respond as follows:

8.4.1.1.1 Primary and Secondary responders SHALL call the Beaver Valley Emergency Response System (BVERS) prior to responding to their emergency location (This includes personnel onsite).

8.4.1.1.2 ALL "On-Call" ERO personnel SHALL respond to their emergency facility.

8.4.1.1.3 Determine manpower needs and supplement, as necessary.

8.4.1.2 All Other ERO Personnel

8.4.1.2.1 SHALL report to their emergency facility.

8.4.1.2.2 Take direction from the "On-Call" ERO personnel.

8.4.2 Response During Non-Working Hours

8.4.2.1 "On-Call" ERO Personnel

8.4.2.1.1 Beeper Holders SHALL call the Beaver Valley Emergency Response System (BVERS) and respond to their emergency location.

8.4.2.1.2 Determine manpower needs and "call-out" additional personnel, if necessary.

8.4.2.2 All Other ERO Personnel

8.4.2.2.1 Beeper Holders SHALL remain alert for further instructions (call-out, shift rotation, etc.).

8.4.2.2.2 All other ERO personnel will be called-out, if necessary.

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ATTACHMENT A
Page 1 of 4
ERO EXPECTATIONS

Duty Expectations/Pager Response Expectations

- All ERO personnel shall understand, and adhere to, the requirements of procedure EPP/IP 1.7, Emergency Response Organization (ERO) Teams.

- All ERO personnel assigned ERO Pagers are expected to wear their Pagers at all times when within the Pager Service Area (located on the EPP Webpage/ERO Info) and respond appropriately to messages. The following are some unacceptable responses for NOT responding to Pager messages:

  - Pager left in vibrate when not being worn
  - Pager left in other location too far to hear audible alarm (i.e.: bathroom, shower, etc.)
  - Weak/dead battery

- All ERO notifications initiated by BVERS shall display one of the following messages:

  1) "Actual Event-On-Call ERO Team call 724-682-4730", or,
  2) "This is a Drill-On-Call ERO Team call 724-682-4730"
     (*An alternate phone number that may be displayed for BVERS is 330-315-4380*)

     - When the above messages are displayed, ALWAYS call the number provided.
     - These are the ONLY two alpha messages initiated by BVERS that require ERO response (other alpha messages are for information, or non-ERO response).

- Only On-Call ERO personnel are to initially call-in to BVERS.

- If only the BVERS phone number (724-682-4730 or *330-315-4380*) is displayed (BVERS searching to fill a specific ERO position), then any individual receiving this message shall call-in, respond and upon being accepted, report for your position as required.

- For an actual event, or Drill/Exercise, a BVERS Pager message shall be followed by a LOTUS NOTES alpha-numeric message describing the event and emergency declaration time.

- Upon notification, On-Call ERO personnel shall report to their ERO positions as soon as possible, but no later than their assigned response times from the time of the emergency declaration (this includes allowing for Facility activation time).

ATTACHMENT A
Page 2 of 4
ERO EXPECTATIONS

Duty Expectations/Pager Response Expectations (cont.)

- On-Call ERO personnel are expected to maintain response times to their respective emergency response facilities (1 or 2 hours from the time of event declaration, not the time of Pager activation).
- For actual events, personnel are to respond appropriately when notified by Pager (via BVERS/Lotus Notes), Plant Page Party System, phone or BVERS phone call. (i.e.: take cover, report to emergency facilities, report to alternate facilities, etc.).
- For Drills or Exercises, personnel are to respond appropriately when notified by Pager (BVERS/Lotus Notes), Plant Page Party System, phone or BVERS phone call (i.e.: take cover, report to emergency facilities, report to alternate facilities, call-in Drill/OST only).
- In the event alphanumeric messaging is not available, ERO Pagers will be activated with one of these message codes:
  1) 9999995080 (Actual Event/Site Accessible), On-Call ERO personnel report to their assigned emergency facilities.
  2) 0000005080 (Actual Event/Site Inaccessible), On-Call ERO Managers/Coordinators report to the Alternate EOF per procedure.
     - The ERO call-back phone number for this response is 724-682-5080.
- ERO personnel On-Call are expected to maintain fitness-for-duty per 10CFR26.
- For actual events occurring during normal working hours (0700-1700 hrs), all ERO personnel are expected to report to their appropriate emergency facility to support the On-Call Team (only On-Call ERO personnel call-in to BVERS).
- ERO personnel are not to call the Control Room upon notification of an emergency, unless specifically requested.
- On-Call ERO personnel are expected to have their FirstEnergy ID Badge and Dosimetry when reporting to their respective facilities.
- If an On-Call ERO member becomes incapable of performing their ERO duties, they are to contact another qualified person for that position and transfer On-Call responsibility. (Notification to EPP personnel of the transfer is per EPP/IP 1.7.).

ATTACHMENT A
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ERO EXPECTATIONS

Duty Expectations/Pager Response Expectations (cont.)

- Emergency Facility Leads should define their expectations for their Team while remaining cognizant of Facility activation timing requirements (i.e.: delegate activities, maintain overview of events, involve the Team in response, etc.).

- ERO personnel must provide information, not just data points, to each other and the Facility Lead, i.e.:
  - Explain the meaning of a data point provided to the Team (i.e.: D/G #1 tripped off vs. D/G #1 tripped off and was the only remain power supply)

- ERO communications shall use three-way communications and noun descriptors.

- Following Actual Events, Drills/Exercises or staffing of Emergency Facilities to provide plant support, each Emergency Facility SHALL conduct and document a critique.
  - The critique will be lead by the Facility Lead.
  - A Condition Report will be written for each Delta (Area For Improvement) as deemed necessary by the Facility Lead.
  - The person presenting the comment warranting the Condition Report SHALL write the Condition Report.
  - Each Delta presented, whether a Condition Report was warranted or not, SHALL have the presenters name written beside the comment.
  - Emergency Preparedness will be notified of each Condition Report written.

- Facility equipment, procedure or supply challenges that occur during Actual Events, Drills or Exercises SHOULD have a resolution attempted during the Actual Event, Drill or Exercise, not simply commented upon during the critique.

ATTACHMENT A
Page 4 of 4
ERO EXPECTATIONS

ERO Training and Drill Participation Expectations

- Attend appropriate Initial ERO Classroom Training for assigned position.
- Attend appropriate Continuing ERO Classroom Training for assigned position.
- Attend assigned ERO Team Drills/Exercises (Drill participation for key ERO positions is tracked as a NRC Performance Indicator.)
- Managers and supervisors shall ensure that each ERO member under their supervision remains fully qualified at all times to respond to an emergency.
- Ensure ERO participation in training and Drills is documented.
- Participate in Drill/Exercise critiques and identify areas for improvement and strengths so appropriate corrective actions can be taken.
- ERO personnel shall initiate Condition Reports, and notify EPP, as necessary.
- ERO personnel shall respond to, or assist EPP personnel, with the response to Condition Reports.
- Ensure their emergency response facility is in a state of readiness prior to leaving the facility.

Beaver Valley Power Station

Unit 1/2

EPP-IP-2.7

LIQUID RELEASE ESTIMATE

Document Owner
Manager, Emergency Preparedness

Revision Number	8
Level Of Use	General Skill Reference
Safety Related Procedure	Yes

TABLE OF CONTENTS

1.0 PURPOSE

1.1 This procedure provides various methods of determining the fractions of NRC -EC's and EPA-MPC's following an unplanned or uncontrolled release of radioactive materials via a monitored or unmonitored pathway to the Ohio River. The Environmental Assessment and Dose Projection Coordinator is responsible to ensure that actions outlined in this procedure are implemented when necessary.

2.0 SCOPE

2.1 This procedure provides several different calculation methods for determining the concentration in the discharge or the drinking water after an unplanned release. The method used will be determined by the availability of sampling or radiation monitoring data along with release rate and dilution rate information. Brief descriptions of the different procedures (methods) are described in Section 8.0.

2.2 IF a liquid discharge is occurring at Unit 1 and Unit 2, THEN perform the appropriate attachment calculations for NRC-EC and EPA-MPC determination for both sites and all discharge pathways. Interpret the results as follows:

2.2.1 Use the maximum calculated NRC-EC fraction from both sites and all discharge pathways for comparisons against Unusual Event and Alert EAL criteria as follows:

2.2.1.1 IF the maximum fraction is >2, and the release is ≥60 minutes, THEN an Unusual Event is declared.

2.2.1.2 IF the maximum fraction is >200 and the release is ≥15 minutes, THEN an Alert is declared.

2.2.2 Use the sum total of the EPA-MPC fraction that is calculated from both sites and all discharge pathways for comparisons against PAG criteria as follows:

2.2.2.1 IF the sum total fraction is >12, THEN a protective action recommendation is made per EPP/IP 4.1.

3.0 REFERENCES AND COMMITMENTS

3.1 References

3.1.1 Beaver Valley Power Station Emergency Preparedness Plan and Implementing Procedures.

3.1.2 Appendix B, Table 2, Col. 2 to 10 CFR Part 20.1001-20.2401.

3.1.3 Appendix I to 10 CFR Part 50.

3.1.4 Plan for Nuclear Power Generating Station Incidents Commonwealth of Pennsylvania Dept. of Environmental Resources/Bureau of Radiation Protection.

3.1.5 NUREG-0654/FEMA-REP-1 Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants.

3.1.6 Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure, U.S. Department of Commerce, National Bureau of Standards, Handbook 69.

3.1.7 DLC Calculation Package No. ERS-ATL-93-030, EPP/IP 2.7 Procedure.

3.1.8 Offsite Dose Calculation Manual, including procedure 1/2-ODC-2.01, Liquid Effluents, 1/2-ODC-3.03, Controls for RETS and REMP programs.

3.2 Commitments

3.2.1 None

4.0 RECORDS AND FORMS

4.1 Records

4.1.1 The following QA Records are generated by this procedure:

4.1.1.1 Attachment B, Unit 1 NRC-EC Calculation (Sample Method): Unusual Event and Alert Determination

4.1.1.2 Attachment C, Unit 1 EPA-MPC Calculation (Sample Method): PAG Determination

4.1.1.3 Attachment D, Unit 1 NRC-EC Calculation (Process Monitor Method): Unusual Event and Alert Determination

4.1.1.4 Attachment E, Unit 1 EPA-MPC Calculation (Process Monitor Method): PAG Determination

4.1.1.5 Attachment F, Unit 1 Unmonitored Liquid Discharge Pathways

4.1.1.6 Attachment G, Unit 2 NRC-EC Calculation (Sample Method): Unusual Event and Alert Determination

4.1.1.7 Attachment H, Unit 2 EPA-MPC Calculation (Sample Method): PAG Determination

4.1.1.8 Attachment I, Unit 2 NRC-EC Calculation (Process Monitor Method): Unusual Event and Alert Determination

4.1.1.9 Attachment J, Unit 2 EPA-MPC Calculation (Process Monitor Method): PAG Determination

4.1.1.10 Attachment K, Unit 2 Unmonitored Liquid Discharge Pathways

4.2 Forms

4.2.1 None

5.0 RESPONSIBILITIES

5.1 Environmental Assessment and Dose Projection Coordinator

5.1.1 Responsible to ensure that actions outlined in this procedure are implemented when necessary.

6.0 PRECAUTIONS AND LIMITATIONS

6.1 Precautions

6.1.1 The NRC-Effluent Concentrations (NRC-EC's) referred to in this procedure, and throughout the Offsite Dose Calculation Manual (ODCM), were adjusted to accommodate operational flexibility needed for effluent releases. Therefore, the limits associated with liquid release concentrations (i.e., the OEC ODCM Effluent Concentration) are based on 10 times the NRC-EC's stated in Appendix B, Table 2, Col. 2 of 10 CFR 20.1001-20.2401. The multiplier of 10 is justified because the annual dose of 500 mrem (old 10 CFR 20 MPC bases, and BVPS Technical Specification bases) is a factor 10 times higher than the annual dose of 50 mrem (new 10 CFR EC bases).

6.2 Limitations

6.2.1 The estimation methods in this procedure are based on a uniform distribution of the released activity within the river water. The actual concentrations at the Midland Water Treatment Plant may vary as a function of mixing. Mixing is projected to be complete at the East Liverpool Water Treatment Plant intake.

7.0 PREREQUISITES

7.1 An unplanned or uncontrolled release of radioactive materials to the Ohio River has occurred, is imminent, or is suspected.

8.0 PROCEDURE

NOTE:	This method is one of the backup methods for determining the river flow rate. The primary method is to call the National Weather Service and request the Ohio River flowrate at the Montgomery Dam in cuft/sec.

8.1 ATTACHMENT A, Graphic River Flow Rate Determination

8.1.1 The graph represents a means to determine the Ohio River Flow Rate necessary for obtaining various dilution factors used in the calculations of EPP/IP 2.7.

8.2 ATTACHMENT B (Unit 1) and G (Unit 2), NRC-EC Calculation (Sample Method): Unusual Event and Alert Determination

8.2.1 This method determines the concentration in the release prior to dilution by the Ohio River, and compares the result to the appropriate Technical Specification/ODCM limits. The resulting factor is used as the basis of the Unusual Event and Alert Emergency Action Levels. This method requires an isotopic or gross beta-gamma sample from the discharge or directly from the source (i.e., from a tank). IF a source sample is taken, THEN an appropriate dilution factor between the discharge flow and the cooling tower blowdown/emergency outfall structure flow must be applied, unless the release is directly to the river via the Catch Basin System.

8.3 ATTACHMENT C (Unit 1) and H (Unit 2), EPA-MPC Calculation (Sample Method): PAG Determination

8.3.1 This method determines the concentration in the Ohio River (at the Midland Water Treatment Plant Intake) following dilution by the river, and compares the results to the appropriate EPA Drinking Water Standard. This concentration is assumed to be in the drinking water at Midland and East Liverpool; and is the basis to provide a protective action to downstream water treatment plants. This method requires isotopic or gross beta gamma sample from the discharge source (i.e., the appropriate tank) and a dilution factor between the discharge flow and the flow of the Ohio River. This attachment may also be used for a sample from the Midland Water Treatment Plant without a dilution factor.

8.4 ATTACHMENT D (Unit 1) and I (Unit 2), NRC-EC Calculation (Process Monitor Method): Unusual Event and Alert Determination

8.4.1 This method duplicates the methods of Attachment B and G except that a process monitor reading is used in lieu of an actual sample. The criteria for use of these Attachments requires an upper alarm indication on one or more of the following radiation monitors:

Unit 1	Unit 2
RM-1LW-104	2SGC-RQ100
RM-1LW-116	2SWS-RQ100A,B,C,D
RM-1RW-100	2SWS-RQ101
RM-1RW-101	2SWS-RQ102
RM-1RW-100A,B,C,D	
RM-1DA-100	

8.5 ATTACHMENT E (Unit 1) and J (Unit 2), EPA - MPC Calculation (Process Monitor Method): PAG Determination

8.5.1 This method duplicates the methods of Attachment C and H except that a process monitor reading is used in lieu of an actual sample. The criteria for use of these Attachments requires an upper alarm indication on one or more of the following radiation monitors:

Unit 1	Unit 2
RM-1LW-104	2SGC-RQ100
RM-1LW-116	2SWS-RQ100A,B,C,D
RM-1RW-100	2SWS-RQ101
RM-1RW-101	2SWS-RQ102
RM-1RW-100A,B,C,D	
RM-1DA-100	

8.6 ATTACHMENT F (Unit 1) and K (Unit 2), Unmonitored Liquid Discharge Pathways

8.6.1 This method determines the release rate and dilution rate of an unplanned and unmonitored release of radioactive material via leakage of a storage tank, etc. Use of this attachment requires knowledge of the amount of liquid released and the estimated duration of the release. After completion of this attachment, enter the release rate and dilution rate into Attachments B and C or G and H (as appropriate) and continue the calculation as before.

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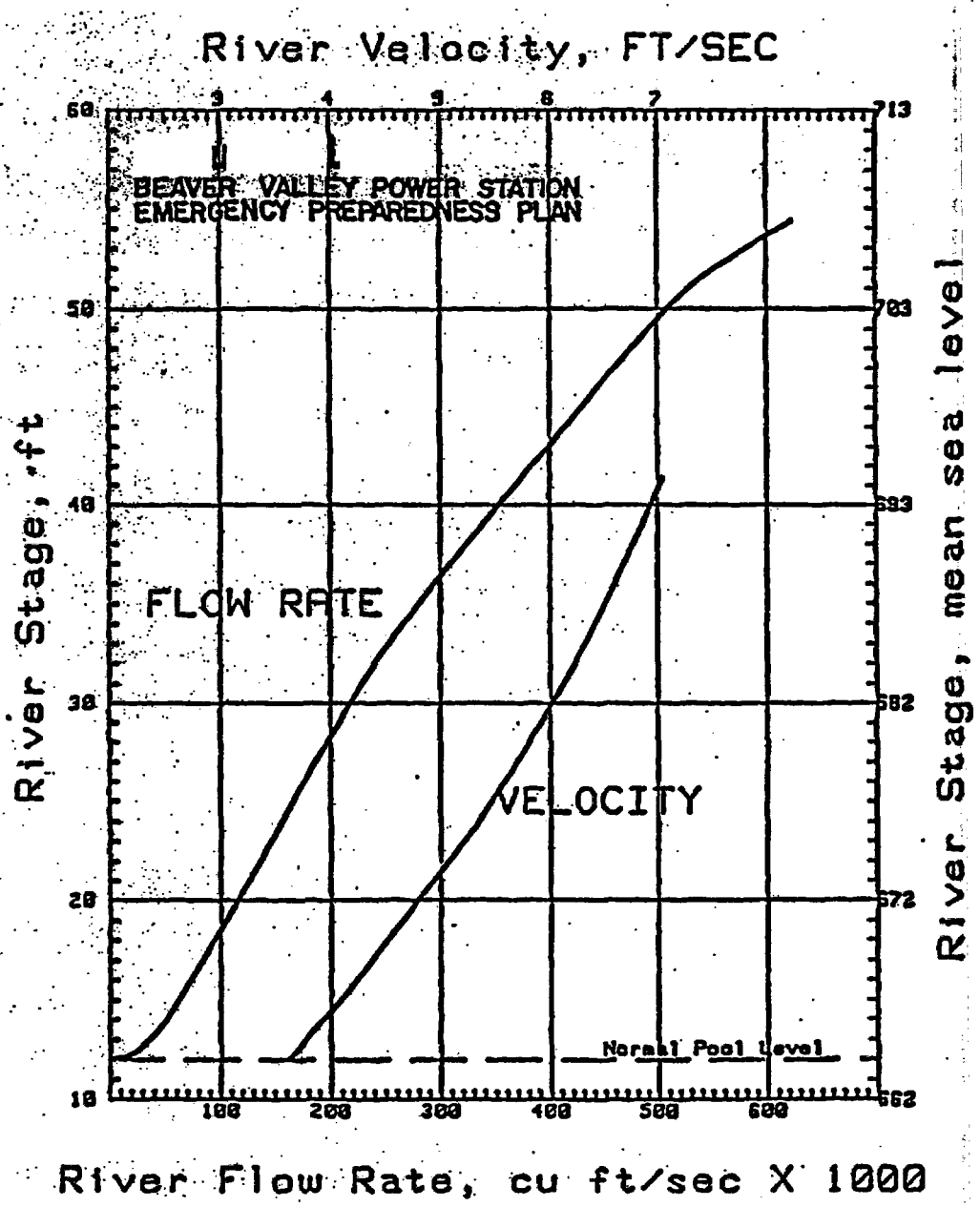
ATTACHMENT A
Page 1 of 2
GRAPHICAL RIVER FLOW RATE DETERMINATION

IF the Stage Height method is used to determine the River Flow Rate in ft^3/sec, THEN call the Montgomery Dam at 724-643-8400 to obtain the Lower Gauge Height (ft) (stage height) (ft) of the Ohio River at the dam site. Find this value on the vertical axis and move horizontally on the graph (Attachment A) to the solid line marked flow rate. At this point, move vertically down the graph to the associated River Flow Rate on the horizontal axis. The value is in the necessary unit of ft/sec. This number is used in determining various dilution factors of liquid waste discharge.

ATTACHMENT A
Page 2 of 2
GRAPHICAL RIVER FLOW RATE DETERMINATION



Based on Corps of Engineers data for Montgomery Dam

ATTACHMENT B
Page 1 of 2

UNIT 1

UNIT 1 NRC-EC CALCULATION (SAMPLE METHOD): UNUSUAL EVENT AND ALERT DETERMINATION

Liquid Release Estimate
Unit 1: NRC – EC Calculation (Sample Method)

CALCULATIONS (RTL A5.715FG)
2.7-2F 11/1994

Unusual Event Determination .... (Criteria: >2 x TS/ODCM Limit, and release is > or = 60 minutes)
Alert Determination ..... (Criteria: > 200 x TS/ODCM Limit, and release is > or = 15 minutes)

Sample Location: _____ Sample Date: _____ @ _____ hrs

Release Start: _____ @ _____ hrs, Release Stop: _____ @ _____ hrs, Release Time: _____ = minutes

	Nuclide	Col A Sample Concentration (uCi/ml)		Col B TS/ODCM Limit 10 x NRC-EC (uCi/ml)		Col C (Col A / Col B) Fraction of Limit
	Be-7		/	6E-03	=	
	Cr-51		/	5E-03	=	
P	Mn-54		/	3E-04	=	
A	Fe-59		/	1E-04	=	
R	Co-57		/	6E-04	=	
T	Co-58		/	2E-04	=	
I	Co-60		/	3E-05	=	
C	Ni-59		/	3E-03	=	
U	Ni-63		/	1E-03	=	
L	Zn-65		/	5E-05	=	
A	Zr/Nb-95		/	2E-04	=	
T	Nb-97		/	3E-03	=	
E	Mo-99		/	2E-04	=	
S	Tc-99m		/	1E-02	=	
	Ag-110m		/	6E-05	=	
&	Sb-124		/	7E-05	=	
	Sb-125		/	3E-04	=	
I	I-131		/	1E-05	=	
O	I-133		/	7E-05	=	
D	I-135		/	3E-04	=	
I	Cs-134		/	9E-06	=	
N	Cs-137		/	1E-05	=	
E	Ba/La-140		/	8E-05	=	
S	Ce-141		/	3E-04	=	
	Ce-144		/	3E-05	=	
	W-187		/	3E-04	=	
*	H-3		/	1E-02	=	
*	Fe-55		/	1E-03	=	
*	Sr-89		/	8E-05	=	
*	Sr-90		/	5E-06	=	
**	Gr Beta-Gamma		/	1E-07	=	
	Sum Total (Undiluted Fraction of Limit)				=	(1)

* Use the latest appropriate composite sample analysis.
** Use only if isotopic sample analysis is not available.

IF sample was taken from the outfall structure or cooling tower blowdown, THEN enter 1.0 in Block (4) and determine Block (5)

Otherwise, do the following:

Enter Liquid Waste Release Rate in Block (2)

(2) Release Rate = _____ gpm

Enter the Cooling Tower Blowdown in Block (3), as obtained from:
( ) FT-1CW-101-1
( ) other: _____

(3) Dilution Rate = _____ gpm

Divide Block (2) by Block (3), then enter the result in Block (4)

(4) DF = _____

Multiply Block (1) by Block (4), then enter the result in Block (5)

(5) Fr of NRC Limit = _____

Note 1: IF Block (5) is > 2, and the release is > or = 60 minutes, THEN declare an Unusual Event.

Note 2: IF Block (5) is > 200, and the release is > or = 15 minutes, THEN declare an Alert.

Note 3: IF more than one release is ongoing, THEN calculate a Block (5) for each release. Use the max Block (5) to classify the event.

( ) No Emergency

( ) Unusual Event Emergency

( ) Alert Emergency

Calculations By: _____ Date: _____ @ _____ hrs.

Reviewed By: _____ Date: _____ @ _____ hrs.

ATTACHMENT B
Page 2 of 2

UNIT 1

UNIT 1 NRC-EC CALCULATION (SAMPLE METHOD): UNUSUAL EVENT AND ALERT DETERMINATION

Liquid Release
Unit 1: NRC – EC Calculation (Sample Method)

INSTRUCTIONS (RTL A5.715FG)
2.7-2R 11/1994

1. Obtain an isotopic sample from the source (e.g.: the Liquid Waste Discharge Line) or from the Cooling Tower Blowdown.

   1.1 IF the radioactivity is a result of a leaking heat exchanger, THEN obtain the sample from the Combined Cooling Tower Blowdown.

2. Enter the nuclide concentrations (uCi/ml), or gross beta-gamma concentration (uCi/ml) in the Column A.

3. Divide the nuclide concentration (uCi/ml) in Column A by the TS/ODCM Limit (uCi/ml) in Column B. Enter the results in Column C (Fraction of Limit).

   3.1 Note that the TS/ODCM Limit Values are based on 10 times the NRC-EC concentrations listed in 10 CFR 20 Appendix B to 20.1001 – 20.2401, Table 2 Col. 2.

4. Sum the Fraction of TS/ODCM Limit values. Enter the Undiluted Fraction of TS/ODCM Limit total in Block (1).

5. IF the sample was taken from the outfall structures, the cooling tower blowdown, or the Catch Basin System, THEN enter 1.0 in Block (4) and proceed to Step 9.

6. IF the sample was taken from the Liquid Waste System, THEN obtain the Release Rate (gpm), for the appropriate pathway. Enter the value in Block (2).

7. Obtain the combined Cooling Tower Blowdown Flowrate from FT-1CW-101-1 (gpm), or obtain any other applicable Dilution Flowrate (gpm). Enter the appropriate value in Block (3).

8. Determine the Dilution Factor by dividing the Release Rate (gpm) in Block (2) by the Dilution Rate (gpm) in Block (3). Enter the result in Block (4).

9. Determine the Diluted Fraction of TS/ODCM Limit by Multiplying the Undiluted Fraction of TS/ODCM Limit in Block (1) by the Dilution Factor in Block (4). Enter the result in Block (5).

   9.1 IF the Diluted Fraction of TS/ODCM Limit from Block (5) is > 2, and the release is > or = 60 minutes, THEN declare an Unusual Event.

   9.2 IF the Diluted Fraction of TS/ODCM Limit from Block (5) is > 200, and the release is > or = 15 minutes, THEN declare an Alert.

   9.3 IF more than one release is ongoing, THEN calculate a Diluted Fraction of TS/ODCM Limit as shown in Block (5), for each release. Use the highest Block (5) value for event classification.

ATTACHMENT C
Page 1 of 2

UNIT 1

UNIT 1 EPA-MPC CALCULATION (SAMPLE METHOD): PAG DETERMINATION

Liquid Release Estimate
Unit 1: EPA – MPC Calculation (Sample Method)

CALCULATIONS (RTL A5.715FH)
2.7-3F 11/1994

PAG Determination .... (Criteria > 12 x EPA – MPC Limit)

Sample Location: _____ Sample Date: _____ @ _____ hrs

Release Start: _____ @ _____ hrs, Release Stop: _____ @ _____ hrs, Release Time: _____ = minutes

	Nuclide	Col A Sample Concentration (uCi/ml)		Col B EPA-MPC Limit EPA-570 (uCi/ml)		Col C (Col A / Col B) Fraction of Limit
	Be-7		/	6E-06	=	
	Cr-51		/	6E-06	=	
P	Mn-54		/	3E-07	=	
A	Fe-59		/	2E-07	=	
R	Co-57		/	1E-06	=	
T	Co-58		/	3E-07	=	
I	Co-60		/	1E-07	=	
C	Ni-59		/	3E-07	=	
U	Ni-63		/	5E-08	=	
L	Zn-65		/	3E-07	=	
A	Zr/Nb-95		/	2E-07	=	
T	Nb-97		/	3E-06	=	
E	Mo-99		/	6E-07	=	
S	Tc-99m		/	2E-05	=	
	Ag-110m		/	9E-08	=	
&	Sb-124		/	6E-08	=	
	Sb-125		/	3E-07	=	
I	I-131		/	3E-09	=	
O	I-133		/	1E-08	=	
D	I-135		/	3E-08	=	
I	Cs-134		/	8E-08	=	
N	Cs-137		/	2E-07	=	
E	Ba/La-140		/	6E-08	=	
S	Ce-141		/	3E-07	=	
	Ce-144		/	0E+00	=	
	W-187		/	2E-07	=	
*	H-3		/	2E-05	=	
*	Fe-55		/	2E-06	=	
*	Sr-89		/	2E-08	=	
*	Sr-90		/	8E-09	=	
**	Gr Beta-Gamma		/	9E-11	=	
				Sum Total (Undiluted Fraction of Limit)	=	(1)

* Use the latest appropriate composite sample analysis.
** Use only if isotopic sample analysis is not available.

IF sample was taken from the Midland Water Treatment Plant intake, THEN enter 1.0 in Block (4) and determine Block (5)

otherwise, do the following:

Enter Liquid Waste Release Rate in Block (2)

(2) Release Rate = _____ gpm

Enter Ohio River Flowrate in Block (3)
(See INSTRUCTIONS)
( ) table value for month of _____
( ) other: _____

(3) Ohio River Flow = _____ cuft/sec

Divide Block (2) by Block (3), then multiply by 2.23E-3. Enter the result in Block (4)

(4) DF = _____

Multiply Block (1) by Block (4), then enter the result in Block (5)

(5) Fr of EPA Limit = _____

Note 1: IF Block (5) is > 12, THEN implement the PAG per EPP/IP 4.1.

Note 2: IF more than one release is ongoing, THEN calculate a Block (5) for each release. Sum the Block (5)'s for each release. IF the sum exceeds 12, THEN implement the PAG per EPP/IP 4.1.

( ) Sum EPA-MPC <12, No PAG Required.

( ) Sum EPA-MPC >12, No PAG Required.

Calculations By: _____ Date: _____ @ _____ hrs.

Reviewed By: _____ Date: _____ @ _____ hrs.

ATTACHMENT C
Page 2 of 2

UNIT 1

UNIT 1 EPA-MPC CALCULATION (SAMPLE METHOD): PAG DETERMINATION

Liquid Release Estimate
Unit 1: EPA – MPC Calculation (Sample Method)

CALCULATIONS (RTL AS.715FH)
2.7-3R 11/1994

1. Obtain an isotopic sample from the source or from the Midland Water Treatment Plant intake.
2. Enter the nuclide concentrations (uCi/ml), or gross beta-gamma concentrations (uCi/ml) in the Column A.
3. Divide the nuclide concentration (uCi/ml) in Column A by the EPA-MPC Limit (uCi/ml) in Column B. Enter the results in Column C (Fraction of Limit).

   3.1 Note that the EPA-MPC Limit Values are from the Interim Drinking Water Regulations (EPA-570/9-76-003), and from DLC Calculation Package No. ERS-DKY-82-022.

4. Sum the Fraction of EPA-MPC Limit values. Enter the Undiluted Fraction of EPA-MPC Limit total in Block (1).
5. IF the sample was taken from the Midland Water Treatment Plant intake, THEN enter 1.0 in Block (4) and proceed to Step 9.
6. Determine the Release Rate (gpm), by one of the following methods, and enter the value in Block (2).

   ( ) For a sample taken from a tank or piping; Release Rate = _____ gpm = Discharge Rate from tank or piping.
   ( ) For a sample taken from the CT Blowdown; Release Rate = _____ gpm = CT Blowdown Flowrate.
   ( ) For a sample taken from the Catch Basin; Release Rate = _____ gpm = Catch Basin Flowrate.

7. Determine the Ohio River Flowrate (cuft/sec) by one of the following methods, and enter the value in Block (3).

   PRIMARY METHOD

   ( ) Call the National Weather Service – 412-262-1882 or 412-262-1984 and request the following:

      ( ) _____ cuft/sec = Ohio River Flowrate at the Montgomery Dam.

   BACKUP METHOD

   ( ) Call the National Weather Service – 412-262-1882 or 412-262-1984 and request one of the following:

      ( ) _____ cuft/sec = Ohio River Flowrate at the Wheeling Dam.
      ( ) _____ ft = Ohio River Stage Height at the Wheeling Dam ( ) or the Montgomery Dam ( ).
      Convert this value to _____ cuft/sec using the graph on Attachment A.

   ( ) Use one of the following approximations based on the average reported monthly Ohio River Flowrates:

( ) 53,000 cuft/sec = January	( ) 44,000 cuft/sec = May	( ) 11,000 cuft/sec = September
( ) 55,000 cuft/sec = February	( ) 23,000 cuft/sec = June	( ) 16,000 cuft/sec = October
( ) 77,000 cuft/sec = March	( ) 15,000 cuft/sec = July	( ) 28,000 cuft/sec = November
( ) 64,000 cuft/sec = April	( ) 12,000 cuft/sec = August	( ) 43,000 cuft/sec = December

   ( ) Determine the Ohio River Flowrate By determining the Stage Height from one of the following onsite methods.

      ( ) _____ ft = Ohio River Stage Height as read from the Intake Structure.
      Convert this value to _____ cuft/sec using the graph on Attachment A.
      ( ) _____ ft = Ohio River Stage Height as read from 1LR-CW-101 (located in Intake Structure).
      Convert this value to _____ cuft/sec using the graph on Attachment A.

8. Determine the Dilution Factor by dividing the Release Rate (gpm) in Block (2) by the Ohio River Flowrate (gpm) in Block (3) and multiply by a conversion factor of 2.2E-3. Enter the result in Block (4).
9. Determine the Diluted Fraction of EPA-MPC Limit By Multiplying the Undiluted Fraction of EPA-MPC Limit in Block (1) by the Dilution Factor in Block (4). Enter the result in Block (5).

   9.1 IF the Diluted Fraction of EPA-MPC Limit from Block (5) is > 12, THEN implement the PAG per EPP/IP 4.1.

   9.2 IF more than one release is ongoing, THEN calculate a Diluted Fraction of EPA-MPC Limit as shown in Block (5), for each release. Sum the Block (5) for each release. IF the sum exceeds 12, THEN implement PAG per EPP/IP 4.1.

ATTACHMENT D
Page 1 of 2

UNIT 1

UNIT 1 NRC-EC CALCULATION (PROCESS MONITOR METHOD): UNUSUAL EVENT AND ALERT DETERMINATION

Liquid Release Estimate
Unit 1: NRC – EC Calculation (Process Monitor Method)

(RTL A5.715FJ)
2.7-4F 11/1994

Unusual Event Determination .... (Criteria: > 2 x TS/ODCM Limit, and release is > or = 60 minutes)
Alert Determination .....(Criteria: > 200 x TS/ODCM Limit, and release is > or = 15 minutes)

Release Start: _____ @ _____ hrs, Release Stop: _____ @ _____ hrs, Release Time: _____ = minutes

A. DETERMINATION OF DILUTED FRACTION OF TS/ODCM LIMIT FOR VARIOUS PLANT SYSTEMS

1. Liquid Waste System Release (Criteria: Monitor Reading Exceeds The HI HI Alarm Setpoint)

1.1 Obtain the Release Rate for the appropriate pathway using one of the following methods:

( ) RM-1LW-116: Release Rate = _____ gpm; As read from FR-1LW-103, or
( ) RM-1LW-104: Release Rate = _____ gpm; As read from FR-1LW-104

1.2 Obtain the Cooling Tower Blowdown Flowrate as follows:

U1/2 CTBD Flowrate = _____ gpm; As read from FT-1CW-101-1

1.3 Determine the Dilution Factor as follows:

DF = (Release Rate _____ gpm) / (U1/2 CTBD Flowrate _____ gpm) = _____

1.4 Determine the Diluted Fraction of TS/ODCM Limit using one of the following methods:

( ) RM-1LW-116: fr TS/ODCM Limit = (DF _____) x (Mon Reading _____ ncpm) x (1.36E-3) = _____ , or
( ) RM-1LW-104: fr TS/ODCM Limit = (DF _____) x (Mon Reading _____ ncpm) x (1.36E-3) = _____

2. Reactor Plant River Water System Release (Criteria: Monitor Reading Exceeds The HI HI Alarm Setpoint)

2.1 Determine the Release Rate for the appropriate pathway using one of the following methods:

( ) RM-1LW-100: Release Rate = (9000 gpm per RPRWP) x (_____ RPRWP's) = _____ gpm, or
* ( ) RM-1LW-101: Release Rate = (9000 gpm per RPRWP) x (_____ RPRWP's) = _____ gpm, or
** ( ) RM-1LW-100 ABCD: Release Rate = (2250 gpm per RPRWP) x (_____ RPRWP's) = _____ gpm

* Do not use if in a CIB ** Do not use unless 1RM-RW-100 is INOPERABLE

2.2 Obtain the Cooling Tower Blowdown Flowrates as follows:

U1 CTBD Flowrate = _____ gpm; As read from FT-1CW-101, and
U1/2 CTBD Flowrate = _____ gpm; As read from FT-1CW-101-1

2.3 Determine the Cooling Tower Recirculation Flowrates as follows:

CT Recirc Rate = (127,000 gpm per CTP) x (_____ CTP's) = _____ gpm

2.4 Determine the Dilution Factor as follows:

$$DF = \frac{\text{(Release Rate \_\_\_\_\_ gpm) x (U1 CTBD Flowrate \_\_\_\_\_ gpm)}}{\text{CT Recirc Rate \_\_\_\_\_ gpm) x (U1/2 CTBD Flowrate \_\_\_\_\_ gpm)}} = \_\_\_\_\_$$

2.5 Determine the Diluted Fraction of TS/ODCM Limit using one of the following methods:

( ) RM-1RW-100 fr TS/ODCM Limit = (DF _____) x (Mon Reading _____ ncpm) x (3.44E-04) = _____ , or
( ) RM-1RW-101: fr TS/ODCM Limit = (DF _____) x (Mon Reading _____ ncpm) x (1.36E-3) = _____ , or
( ) RM-1RW-100 ABCD: fr TS/ODCM Limit = (DF _____) x (Sum Mon Rds _____ ncpm) x (3.44E-4) = _____

ATTACHMENT D
Page 2 of 2

UNIT 1

UNIT 1 NRC-EC CALCULATION (PROCESS MONITOR METHOD): UNUSUAL EVENT AND ALERT DETERMINATION

Liquid Release Estimate
Unit 1: NRC – EC Calculation (Process Monitor Method)

(RTL A5.715FJ)
2.7-4R 11/1994

A. DETERMINATION OF DILUTED FRACTION OF TS/ODCM LIMIT FOR VARIOUS PLANT SYSTEMS (Continued)

3. Auxiliary Feed Pump Bay Drain System Release (Criteria: Monitor Reading Exceeds The HI HI Alarm Setpoint)

3.1 Determine the Diluted Fraction of TS/ODCM Limit as follows:

RM-1DA-100: fr TS/ODCM Limit = (0.333 DF) x (Monitor Reading _____ ncpm) x (2.46E-4) = _____

B. DETERMINATION OF EVENT CLASSIFICATION

1. IF the Diluted Fraction of TS/ODCM Limit is > 2, and the release is > or = 60 minutes, THEN declare an Unusual Event.

2. IF the Diluted Fraction of TS/ODCM Limit is > 200, and the release is > or = 15 minutes, THEN declare an Alert.

3. IF more than one release is ongoing, THEN calculate a Diluted Fraction of TS/ODCM Limit for each release. Use the highest Fraction of TS/ODCM Limit value for event classification.

( ) No Emergency
( ) Unusual Event Emergency
( ) Alert Emergency

Calculations By: _____ Date: _____ @ _____ hrs.

Reviewed By: _____ Date: _____ @ _____ hrs.

ATTACHMENT E
Page 1 of 2

UNIT 1

UNIT 1 EPA-MPC CALCULATION (PROCESS MONITOR METHOD): PAG DETERMINATION

Liquid Release Estimate
Unit 1: EPA - MPC Calculation (Process Monitor Method)

(RTL A5.715FK)
2.7-5F 11/1994

PAG Determination .... (Criteria: > 12 x EPA – MPC Limit)

Release Start: _____ @ _____ hrs, Release Stop: _____ @ _____ hrs, Release Time: _____ = minutes

A. DETERMINATION OF OHIO RIVER FLOW RATE

1. Determine the Ohio River Flowrate by one of the following methods:

PRIMARY METHOD

( ) Call the National Weather Service – 412-262-1882 or 412-262-1984 and request the following:

( ) _____ cuft/sec = Ohio River Flowrate at the Montgomery Dam.

BACKUP METHOD

( ) Call the National Weather Service – 412-262-1882 or 412-262-1984 and request one of the following:

( ) _____ cuft/sec = Ohio River Flowrate at the Wheeling Dam.
( ) _____ ft = Ohio River Stage Height at the Wheeling Dam ( ) or the Montgomery Dam ( ).
Convert this value to _____ cuft/sec using the graph on Attachment A.

( ) Use one of the following approximations based on the average reported monthly Ohio River Flowrates:

( ) 53,000 cuft/sec = January	( ) 44,000 cuft/sec = May	( ) 11,000 cuft/sec = September
( ) 55,000 cuft/sec = February	( ) 23,000 cuft/sec = June	( ) 16,000 cuft/sec = October
( ) 77,000 cuft/sec = March	( ) 15,000 cuft/sec = July	( ) 28,000 cuft/sec = November
( ) 64,000 cuft/sec = April	( ) 12,000 cuft/sec = August	( ) 43,000 cuft/sec = December

( ) Determine the Ohio River Flowrate By determining the Stage Height from one of the following onsite methods.

( ) _____ ft = Ohio River Stage Height as read from the Intake Structure.
Convert this value to _____ cuft/sec using the graph on Attachment A.
( ) _____ ft = Ohio River Stage Height as read from 1LR-CW-101 (located in Intake Structure).
Convert this value to _____ cuft/sec using the graph on Attachment A.

B. DETERMINATION OF DILUTED FRACTION OF EPA-MPC LIMIT FOR VARIOUS PLANT SYSTEMS

1. Liquid Waste System Release (Criteria: Monitor Reading Exceeds The HI HI Alarm Setpoint)

1.1 Obtain the Release Rate for the appropriate pathway using one of the following methods:

( ) RM-1LW-116: Release Rate = _____ gpm; As read from FR-1LW-103, or
( ) RM-1LW-104: Release Rate = _____ gpm; As read from FR-1LW-104

1.2 Determine the Dilution Factor as follows:

(Release Rate _____ gpm) x (2.23E-3)

DF = _____ = _____
(Ohio River Flowrate _____ cuft/sec)

1.3 Determine the Diluted Fraction of EPA-MPC Limit using one of the following methods:

( ) RM-1LW-116: fr EPA-MPC Limit = (DF _____) x (Mon Reading _____ ncpm) x (1.95E+0) = _____ , or
( ) RM-1LW-104: fr EPA-MPC Limit = (DF _____) x (Mon Reading _____ ncpm) x (1.95E+0) = _____

ATTACHMENT E
Page 2 of 2

UNIT 1

UNIT 1 EPA-MPC CALCULATION (PROCESS MONITOR METHOD): PAG DETERMINATION

Liquid Release Estimate)
Unit 1: EPA - MPC Calculation (Process Monitor Method)

(RTL A5.715FK)
2.7-5R11/1994

B. DETERMINATION OF DILUTED FRACTION OF EPA-MPC LIMIT FOR VARIOUS PLANT SYSTEMS (Continued)

2. Reactor Plant River Water System Release (Criteria: Monitor Reading Exceeds The HI HI Alarm Setpoint)

2.1 Determine the Release Rate for the appropriate pathway using one of the following methods:

( ) RM-1RW-100: Release Rate = (9000 gpm per RPRWP) x (_____ RPRWP's) = _____ gpm, or
* ( ) RM-1RW-101: Release Rate = (9000 gpm per RPRWP) x (_____ RPRWP's) = _____ gpm, or
** ( ) RM-1RW-100 ABCD: Release Rate = (2250 gpm per RPRWP) x (_____ RPRWP's) = _____ gpm

* Do not use if in a CIB ** Do not use unless 1RM-RW-100 is INOPERABLE

2.2 Obtain the Cooling Tower Blowdown Flowrates as follows:

U1 CTBD Flowrate = _____ gpm; As read from FT-1CW-101, and

2.3 Determine the Cooling Tower Recirculation Flowrates as follows:

CT Recirc Rate = (127,000 gpm / CTP) x (_____ CTP's) = _____ gpm

2.4 Determine the Dilution Factor as follows:

$$DF = \frac{\text{(Release Rate \_\_\_\_\_ gpm) x (U1 CTBD Flowrate \_\_\_\_\_ gpm) x (2.23E-3)}}{\text{CT Recirc Rate \_\_\_\_\_ gpm) x (Ohio River Flowrate \_\_\_\_\_ cuft/sec)}} = \_\_\_\_\_$$

2.5 Determine the Diluted Fraction of TS/ODCM Limit using one of the following methods:

( ) RM-1RW-100 fr TS/ODCM Limit = (DF _____) x (Mon Reading _____ ncpm) x (7.92E-1) = _____, or
( ) RM-1RW-101: fr TS/ODCM Limit = (DF _____) x (Mon Reading _____ ncpm) x (1.95E+0) = _____, or
( ) RM-1RW-100 ABCD: fr TS/ODCM Limit = (DF _____) x (Sum Mon Rdngs _____ ncpm) x (7.92E-1) = _____

3. Auxiliary Feed Pump Bay Drain System Release (Criteria: Monitor Reading Exceeds The HI HI Alarm Setpoint)

3.1 Determine the Diluted Factor as follows:

$$DF = \frac{\text{(120 gpm Release Rate) x (2.23E-3)}}{\text{(Ohio River Flowrate \_\_\_\_\_ cuft/sec)}} = \_\_\_\_\_$$

3.2 Determine the Diluted Fraction of TS/ODCM Limit as follows:

RM-1DA-100: fr TS/ODCM Limit = (DF_____) x (Monitor Reading _____ ncpm) x (1.02E+0) = _____

C. DETERMINATION OF EVENT CLASSIFICATION

1. IF the Diluted Fraction of EPA-MPC Limit is > 12, THEN implement the Protective Action Guide (PAG) per EPP/IP 4.1.

2. IF more than one release is ongoing, THEN calculate a Diluted Fraction of EPA-MPC Limit for each release. Sum the values for each release. IF the sum is > 12, THEN implement the PAG per EPP/IP 4.1

( ) Sum EPA-MPC < 12, No PAG Required
( ) Sum EPA-MPC > 12, PAG Required (Implement PAG per EPP/IP 4.1)

Calculations By: _____ Date: _____ @ _____ hrs.

Reviewed By: _____ Date: _____ @ _____ hrs.

ATTACHMENT F
Page 1 of 1
UNIT 1 UNMONITORED LIQUID DISCHARGE PATHWAYS

UNIT 1

Liquid Release Estimate
Unit 1: Unmonitored Liquid Discharge Pathways

(RTL A5.715FL)
2.7-6 11/1994

1. Unmonitored Release Origin

1. This type of unmonitored discharge can occur in the outside yard area by means of abnormal leakage from a storage tank. The pathway for this type of discharge is over the yard area curbs, to the Catch Basin system, and then directly to the Ohio River. Choose one of the following options:

( ) 1QS-TK-1: Refueling Water Storage Tank (RWST) — Capacity = 452,000 gallons

This tank is filled with borated water supplied by the Boric Acid Blender. The tank provides suction head for the Quench Spray Pumps during a CIB, and provides a return path for these pumps during normal operation. Since this water is used in the reactor cavity during refueling, it is highly contaminated.

( ) 1BR-TK-6A: Primary Grade Water Storage Tank — Capacity = 75,000 gallons
( ) 1BR-TK-6B: Primary Grade Water Storage Tank — Capacity = 75,000 gallons

These tanks receive processed water from the Boron Recovery System or the Water Treatment System. These tanks can contain low level particulate contaminants, but generally high levels of tritium.

( ) 1LW-TK-7A: Steam Generator Drain Tank — Capacity = 34,500 gallons
( ) 1LW-TK-7B: Steam Generator Drain Tank — Capacity = 34,500 gallons

These tanks generally receive processed water from the Liquid Waste System. The water in these tanks can contain low-to-high level particulate contaminants, and generally high levels of tritium.

( ) Other: _____

2. Unmonitored Release Calculations

2.1 Determine the amount of liquid released.

Liquid Released = _____ gallons

2.2 Determine or estimate the duration of the release.

Release Time = _____ minutes

2.3 Calculate the Release Rate as follows:

( ) Release Rate = (Liquid Release _____ gal) / (Release Time _____ min) = _____ gpm

Enter this Release Rate in Block (2) of Attachment B, and Block (2) of Attachment C.

2.4 Determine or estimate the Dilution Rate for the release.

( ) Dilution Rate = _____ gpm

Enter this Dilution Rate in Block (3) of Attachment B. IF the Dilution Flowrate is zero, or IF the Dilution Flowrate cannot be determined, THEN consider the Dilution Factor to be 1.0 and enter 1.0 in Block (4) of Attachment B.

Calculations By: _____ Date: _____ @ _____ hrs.

Reviewed By: _____ Date: _____ @ _____ hrs.

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ATTACHMENT G
Page 1 of 2

UNIT 2

UNIT 2 NRC-EC CALCULATION (SAMPLE METHOD): UNUSUAL EVENT AND ALERT DETERMINATION

Liquid Release Estimate
Unit 2: NRC – EC Calculation (Sample Method)

CALCULATIONS (RTL A5.715FG)
2.7-7F 11/1994

Unusual Event Determination .... (Criteria: >2 x TS/ODCM Limit, and release is > or = 60 minutes)
Alert Determination ..... (Criteria: > 200 x TS/ODCM Limit, and release is > or = 15 minutes)

Sample Location: _____ Sample Date: _____ @ _____ hrs

Release Start: _____ @ _____ hrs, Release Stop: _____ @ _____ hrs, Release Time: _____ = minutes

	Nuclide	Col A Sample Concentration (uCi/ml)		Col B TS/ODCM Limit 10 x NRC-EC (uCi/ml)		Col C (Col A / Col B) Fraction of Limit
	Be-7		/	6E-03	=	
	Cr-51		/	5E-03	=	
P	Mn-54		/	3E-04	=	
A	Fe-59		/	1E-04	=	
R	Co-57		/	6E-04	=	
T	Co-58		/	2E-04	=	
I	Co-60		/	3E-05	=	
C	Ni-59		/	3E-03	=	
U	Ni-63		/	1E-03	=	
L	Zn-65		/	5E-05	=	
A	Zr/Nb-95		/	2E-04	=	
T	Nb-97		/	3E-03	=	
E	Mo-99		/	2E-04	=	
S	Tc-99m		/	1E-02	=	
	Ag-110m		/	6E-05	=	
&	Sb-124		/	7E-05	=	
	Sb-125		/	3E-04	=	
I	I-131		/	1E-05	=	
O	I-133		/	7E-05	=	
D	I-135		/	3E-04	=	
I	Cs-134		/	9E-06	=	
N	Cs-137		/	1E-05	=	
E	Ba/La-140		/	8E-05	=	
S	Ce-141		/	3E-04	=	
	Ce-144		/	3E-05	=	
	W-187		/	3E-04	=	
*	H-3		/	1E-02	=	
*	Fe-55		/	1E-03	=	
*	Sr-89		/	8E-05	=	
*	Sr-90		/	5E-06	=	
**	Gr Beta-Gamma		/	1E-07	=	
	Sum Total (Undiluted Fraction of Limit)				=	(1)

* Use the latest appropriate composite sample analysis.
** Use only if isotopic sample analysis is not available.

IF sample was taken from the outfall structure or cooling tower blowdown, THEN enter 1.0 in Block (4) and determine Block (5)

Otherwise, do the following:

Enter Liquid Waste Release Rate in Block (2)

(2) Release Rate = _____ gpm

Enter the Cooling Tower Blowdown in Block (3), as obtained from:
( ) FT-1CW-101-1
( ) other: _____

(3) Dilution Rate = _____ gpm

Divide Block (2) by Block (3), then enter the result in Block (4)

(4) DF = _____

Multiply Block (1) by Block (4), then enter the result in Block (5)

(5) Fr of NRC Limit = _____

Note 1: IF Block (5) is > 2, and the release is > or = 60 minutes, THEN declare an Unusual Event.

Note 2: IF Block (5) is > 200, and the release is > or = 15 minutes, THEN declare an Alert.

Note 3: IF more than one release is ongoing, THEN calculate a Block (5) for each release. Use the max Block (5) to classify the event.

( ) No Emergency
( ) Unusual Event Emergency
( ) Alert Emergency

Calculations By: _____ Date: _____ @ _____ hrs.

Reviewed By: _____ Date: _____ @ _____ hrs.

UNIT 2

ATTACHMENT G
Page 2 of 2
UNIT 2 NRC-EC CALCULATION (SAMPLE METHOD): UNUSUAL EVENT AND ALERT DETERMINATION

Liquid Release Estimate
Unit 2: NRC – EC Calculation (Sample Method)

INSTRUCTIONS (RTL A5.715FG)
2.7-7R 11/1994

1. Obtain an isotopic sample from the source (e.g.: the Liquid Waste Discharge Line) or from the Cooling Tower Blowdown, or from the Emergency Outfall Structure.

   1.1 IF the radioactivity is a result of a leaking heat exchanger, THEN obtain the sample from the Combined Cooling Tower Blowdown or the Emergency Outfall Structure, as appropriate. However, IF the sample is obtained from the Service Water System, THEN consult EADP personnel for an appropriate Dilution Factor.

2. Enter the nuclide concentrations (uCi/ml), or gross beta-gamma concentrations (uCi/ml) in the appropriate column.

3. Divide the nuclide concentrations (uCi/ml) in Column A by the TS/ODCM Limit (uCi/ml) in Column B. Enter the results in Column C (Fraction of Limit).

   3.1 Note that the TS/ODCM Limit Values are based on 10 times the NRC-EC concentrations listed in 10 CFR 20 Appendix B to 20.1001 – 20.2401, Table 2 Col. 2.

4. Sum the Fraction of TS/ODCM Limit values. Enter the Undiluted Fraction of TS/ODCM Limit total in Block (1).

5. IF the sample was taken from the outfall structures, the cooling tower blowdown, or the Catch Basin System, THEN enter 1.0 in Block (4) and proceed to Step 9.

6. IF the sample was taken from the Liquid Waste System, THEN obtain the Release Rate (gpm) for the appropriate pathway. Enter the value in Block (2).

7. Obtain the combined Cooling Tower Blowdown Flowrate from FT-1CW-101-1 (gpm), or obtain any other applicable Dilution Flowrate (gpm). Enter the appropriate value in Block (3).

8. Determine the Dilution Factor by dividing the Release Rate (gpm) in Block (2) by the Dilution Rate (gpm) in Block (3). Enter the result in Block (4).

9. Determine the Diluted Fraction of TS/ODCM Limit By Multiplying the Undiluted Fraction of TS/ODCM Limit in Block (1) by the Dilution Factor in Block (4). Enter the result in Block (5).

   9.1 IF the Diluted Fraction of TS/ODCM Limit from Block (5) is >2, and the release is > or = 60 minutes, THEN declare an Unusual Event.

   9.2 IF the Diluted Fraction of TS/ODCM Limit from Block (5) is >200, and the release is > or = 15 minutes, THEN declare an Alert.

   9.3 IF more than one release is ongoing, THEN calculate a Diluted Fraction of TS/ODCM Limit, as shown in Block (5), for each release. Use the highest Block (5) value for event classification.

ATTACHMENT H
Page 1 of 2

UNIT 2

UNIT 2 EPA-MPC CALCULATION (SAMPLE METHOD): PAG DETERMINATION

Liquid Release Estimate
Unit 2: EPA - MPC Calculation (Sample Method)
PAG Determination ..... (Criteria: > 12 x EPA – MPC Limit)

CALCULATIONS (RTL A5.715FH)
2.7-8F 11/1994

Sample Location: _____ Sample Date: _____ @ _____ hrs

Release Start: _____ @ _____ hrs, Release Stop: _____ @ _____ hrs, Release Time: _____ = minutes

	Nuclide	Col A Sample Concentration (uCi/ml)		Col B EPA-MPC Limit EPA-570 (uCi/ml)		Col C (Col A / Col B) Fraction of Limit
	Be-7		/	6E-06	=	
	Cr-51		/	6E-06	=	
P	Mn-54		/	3E-07	=	
A	Fe-59		/	2E-07	=	
R	Co-57		/	1E-06	=	
T	Co-58		/	3E-07	=	
I	Co-60		/	1E-07	=	
C	Ni-59		/	3E-07	=	
U	Ni-63		/	5E-08	=	
L	Zn-65		/	3E-07	=	
A	Zr/Nb-95		/	2E-07	=	
T	Nb-97		/	3E-06	=	
E	Mo-99		/	6E-07	=	
S	Tc-99m		/	2E-05	=	
	Ag-110m		/	9E-08	=	
&	Sb-124		/	6E-08	=	
	Sb-125		/	3E-07	=	
I	I-131		/	3E-09	=	
O	I-133		/	1E-08	=	
D	I-135		/	3E-08	=	
I	Cs-134		/	8E-08	=	
N	Cs-137		/	2E-07	=	
E	Ba/La-140		/	6E-08	=	
S	Ce-141		/	3E-07	=	
	Ce-144		/	0E-00	=	
	W-187		/	2E-07	=	
*	H-3		/	2E-05	=	
*	Fe-55		/	2E-06	=	
*	Sr-89		/	2E-08	=	
*	Sr-90		/	8E-09	=	
**	Gr Beta-Gamma		/	9E-11	=	
				Sum Total (Undiluted Fraction of Limit)	=	(1)

* Use the latest appropriate composite sample analysis.
** Use only if isotopic sample analysis is not available.

IF sample was taken from the Midland Water Treatment Plant Intake, THEN enter 1.0 in Block (4) and determine Block (5)

Otherwise, do the following:

Enter Liquid Waste Release Rate in Block (2)

(2) Release Rate = _____ gpm

Enter Ohio River Flowrate in Block (3) (See INSTRUCTIONS)
( ) table value for month of _____
( ) other: _____

(3) Ohio River Flow = _____ cuft/sec

Divide Block (2) by Block (3), then Multiply by 2.23E-3. Enter the result in Block (4)
(4) DF = _____

Multiply Block (1) by Block (4), then enter the result in Block (5)

(5) Fr of EPA Limit = _____

Note 1: IF Block (5) is > 12, THEN implement the PAG per EPP/IP 4.1.

Note 2: IF more than one release is ongoing, THEN calculate a Block (5) for each release. Sum the Block (5)'s for each release. IF the sum exceeds 12, THEN implement the PAG per EPP/IP 4.1.

( ) Sum EPA – MPC <12, No PAG Required

( ) Sum EPA – MPC >12, PAG Required per EPP/IP 4.1.

Calculations By: _____ Date: _____ @ _____ hrs.

Reviewed By: _____ Date: _____ @ _____ hrs.

ATTACHMENT H
Page 2 of 2

UNIT 2

UNIT 2 EPA-MPC CALCULATION (SAMPLE METHOD): PAG DETERMINATION

Liquid Release Estimate
Unit 2: EPA - MPC Calculation (Sample Method)

INSTRUCTIONS (RTL A5.715FH) 2.7-8R 11/1994

1. Obtain an isotopic sample from the source or form the Midland Water Treatment Plant Intake.

2. Enter the nuclide concentrations (uCi/ml), or gross beta-gamma concentrations (uCi/ml) in the Column A.

3. Divide the nuclide concentrations (uCi/ml) in Column A by the EPA-MPC Limit (uCi/ml) in Column B. Enter the results in Column C (Fraction of Limit).

   3.1 Note that the EPA-MPC Limit Values are from the Interim Drinking Water Regulations (EPA-570/9-76-003), and from DLC Calculation Package No. ERS-DKY-82-022.

4. Sum the Fraction of EPA-MPC Limit values. Enter the Undiluted Fraction of EPA-MPC Limit total in Block (1).

5. IF the sample was taken from the Midland Water Treatment Plant intake, THEN enter 1.0 in Block (4) and proceed to Step 9.

6. Determine the Release Rate (gpm) by one of the following methods, and enter the result in Block (2).

   ( ) For a sample taken from a tank or piping; Release Rate = _____ gpm = Discharge Rate from tank or piping.
   ( ) For a sample taken from the CT Blowdown; Release Rate = _____ gpm = CT Blowdown Flowrate.
   ( ) For a sample taken from the Catch Basin; Release Rate = _____ gpm = Catch Basin Flowrate.

7 Determine the Ohio River Flowrate (cuft/sec) by one of the following methods, and enter the result in Block (3).

   ( ) Call the National Weather Service – 412-262-1882 or 412-262-1984 and request one of the following.

      ( ) _____ cuft/sec = Ohio River Flowrate at the Wheeling Dam ( ) or the Montgomery Dam ( ).
      ( ) _____ ft = Ohio River Stage Height at the Wheeling Dam ( ) or the Montgomery Dam ( ).
      Convert this value to _____ cuft/sec using the graph on Attachment A.

   ( ) Use one of the following approximations based on the average reported monthly Ohio River Flowrates.

( ) 53,000 cuft/sec = January	( ) 44,000 cuft/sec = May	( ) 11,000 cuft/sec = September
( ) 55,000 cuft/sec = February	( ) 23,000 cuft/sec = June	( ) 16,000 cuft/sec = October
( ) 77,000 cuft/sec = March	( ) 15,000 cuft/sec = July	( ) 28,000 cuft/sec = November
( ) 64,000 cuft/sec = April	( ) 12,000 cuft/sec = August	( ) 43,000 cuft/sec = December

   ( ) Determine the Ohio River Flowrate by determining the Stage Height from one of the following onsite methods.

      ( ) _____ ft = Ohio River Stage Height as read from the Intake Structure.
      Convert this value to _____ cuft/sec using the graph on Attachment A.
      ( ) _____ ft = Ohio River Stage Height as read from 1LR-CW-101 (located in Intake Structure).
      Convert this value to _____ cuft/sec using the graph on Attachment A.

8. Determine the Dilution Factor by dividing the Release Rate (gpm) in Block (2) by the Ohio River Flowrate (gpm) in Block (3) and multiply by a conversion factor of 2.23E-3. Enter the result in Block (4).

9. Determine the Diluted Fraction of EPA-MPC Limit By Multiplying the Undiluted Fraction of EPA-MPC Limit in Block (1) by the Dilution Factor in Block (4). Enter the result in Block (5).

   9.1 IF the Diluted Fraction of EPA-MPC Limit from Block (5) is >12, THEN implement the PAG per EPP/IP 4.1.

   9.2 IF more than one release is ongoing, THEN calculate a Diluted Fraction of EPA-MPC Limit, as shown in Block (5), for each release. Sum the Block (5)'s for each release. IF the sum exceeds 12, THEN implement PAG per EPP/IP 4.1

ATTACHMENT I
Page 1 of 2

UNIT 2

UNIT 2 NRC-EC CALCULATION (PROCESS MONITOR METHOD): UNUSUAL EVENT AND ALERT DETERMINATION

Liquid Release Estimate
Unit 2: NRC - EC Calculation (Process Monitor Method)

(RTL A5.715FJ)
2.7-9F 11/1994

Unusual Event Determination .... (Criteria: >2 x TS/ODCM Limit, and release is > or = 60 minutes)
Alert Determination ..... (Criteria: > 200 x TS/ODCM Limit, and release is > or = 15 minutes)

Release Start: _____ @ _____ hrs, Release Stop: _____ @ _____ hrs, Release Time: _____ = minutes

A. DETERMINATION OF DILUTED FRACTION OF TS/ODCM LIMIT FOR VARIOUS PLANT SYSTEMS

1. Liquid Waste System Release (Criteria: Monitor Reading Exceeds the HI HI Alarm Setpoint)

1.1 Obtain the Release Rate using the following method:

2SGC-RQ100: Release Rate = _____ gpm; As read from 2SGC-HIC100

1.2 Obtain the Cooling Tower Blowdown Flowrate as follows:

U1/2 CTBD Flowrate = _____ gpm; As read from FT-1CW-101-1

1.3 Determine the Dilution Factor as follows:

DF = (Release Rate _____ gpm) / (U1/2 CTBD Flowrate _____ gpm) = _____

1.4 Determine the Diluted Fraction of TS/ODCM Limit as follows::

2SGC-RQ100: fr TS/ODCM Limit = (DF _____) x (Mon Reading _____ net uCi/cc) x (2.90E+5) = ____

2. Recirculation Spray System Release (Criteria: In a CIB, and Monitor Reading Exceeds The High Alarm Setpoint)

2.1 Determine the Dilution Factor (VIA Emergency Outfall Structure) using one of the following methods:

( ) DF = 0.44 (For one SWSP in operation)
( ) DF = 0.22 (For two SWSP's in operation)

2.2 Determine the Diluted Fraction of TS/ODCM Limit as follows:

2SWS-RQ100 ABCD: fr TS/ODCM = (DF _____) x (Sum Mon Rdngs _____ net uCi/cc) x (3.04E+4) = ____

ATTACHMENT I
Page 2 of 2

UNIT 2

UNIT 2 NRC-EC CALCULATION (PROCESS MONITOR METHOD): UNUSUAL EVENT AND ALERT DETERMINATION

Liquid Release Estimate
Unit 2: NRC - EC Calculation (Process Monitor Method)

(RTL A5.715FJ)
2.7-9R 11/1994

A. DETERMINATION OF DILUTED FRACTION OF TS/ODCM LIMIT FOR VARIOUS PLANT SYSTEMS (Continued)

3. Component Cooling / Service Water System Release (Criteria: Monitor Reading Exceeds The High Alarm Setpoint)

3.1 Determine the Release Rate using one of the following methods:

( ) 2SWS-RQ101: Release Rate = (1900 gpm per SWSP) x (_____ SWSP's) = _____ gpm, or
( ) 2SWS-RQ102: Release Rate = (1900 gpm per SWSP) x (_____ SWSP's = _____ gpm

3.2 Obtain the Cooling Tower Blowdown Flowrate as follows:

U2 CTBD Flowrate = _____ gpm; As read from 2CWS-FT101, and
U1/2 CTBD Flowrate = _____ gpm; As read from FT-1CW-101-1

3.3 Determine the Cooling Tower Recirculation Flowrate as follows:

CT Recirc Rate = (127,000 gpm per CTP) x (_____ CTP's) = _____ gpm

3.4 Determine the Dilution Factor (VIA U1/2 Outfall Structure) as follows:

$$DF = \frac{\text{(Release Rate \_\_\_\_\_ gpm) x (U2 CTBD Flowrate \_\_\_\_\_ gpm)}}{\text{(CT Recirc Rate \_\_\_\_\_ gpm) x (U1/2 CTBD Flowrate \_\_\_\_\_ gpm)}} = \_\_\_\_$$

3.5 Determine the Diluted Fraction of TS/ODCM Limit (VIA U1/2 Outfall Structure) using one of the following:

( ) 2SWS-RQ101: OS fr TS/ODCM = (DF _____) x (Mon Reading _____net uCi/cc) x (2.72E+4) = ____, or
( ) 2SWS-RQ102: OS fr TS/ODCM = (DF _____) x (Mon Reading _____net uCi/cc) x (2.72E+4) = ____

3.6 Determine the Diluted Fraction of TS/ODCM Limit (VIA Emergency Outfall Structure) using one of the following:

( ) 2SWS-RQ101: EOS fr TS/ODCM = (0.86 DF) x (Mon Reading _____net uCi/cc) x (2.72E+4) = ____, or
( ) 2SWS-RQ102: EOS fr TS/ODCM = (0.86 DF) x (Mon Reading _____net uCi/cc) x (2.72E+4) = ____

3.7 Record the maximum diluted Fraction of TS/ODCM Limit _____ (From Step A.3.5 or A.3.6)

B. DETERMINATION OF EVENT CLASSIFICATION

1. IF the Diluted Fraction of TS/ODCM Limit is > 2, and the release is > or = 60 minutes, THEN declare an Unusual Event.

2. IF the Diluted Fraction of TS/ODCM Limit is > 200, and the release is > or = 15 minutes, THEN declare an Alert.

3. IF more than one release is ongoing, THEN calculate a Diluted Fraction of TS/ODCM Limit for each release. Use the highest Fraction of TS/ODCM Limit value for event classification.

( ) No Emergency
( ) Unusual Event Emergency
( ) Alert Emergency

Calculations By: _____ Date: _____ @ _____ hrs.

Reviewed By: _____ Date: _____ @ _____ hrs.

ATTACHMENT J
Page 1 of 2

UNIT 2

UNIT 2 EPA-MPC CALCULATION (PROCESS MONITOR METHOD): PAG DETERMINATION

Liquid Release Estimate
Unit 2: EPA - MPC Calculation (Process Monitor Method)

(RTL A5.715FK)
2.7-10F 11/1994

PAG Determination ..... (Criteria: > 12 x EPA – MPC Limit)
Release Start: _____ @ _____ hrs, Release Stop: _____ @ _____ hrs, Release Time: _____ = minutes

A. DETERMINATION OF OHIO RIVER FLOW RATE

1. Determine the Ohio River Flowrate by one of the following methods:

PRIMARY METHOD

( ) Call the National Weather Service – 412-262-1882 or 412-262-1984 and request the following.

( ) _____ cuft/sec = Ohio River Flowrate at the Montgomery Dam.

BACKUP METHOD

( ) Call the National Weather Service – 412-262-1882 or 412-262-1984 and request one of the following.

( ) _____ cuft/sec = Ohio River Flowrate at the Wheeling Dam.
( ) _____ ft = Ohio River Stage Height at the Wheeling Dam ( ) or the Montgomery Dam ( ).
Convert this value to _____ cuft/sec using the graph on Attachment A.

( ) Use one of the following approximations based on the average reported monthly Ohio River Flowrates.

( ) 53,000 cuft/sec = January	( ) 44,000 cuft/sec = May	( ) 11,000 cuft/sec = September
( ) 55,000 cuft/sec = February	( ) 23,000 cuft/sec = June	( ) 16,000 cuft/sec = October
( ) 77,000 cuft/sec = March	( ) 15,000 cuft/sec = July	( ) 28,000 cuft/sec = November
( ) 64,000 cuft/sec = April	( ) 12,000 cuft/sec = August	( ) 43,000 cuft/sec = December

( ) Determine the Ohio River Flowrate by determining the Stage Height from one of the following onsite methods.

( ) _____ ft = Ohio River Stage Height as read from the Intake Structure.
Convert this value to _____ cuft/sec using the graph on Attachment A.

( ) _____ ft = Ohio River Stage Height as read from 1LR-CW-101 (located in Intake Structure).
Convert this value to _____ cuft/sec using the graph on Attachment A.

B. DETERMINATION OF DILUTED FRACTION OF EPA-MPC LIMIT FOR VARIOUS PLANT SYSTEMS

1. Liquid Waste System Release (Criteria: Monitor Reading Exceeds the High Alarm Setpoint)

1.1 Obtain the Release Rate using the following method:

2SGC-RQ100: Release Rate = _____ gpm; As read from 2SGC-HIC100

1.2 Determine the Dilution Factor as follows:

DF = ((Release Rate _____ gpm) x (2.23E-3)) / Ohio River Flowrate _____ cuft/sec) = _____

1.3 Determine the Diluted Fraction of EPA-MPC Limit using the following method:

2SGC-RQ100: fr EPA-MPC Limit = (DF _____) x (Mon Reading _____net uCi/cc) x (2.76E+8) = ____

2. Recirculation Spray System Release (Criteria: In a CIB, and Monitor Reading Exceeds The High Alarm Setpoint)

2.1 Determine the Dilution Factor (VIA Emergency Outfall Structure) as follows::

DF = (6000 gpm Release Rate) x (2.23E-3) / (Ohio River Flowrate _____ cuft/sec) = _____

2.2 Determine the Diluted Fraction of EPA-MPC Limit as follows::

2SWS-RQ100 ABCD: fr EPA-MPC = (DF _____) x (Sum Mon Rdngs _____ net uCi/cc) x (8.01E+7) = ____

ATTACHMENT J
Page 2 of 2

UNIT 2

UNIT 2 EPA-MPC CALCULATION (PROCESS MONITOR METHOD): PAG DETERMINATION

Liquid Release Estimate
Unit 2: EPA-MPC Calculation (Process Monitor Method)

(RTL A5.715FK)
2.7-10R 11/1994

B. DETERMINATION OF DILUTED FRACTION OF EPA-MPC LIMIT FOR VARIOUS PLANT SYSTEMS (Continued)

3. Component Cooling / Service Water System Release (Criteria: Monitor Reading Exceeds The High Alarm Setpoint)

3.1 Determine the U1/2 Outfall Structure (U1/2 OS), and the EOS Release Rates using the following methods:

( ) 2SWS-RQ101: U1/2 OS Release Rate = (1900 gpm per SWSP) x (____ SWSP's) = _____ gpm, or
( ) 2SWS-RQ102: U1/2 OS Release Rate = (1900 gpm per SWSP) x (____ SWSP's) = _____ gpm

AND,

( ) 2SWS-RQ101: U1/2 EOS Release Rate = (3650 gpm per SWSP) x (____ SWSP's) = _____ gpm, or
( ) 2SWS-RQ102: U1/2 EOS Release Rate = (3650 gpm per SWSP) x (____ SWSP's) = _____ gpm

3.2 Obtain the Cooling Tower Blowdown Flowrate as follows:

U2 CTBD Flowrate = _____ gpm; As read from 2CWS-FT101

3.3 Determine the Cooling Tower Recirculation Flowrate as follows:

CT Recirc Rate = (127,000 gpm / CTP) x (_____ CTP's) = _____ gpm

3.4 Determine the Dilution Factors(VIA U1/2 Outfall Structure and VIA EOS) as follows:

$$\text{U1/2 OS DF} = \frac{\text{(U1/2 OS Release Rate \_\_\_\_\_ gpm) x (U2 CTBD Flowrate \_\_\_\_\_ gpm) x (2.23E-3)}}{\text{(CT Recirc Rate = \_\_\_\_\_ gpm) x (Ohio River Flowrate \_\_\_\_\_ cuft/sec)}} = \_\_\_\_\_$$

$$\text{EOS DF} = \frac{\text{(EOS Release Rate \_\_\_\_\_ gpm) x (2.23E-3)}}{\text{(Ohio River Flowrate = \_\_\_\_\_ cuft/sec)}} = \_\_\_\_\_$$

3.5 Determine the Diluted Fraction of EPA-MPC (VIA U1/2 OS and VIA EOS) as follows:

( ) 2SWS-RQ101: U1/2 OS EPA-MPC = (U1/2 OS DF _____) x (Mon Rdg _____net uCi/cc) x (9.17E+7) = ____, or
( ) 2SWS-RQ102: U1/2 OS EPA-MPC = (U1/2 OS DF _____) x (Mon Rdg _____net uCi/cc) x (9.17E+7) = ____

AND,

( ) 2SWS-RQ101: EOS fr EPA-MPC = (EOS DF _____) x (Mon Rdg _____net uCi/cc) x (9.17E+7) = ____, or
( ) 2SWS-RQ102: EOS fr EPA-MPC = (EOS DF _____) x (Mon Rdg _____net uCi/cc) x (9.17E+7) = ____

3.6 Record the Total Diluted Fraction of EPA-MPC Limit _____ (Sum the values from Step B.3.5)

C. DETERMINATION OF EVENT CLASSIFICATION

1. IF the Diluted Fraction of EPA-MPC Limit is > 12, THEN implement the Protective Action Guide (PAG) per EPP/IP 4.1.

2. IF more than one release is ongoing, THEN calculate a Diluted Fraction of EPA-MPC Limit for each release. Sum the values for each release. IF the sum is > 12, THEN implement the PAG per EPP/IP 4.1.

( ) Sum EPA-MPC < 12, No PAG Required
( ) Sum EPA-MPC > 12, PAG Required (Implement PAG per EPP/IP 4.1)

Calculations By: _____ Date: _____ @ _____ hrs.

Reviewed By: _____ Date: _____ @ _____ hrs.

ATTACHMENT K
Page 1 of 1
UNIT 2 UNMONITORED LIQUID DISCHARGE PATHWAYS

UNIT 2

Liquid Release Estimate
Unit 2: Unmonitored Liquid Discharge Pathways

(RTL A5.715FL)
2.7-11 11/1994

1. Unmonitored Release Origin

   1. This type of unmonitored discharge can occur in the outside yard area by means of abnormal leakage from a storage tank. The pathway for this type of discharge is over the yard area curbs, to the Catch Basin system, and then directly to the Ohio River. Choose one of the following options:

      ( ) 2QSS-TK21: Refueling Water Storage Tank (RWST) Capacity = 850,000 gallons

      This tank is filled with borated water supplied by the Boric Acid Blender. The tank provides suction head for the Quench Spray Pumps during a CIB, and provides a return path for these pumps during normal operation. Since this water is used in the reactor cavity during refueling, it is highly contaminated.

      ( ) Other: _____

2. Unmonitored Release Calculations

   2.1 Determine the amount of liquid released.

   Liquid Released = _____ gallons

   2.2 Determine or estimate the duration of the release.

   Release Time = _____ minutes

   2.3 Calculate the Release Rate as follows:

   ( ) Release Rate = (Liquid Release _____ gal) / (Release Time _____ min) = _____ gpm

   Enter this Release Rate in Block (2) of Attachment G, and Block (2) of Attachment H.

   2.4 Determine or estimate the Dilution Rate for the release.

   ( ) Dilution Rate = _____ gpm

   Enter this Dilution Rate in Block (3) of Attachment G. IF the Dilution Flowrate is zero, or IF the Dilution Flowrate cannot be determined, THEN consider the Dilution Factor to be 1.0 and enter 1.0 in Block (4) of Attachment G.

Calculations By: _____ Date: _____ @ _____ hrs.

Reviewed By: _____ Date: _____ @ _____ hrs.

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Beaver Valley Power Station

Unit 1/2

EPP-IP-3.3

EMERGENCY CONTAMINATION CONTROL

Document Owner
Manager, Emergency Preparedness

Revision Number	8
Level Of Use	General Skill Reference
Safety Related Procedure	Yes

TABLE OF CONTENTS

1.0 PURPOSE

1.1 This procedure provides general instructions to the TSC staff to supplement the guidance contained in the Health Physics Manual (HPM) and/or the Radiation Protection Procedures.

2.0 SCOPE

2.1 None

3.0 REFERENCES AND COMMITMENTS

3.1 References

3.1.1 Beaver Valley Power Station Emergency Preparedness Plan and Implementing Procedures.

3.1.2 Beaver Valley Power Station Radiation Protection Procedures.

3.1.3 Title 10 Code of Federal Regulations Part 20 and Part 50.

3.1.4 NCRP Report No. 65, "Management of Persons Accidentally Contaminated with Radionuclides".

3.1.5 ICRP Publication 28, "The Principles and General Procedures for Handling Emergency and Accidental Exposures of Workers".

3.1.6 NUREG-0654/FEMA-REP-1 "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants."

3.1.7 BVPS Operations Manual, Chapter 56A

3.2 Commitments

3.2.1 None

4.0 RECORDS AND FORMS

4.1 Records

4.1.1 None

4.2 Forms

4.2.1 None

5.0 RESPONSIBILITIES

5.1 Radiological Controls Coordinator:

5.1.1 Is responsible to implement this procedure when necessary.

6.0 PRECAUTIONS AND LIMITATIONS

6.1 Precautions

6.1.1 The Beaver Valley Power Station Radiation Protection procedures contain provisions governing the control of contamination. The requirements and guidelines of these documents shall apply to contamination control during emergency conditions except as specifically provided in this EPP/IP, the BVPS Emergency Preparedness Plan, and/or by direction of the Radiological Controls Coordinator/Emergency Director.

6.1.2 Most cases of skin contamination with radioactive materials can be decontaminated using methods established in Radiation Protection procedures. Since the annual SDE-WB limit for the skin is 50 rem, skin decontamination efforts should never take precedence over necessary first aid. While not life threatening, discrete radioactive particles can rapidly cause skin doses in excess of limits. Personnel should remain alert for such particles when doing skin contamination surveys.

6.2 Limitations

6.2.1 None

7.0 PREREQUISITES

7.1 An emergency condition has been declared at the Beaver Valley Power Station as provided in the BVPS Emergency Preparedness Plan.

7.2 As a result of the emergency condition, measurable abnormal contamination levels are noted.

8.0 PROCEDURE

8.1 Contamination Control

8.1.1 It may become necessary to extend the boundaries of the Radiologically Restricted Area (RRA). Appropriate access control and associated contamination control measures shall be established for any area in which contamination exists at levels higher than specified for a non-contaminated area in the Radiation Protection procedures.

8.1.2 Personnel and equipment monitoring and release procedures and criteria shall remain in force to the extent possible. There may be exceptions applicable to emergency conditions, as follows:

8.1.2.1 If background dose rates at normal monitoring locations preclude detection of levels of contamination equivalent to the non-contaminated limit, monitoring shall be moved back to a location where this can be done. However, if significant levels of contamination exist, it may be appropriate to perform a gross screening at the exit of grossly contaminated area, to be followed by a more complete monitoring at a more suitable location.

8.1.2.2 If dose rates within the contaminated area (or Controlled Area) warrant an immediate evacuation, personnel monitoring shall not be required prior to evacuation. If possible, personnel exiting such areas should remove any clothing thought to be contaminated and/or don clean coveralls to minimize the spread of potential contamination, pending subsequent monitoring. In this case, appropriate monitoring should be performed at the designated assembly area.

8.1.2.3 Contamination limits for release of personnel, equipment, and areas specified in the Radiation Protection procedures shall remain in effect to the maximum extent possible. The Radiological Controls Coordinator will determine when a change in contamination limits is applicable and will establish appropriate revised limits. However, under site evacuation conditions, decontamination is normally mandatory if the removable contamination exceeds 5000 dpm/100cm2.

8.1.3 The conditions under which a Site Evacuation would be initiated might involve significant releases with resultant contamination of environmental surfaces offsite. Under these conditions, delaying Site Evacuation to monitor and/or decontaminate personnel or vehicles would be inconsistent with maintaining exposures as low as reasonably achievable, and may be superfluous in light of the potential for re-contamination offsite. The following procedures should be used:

8.1.3.1 Personnel should be directed to the upwind remote assembly area for monitoring (Western Power Delivery Division or Hookstown Grange). Rad Protection shall monitor personnel on the basis of a screening process to identify contaminants in excess of 5000 dpm/100 cm2. Personnel monitoring should basically consist of checking hands, feet, and the face with an E140/HP210 or equivalent survey instrument.

8.1.3.1.1 Personnel identified as contaminated should be segregated to an area for eventual decontamination.

8.1.3.1.2 Documentation of the extent and magnitude of the individual's contamination will be performed after the initial segregation phase of the group monitoring.

8.1.3.2 If the Remote Assembly Area is within sectors from which the population is being evacuated, the Emergency Director, in cooperation with FENOC management and State and county agencies shall designate an assembly area at which personnel monitoring will be performed. In this event, personnel and vehicles will be monitored the same as members of the general public as provided in the emergency plans of the affected jurisdictions.

8.1.4 In situations where there is potential for the imminent death of the victim and the magnitude of radiological conditions are generally known, rescue efforts take first priority.

8.1.4.1 An Emergency Squad member(s) should proceed to the scene without protective clothing to assess the situation and render first aid if personal safety permits.

8.1.4.2 Other Emergency Squad members should don appropriate clothing and proceed to the area to assist.

8.1.4.3 The initial Emergency Squad member providing assistance should leave the area and be monitored and/or decontaminated as soon as practical.

8.1.5 For fire-fighting efforts, normal fire-fighting gear (helmets, coats, boots, gloves, etc.) may take the place of protective clothing. This apparel will provide protection from contaminated water spray.

8.2 Decontamination

8.2.1 Personnel decontamination shall be performed as provided in the Radiation Protection procedures.

8.2.2 Contaminated/injured personnel should be decontaminated prior to transfer to the hospital, if possible, and if compatible with the extent of the injuries. Even a superficial initial decontamination to remove the loose contamination or the removal of outer clothes will help minimize the contamination of ambulances and hospital facilities and personnel. Refer to Operations Manual 56A and Radiation Protection procedures.

8.2.3 Most cases of skin contamination with radioactive materials can be decontaminated by Radiation Protection personnel using methods established in the Radiation Protection Procedures. Refer to 1/2-HPP-3.02.003, Decontamination Control. If the contamination has entered wounds or body openings, medical assistance should be sought. The urgency of such treatment will depend on the dose rate attributable to the contamination.

8.2.3.1 Since the annual SDE-WB limit for the skin is 50 rem, skin decontamination efforts should never take precedence over necessary first aid. However, an evaluation should be conducted under direction of the Radiation Protection staff to assess the consequence of the skin dose.

8.2.3.2 If skin contamination is the primary health hazard or if persistent contamination remains after decontamination efforts, Presbyterian - University Hospital should be contacted. The individual should be transferred to that facility for evaluation under their Radiation Emergency Response Program.

8.2.4 Decontamination of persons with significant internal contamination shall be referred to medical personnel at the Presbyterian-University Hospital and their Radiological Emergency Response Plan (RERP) program for evaluation and treatment. In the event of a significant uptake of radioiodine, potassium iodide may be administered in accordance with EPP/IP-3.4, "Emergency Respiratory Protection".

8.3 Final Conditions

8.3.1 The use of this procedure shall be terminated when monitoring results indicate contamination control is not necessary and all applicable documentation has been completed.

Beaver Valley Power Station

Unit 1/2

EPP-IP-5.4

EMERGENCY PERSONNEL MONITORING

Document Owner
Manager, Emergency Preparedness

Revision Number	9
Level Of Use	General Skill Reference
Safety Related Procedure	Yes

TABLE OF CONTENTS

1.0 PURPOSE

1.1 This procedure provides general guidance to the TSC staff, and in particular, the Radiological Controls Coordinator, for establishing personnel monitoring suitable for the radiological conditions observed or expected at the time of the accident. Three modifications/exemptions are addressed in this EPP/IP. The first is expanded use of personal monitoring devices. The second is accelerated collection and processing of personal monitoring devices. The third is increased bioassay analyses.

2.0 SCOPE

2.1 This procedure is used during a declared emergency to establish appropriate actions for internal and external personnel radiation monitoring.

3.0 REFERENCES AND COMMITMENTS

3.1 References

3.1.1 Beaver Valley Power Station Emergency Preparedness Plan and Implementing Procedures.

3.1.2 Title 10, Code of Federal Regulations Part 20.

3.1.3 Regulatory Guide 8.9 Revision 1 "Interpretation of Bioassay Data".

3.1.4 Beaver Valley Power Station Health Physics Procedures.

3.1.5 NUREG-0654/FEMA-REP-1 "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants."

3.1.6 Regulatory Guide 8.34 "Monitoring Criteria and Methods to Calculate Occupational Radiation Dose".

3.2 Commitments

3.2.1 None

4.0 RECORDS AND FORMS

4.1 Records

4.1.1 None

4.2 Forms

4.2.1 None

5.0 RESPONSIBILITIES

5.1 Radiological Controls Coordinator

5.1.1 Is responsible for establishing personnel monitoring suitable for the radiological conditions observed or expected at the time of the accident.

6.0 PRECAUTIONS AND LIMITATIONS

6.1 Precautions

6.1.1 The Beaver Valley Power Station Radiation Protection procedures contain standards for personnel monitoring, including bioassay requirements and dosimetry requirements for issuing, using, collecting and processing of dosimetry devices. The provisions of these documents shall apply to emergency conditions except as specifically provided in this EPP/IP or in the BVPS Emergency Preparedness Plan, or as provided by the Radiological Controls Coordinator.

6.1.2 During emergencies when there is a great demand for dosimetry, compounded by delays in processing and recording the exposures in the exposure record system (due to the large number of devices in use, and/or inaccessibility to dosimetry processing data systems, etc.), caution shall be exercised to ensure that the exposure recorded on the dosimetry is credited against the proper individual, and that all exposures are recorded.

6.1.3 To facilitate later evaluation of exposures, all dosimeter issue and processing documents should be marked with the date and time the document was completed or processed.

6.1.4 Personnel radiation doses, which exceed regulatory limits, shall be reported to the NRC in accordance with 10CFR20.2202 and 20.2203, as applicable.

6.2 Limitations

6.2.1 None

7.0 PREREQUISITES

7.1 An emergency condition has been declared at the Beaver Valley Power Station as provided in the BVPS Emergency Preparedness Plan.

7.2 As a result of the emergency condition, radiation and/or airborne radioactivity levels significantly higher than normal are observed or are likely to be encountered.

8.0 PROCEDURE

8.1 Expanded Use of Personal Monitoring Devices

8.1.1 As a general rule, personnel remaining within the Controlled Area following a site evacuation should wear dosimetry at all times. Monitoring teams (onsite or offsite) shall wear their normal and high range dosimetry as required by Radiation Protection (RP) Supervision.

8.1.2 Under non-emergency conditions, regulations require occupational exposure monitoring if it is likely that an external monitoring threshold will be exceeded. This practice should be maintained under emergency conditions. Monitoring thresholds are:

- 500 millirem/year Deep Dose Equivalent (DDE)
- 1500 millirem/year Eye Dose Equivalent (LDE)
- 5000 millirem/year Shallow Dose Equivalent - Whole Body (SDE-WB)
- 5000 millirem/year Shallow Dose Equivalent - Extremity (SDE-ME)

8.1.3 Under emergency conditions, exposed individuals who are not normally issued dosimeters, shall be assigned appropriate dosimeters if it is likely that an external monitoring threshold will be exceeded, or if the radiological status of the area that they occupy is not known.

8.1.4 Any individual authorized to receive emergency exposure shall be assigned appropriate dosimeters.

8.1.5 Electronic alarming radiation dosimeters (EAD) should be issued if available. Indicating range of an assigned direct-reading dosimeter-pocket ion chamber (DRD) should be such that a 75% of full scale reading will not be exceeded given the expected stay time and known or expected exposure rate.

8.1.6 Extremity dosimeters and neutron dosimeters should be issued and worn as indicated in RP procedures.

8.1.7 Beta radiation may become a significant dose contributor in radiological emergencies. For this reason, if any skin surface or the eyes are unshielded, the TLD front should be unshielded. If shielding is provided (e.g., respirator and full Anti-C clothing), the TLD should be worn within the shielding so that accurate eye and shallow dose equivalents can be assessed.

8.2 Accelerated Dosimeter Collection and Processing

8.2.1 1/2-ADM-1601 provides for TLD processing under non-emergency conditions. In addition:

8.2.1.1 Daily exposure tracking shall be performed during the emergency and, initially, during recovery operations until such time as exposure trends have been identified and normal access and exposure control methods have been reestablished. This shall be done for any Site Area or General Emergency that has resulted in the release of radioactivity to the Site, or to the environment.

8.2.1.2 In the event of an accidental exposure, or a planned emergency exposure, the TLD's of the individuals involved shall be processed as soon as practicable following exposure. Further exposure of these individuals should not be allowed until the results of their TLD badge reading are available and have been evaluated.

8.2.1.3 All assigned personal monitoring devices should be processed as soon as practical after a radiological emergency situation is recognized. This provides for updated dose history information and a basis for future dose limitation/authorization.

8.3 Increased Bioassay Analyses

8.3.1 1/2-ADM-1601 and 1/2-HPP-3.04.002 of the BVPS Radiation Protection procedures contains provisions for the bioassay program. In addition:

8.3.1.1 If whole body count results indicate significant fission products, such that Sr-89 or Sr-90 uptake is suspected, in-vitro bioassay measurements will be performed in addition to whole body counting. A preliminary screen level for above which urinalysis is indicated is 70nCi of I-131, if the Unit has been at power within 40 days prior to the accident. Arrangements have been made with offsite vendors for appropriate analyses if this screening level is exceeded. The Radiological Controls Coordinator will establish screening levels based on the actual airborne radioactivity mix following the accident, if the Unit has been shutdown longer than 40 days, or refine the preliminary screening level.

8.3.1.2 If a long-term recovery effort is necessary, periodic comparison of whole body counting and urinalyses/fecal analyses should be performed on a random sampling of radiation workers to establish the adequacy of the monitoring program. DAC-hour calculations could also be used in this evaluation. Urine and/or fecal analyses should include gamma scans, Sr-89, Sr-90 and Pu-241 determinations, tritium determinations, and alpha determinations.

8.3.1.3 Special whole body counts (and urinalyses/fecal analyses, if indicated) should be performed in accordance with 1/2-ADM-1601. However, under emergency conditions, priority should be given to those individuals who have known or suspected intake, which exceeds 0.1 ALI.

8.3.1.4 If the result of the bioassay analysis indicates that a given individual has an intake of radionuclide, or combinations of radionuclides, that exceeds 0.1 ALI, an investigation shall be performed and documented. Recounts or additional samples/analyses shall be performed to determine the validity of the result. If the result is valid, the following minimum additional actions should be taken:

- Restrict the access of the individual to prevent additional exposure until the nature of the intake can be determined.
- Arrange a schedule of additional analyses as necessary to support dose assessment.
- Evaluate, using suitable models and calculational methods, the Committed Effective Dose Equivalent (and Committed Dose Equivalent for the maximally exposed organ, if appropriate) from the intake. Document all assumptions and calculations.

8.4 Post Accident Exposure Evaluation

8.4.1 In those situations in which an individual has been contaminated and some persistent contamination has remained following decontamination; and/or the individual has received significant external or internal exposure in excess of 10 CFR 20 limits as indicated by bioassay, personal dosimeters or survey data, perform an evaluation of the individual's Total Effective Dose Equivalent and other appropriate dose quantities.

8.4.2 Rad Protection personnel, in conjunction with outside consultation (such as Presbyterian-University Hospital), shall perform this evaluation using accepted health physics dosimetry practices as outlined in guidance documents such as ICRP-30, ICRP-54, Federal Guidance Report No. 11 and the MIRD pamphlets. This evaluation will be documented, reviewed by the Plant Operations Review Committee (PORC), and filed in the individual's exposure record.

8.5 Final Conditions

8.5.1 This procedure shall be terminated when conditions at the Site have returned to normal or upon direction of the Radiation Controls Coordinator and/or Emergency Director.

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