

Annex 15 – Accident Assessment (Plume Phase)

In the event of an accident at the Beaver Valley Power Station, the West Virginia Department of Health and Human Resources (WV DHHR) has the responsibility for assessing the accident. To do this, they will be tasked with determining:

- The severity of the accident,
- The impact on the public,
- The impact on the emergency workers, and
- Possible actions to limit the impact.

To perform this function, personnel from BPH or other agencies supporting this function will be assigned to three (3) locations:

1. State Emergency Operations Center (SEOC), Charleston, WV;
2. Hancock County Emergency Operations Center (HCEOC), New Cumberland, WV, and
3. Beaver Valley Power Station - Emergency Operations Facility (BVPS-EOF), Shippingport, PA

Notification

- A. In the event of an incident at the BVPS, the facility will notify the State of West Virginia through the West Virginia Division of Homeland Security and Emergency Management (WV DHSEM). BVPS is responsible for classifying and declaring the event.
- B. Once the WV DHSEM has been notified, WV DHSEM will notify the appropriate agencies and organizations in accordance with Annex 14 and the State Emergency Operation Plan.
- C. The first WV DHHR Representative notified by WV DHSEM will contact one of the following:
 1. Director, Office of Environmental Health Services.
 2. Director, Division of Radiation, Toxic, and Indoor Air.
 3. Chief, Radiological Health Program.
- D. The first Director / Chief contacted will notify the WV DHHR BPH Commissioner.
- E. The Commissioner or designee will serve as the "Accident Assessment Manager".

- F. The Accident-Assessment Manager has the responsibility of assessing the overall release and providing the WV DHSEM Director (or designee) with the necessary information to coordinate actions.
- G. The WVBPH will notify respective radiological health physics personnel at Marshall University (MU) and at West Virginia University Radiation Safety (WVU RS) and request assistance, as needed, for dose assessment and field team monitoring, respectively.

Activation

- A. WV DHHR personnel may be activated at any of the BVPS Emergency Classification Levels. (Unusual Event, Alert, Site Area Emergency, General Emergency).
- B. Once activated, a determination will be made as to if and when state personnel need dispatched.

Personnel

- A. Personnel from WV DHHR have the primary responsibility for assessing the accident.
- B. BPH or designated support agencies will provide personnel for the following positions at the following locations:

SEOC: Charleston, WV – Accident Assessment

- Accident-Assessment Manager¹
- Accident-Assessment Coordinator¹

HCEOC: New Cumberland, WV – Response Team

- Response Team Leader
- Field Monitoring Team Technician
- Field Monitoring Team Driver

BVPS - Emergency Response Facility (ERF): Shippingport, PA

- WV State Representative

- NOTES:
1. One person can serve as both the Accident Assessment Manager and the Accident-Assessment Coordinator.
 2. The Response team consists of both County and State personnel. One Field Monitoring Team will be utilized by the State. The State team will be supplemented by Federal Monitoring Teams, once they are available.
 3. Position descriptions and locations are contained in Tab 1 of this Annex. Contact lists are maintained by the WVDHSEM and core staff listings are contained in Shift Leader's contact book.

Transportation

- A. Transportation of state personnel will vary depending on weather conditions, and the availability of vehicles and aircraft.
- B. If air transportation is readily available, state personnel could fly into the Greater Pittsburgh International Airport, rent cars and drive to Hancock County and the BVPS EOF. There are several car rental facilities located at the airport.

C. Transportation Resources:

<u>Vehicle</u>	<u>Aircraft</u>
State Owned	State Owned
Rental	Civil Air Patrol
Privately Owned	Charter
	Commercial Airlines

If needed, a request can be made to and transportation can be arranged through WVDHSEM.

NOTE: If an individual is dispatched to the county or BVPS EOF, and is working out of the Charleston area, there is no need to return to the Charleston before reporting to Hancock County or BVPS, as the necessary supplies/equipment are available at the county or BVPS.

Communications

- A. Communications between the SEOC, HCEOC and BVPS - EOF will be by commercial telephone.
- B. Back - up communications are identified in Annex 3 of the REP Plan.

Equipment / Supplies

Necessary equipment and supplies are kept at all locations. (Tab 3)

Access

Security will be established at all state locations and requires picture ID.

Documentation

Telephone/message logs to include time and date should be maintained.

Accommodations

Directions to motels and hotels in area can be obtained from the HC DHSEM or BVPS, after arrival at either facility. Arrangements can be made once in Hancock County.

State Emergency Operations Center (SEOC)

Accident-Assessment Manager

- A. The Accident-Assessment Management Team has the responsibility of assessing the situation and providing direction and technical information to the WV DHSEM Director (or designee) for making Protective Actions Recommendations (PAR).
- B. Once notified, BPH will:
 1. Establish two (2) teams of personnel:
 - (a) SEOC Team
 - (b) Response Team
 2. Coordinate transportation for the response team with the SEOC, if appropriate.
 3. Coordinate information with appropriate personnel with:
 - (a) Beaver Valley Power Station
 - (b) Pennsylvania
 - (c) Ohio
 - (d) West Virginia on-scene personnel (once in place)
 - (1) Team Leader, HCEOC
 - (2) State Representative, BVPS-EOF
(BVPS Offsite Agency Liaison until arrival)
 - (e) Federal Response Team (once in place).

NOTE: The request for federal assistance will be initiated by DHSEM through DHS / FEMA.

4. Coordinate "Second Shift" personnel for 24-Hour coverage of operations from personnel from:
 - (a) WV DHHR
 - (b) MU
 - (c) WVU RS

NOTE: DHSEM will be kept informed of assigned personnel and schedules. If State personnel from other agencies are needed to fill positions, WVDHHR-BPH will make the requests through the DHSEM.

5. Assist the Accident Assessment Coordinator.

6. As time permits, confer with counterparts in Pennsylvania and Ohio.
7. Assist with the Protective Action Recommendation (PAR).

NOTE: The accident assessment is only one part of the PAR. Other items to be considered, but are not limited to: (1) Plant Recommendation, (2) Plant Condition, (3) Weather Conditions, (4) Road Conditions, and (5) Time of Day. All of which must be considered in making the PAR.

Accident-Assessment Coordinator

- A. The Accident-Assessment Coordinator is responsible for taking the radiological data that is provided and determining the impact on both the public and emergency workers.
- B. An estimate of the source term, isotopic mix, and Worker Dose or Public Dose projection based on radiological monitoring data or plant conditions, will be provided by BVPS.
- C. Once actual field readings are available, they should be compared with dose projections.

NOTE: DO NOT wait for the field readings if the dose assessment indicates the need for a Protective Action Recommendation.

- D. Discuss with the Accident-Assessment Manager the source term, dose projection, and dose assessment information.
- E. Communicate with the:
 1. WV Response Team Leader (HCEOC)
 2. WV State Representative (BVPS - EOF)
 3. BVPS Offsite Agency Liaison (BVPS - EOF)
 4. BVPS Environmental and Dose Projection (EA&DP) Group (BVPS - EOF)

Dose Projection

- A. There are two (2) types of releases at BVPS: (1) Gaseous and (2) Liquid.
- B. Dose assessment information will be provided by BVPS to the SEOC.

Accident Assessment

Accident Assessment (U.S. Nuclear Regulatory Commission Response Technical Manual, Vol. 1, Rev. 4 [NUREG / BR-0150, March 1996] Section L is incorporated by

reference using the most current version of MIDAS/RASCAL dose assessment software, worksheets and recommendations)

Emergency Workers

- A. Tab 4 lists dose limits for emergency workers.
- B. Dose limits for emergency workers are based on the U.S. Environmental Protection Agency, *Manual of Protective Action Guides and Protective Actions for Nuclear Incidents* [EPA 400-R-92-001, (May 1992)] and their dosimeter readings. [Total Effective Dose Equivalent]
- C. The Team Leader will notify:
 - 1. HC DHSEM Director or the County Radiological Officer if designated. [The designated county person will notify the county emergency workers].
 - 2. Field Monitoring Team.
- D. Accident assessment for emergency workers will be done at the HCEOC.

General Population

- A. Once the Dose Projection is complete, compare it to Tab 5: for the general population.
- B. The guidelines in Tab 5 will assist in making an Accident Assessment, and the PAR.
- C. Accident assessment for the general population will be done at the SEOC.

Protective Action Recommendation Decision Making

- A. West Virginia Protective Action Recommendation is based on information provided by the **Accident Assessment Manager** to the Director WV DHSEM (or designee).
- B. BVPS, the State of Ohio or the Commonwealth of Pennsylvania may be utilized as back up accident assessment.
- C. The accident assessment, based on the Protective Action Guidelines (PAG) - Tabs 5 & 6, is just one part of the Protective Action Recommendation (PAR).
- D. Other PAR considerations include but are not necessarily limited to:
- * Plant Recommendation
 - * Plant Condition
 - * Weather Conditions
 - * Road Conditions
 - * Time of Day
- E. All areas shall be considered when making the PAR.
- F. The Accident Assessment Manager provides a recommendation to the DHSEM Director, based on dose projection/accident assessment information from BVPS and Pennsylvania.
- G. The WVDHSEM Director will consider all concerns when developing the PAR.
- H. When considering the PAR, the WV DHSEM Director will, if time permits, confer with both PEMA and OEMA.
- I. All efforts should be taken to make a coordinated PAR among the three (3) States.
- J. The PAR for the public is made by the West Virginia Governor or representative and given to the Hancock County Commissioners or their representative.
- K. The Hancock County Commissioners or representative will issue the Protective Action Decision (PAD) to the public and inform DHSEM of decision.
- L. The Accident Assessment Manager will notify:
- * WV response team Leader
 - * WV State Representative at the BVPS - EOF

NOTES: The WV DHSEM Director will notify the HCOEM Director of the PAR. If the PAR is based on dose assessment, DO NOT wait for actual field readings to implement the PAR. Field readings are to be used to (1) Verify the dose projection and (2) Verify the location of the plume.

Hancock County Emergency Operations Center

Response Team Leader

- A. Overall direction and control for accident assessment at the HCEOC.
- B. Provide technical information to the Accident Assessment Coordinator at the SEOC.
- C. Coordinate information with the state representative at the BVPS - EOF.
- D. Coordinate transportation, if needed, for response team personnel with the HCEOC.
- E. Coordinate "second shift" for 24-hour coverage with the Accident Assessment Manager.
- F. Assist the Accident Assessment Coordinator at the SEOC.
- G. Coordinate the activities of the Field Monitoring Team.
- H. Assist the county radiological officer.
- I. Provide technical support for the HCEOC.

Field Monitoring Team

- A. Field Monitoring Standard Operating Procedure (SOP) manual is included with the equipment located in the county. The Field Monitoring Team will follow all procedures and guidelines contained in the Field Monitoring SOP in performing those duties outlined

Field Readings

- A. The Response Team Leader will assign the field monitoring points to survey.
- B. The Field Monitoring Team will conduct all radiological surveys in accordance with the guidelines prescribed in the Field Monitoring Team SOP.
- C. The Response Team Leader will report the field readings to the SEOC.

Beaver Valley Power Station - Emergency Response Facility (BVPS - EOF)

State Representative

- A. Represent the State of West Virginia at the BVPS - EOF.
- B. Establish communications with the State Emergency Operations Center (SEOC).
- C. At the BVPS - EOF Interface with the:
 - 1. BVPS Offsite Agency Liaison
 - 2. BVPS Environmental Assessment and Dose Projection Group (EA & DP)
 - 3. BVPS Emergency Recovery Manager (ERM)
 - 4. Pennsylvania representative
 - 5. Ohio representative
- D. Monitor the BVPS incident.
- E. Maintain logs.
- F. Provide information to and assist the Accident Assessment Coordinator at the SEOC.
- G. Provide information to the Response Team Leader in the HCEOC.
- H. Stay informed on actions taken by the state.
- I. Stay informed on actions taken by Hancock County.
- J. Provide information to BVPS on the actions taken by the state and Hancock County.

Accident Assessment

- A. Accident assessment is conducted at the SEOC.
- B. The state representative in the EOF will provide information to assist the SEOC.

Emergency Workers

- A. Tab 4 lists dose limits for emergency workers.
- B. Dose limits for emergency workers are based on their dosimeter readings.
- C. The Team Leader will notify:

1. Hancock County Radiological Officer if designated otherwise the HCDHSEM Director will be notified. (The County Rad. Officer, designee or Director will notify the County Emergency Workers).
2. Field Monitoring Team.

General Population

- A. Once the dose projection is complete, compare it to Tab 5, for the general population.

NOTES: DO NOT apply the EDE/TEDE ratio* to the protection action guidelines for the general population. While a Dose of 50 - 250 Rem skin CDE is listed as a PAG, the 1- 5 REM TEDE or 5 - 25 REM Thyroid CDE will happen first.

* Note: The ratio of external effective dose equivalent (EDE) to Total Effective Dose Equivalent (TEDE) is provided by BVPS as indicated with reference to dose limits in this document

- B. The guidelines in Tab 6 will assist in making an accident assessment and the PAR.

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TAB 1

West Virginia Accident Assessment Position Descriptions

The personnel List for the Accident Assessment is maintained by the West Virginia Bureau of Public Health. Primary contacts for the WVBPH is maintained in the Contact Book located in the WVDHSEM Operations Center

Organization List (revised March 2018)

ORGANIZATION	POSITION	LOCATION
WV DHHR	RAD HEALTH	OEHS-Charleston
WV DHHR	Field Mon. Team	Hancock Co. EOC
WV DHSEM	Accident Coordination	Hancock Co. EOC
WV DEP	Field Mon. Team	Hancock Co. EOC
WV DHHR	Dose Assessment	WV DHSEM - EOC
Marshall University	Dose Assessment	WV DHSEM – EOC
Marshall University	Dose Assessment	WV DHSEM - EOC
WVU	Dose Assessment	BVPS – EOF
WVU	Dose Assessment	BVPS -- EOF

NOTE: LIST OF PERSONNEL AND CONTACT NUMBERS IS MAINTAINED IN THE WVDHSEM - EOC CONTACT TO AGENCIES IS MADE THROUGH THE APPROPRIATE STATE AGENCY-WVDHSEM COORDINATOR

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TAB 2

Emergency Facility Telephone Numbers

State EOCs

WV	304-558-5380
WV Fax	304-558-8902
Ohio	614-799-3899
Ohio Fax	614-889-7183
PA	717-651-2007
PA Fax	717-651-2040

BVPS - EOF

Offsite Utility Liaison	724- 891-1783
WV Representative	724-891-1989/1999
Ohio Representative	724-891-1788/1988
PA Representative	724-891-1990/1789
PA DER / BRP	724-891-1987/1790-
EA & DP Group	724-891-1781/1977
ERF Fax	724-891-1913

County EOCs

HC	304-564-4040
HC Fax	304-564-4031
BR Co. 3	304-757-3660
BR. Fax	304-737-3046
OH Co.	304-234-3688
OH Fax	304-234-3822
MAR. Co.	304-843-1500
MAR. Fax	304-843-1551
COL. Co.	330-424-9725
COL. Fax.	330-424-9267
Beaver Co.	724-775-1700
Beaver Fax	724-775-1163

Federal Resources

FEMA Region III	Regional Office	212-931-5757
	Reg. Op. Ctr.	212-931-5500
	ROC fax	215-931-5590
DOE	Oak Ridge Op.	865-576-1005
	NRC	Region I

NOTE: UPDATED LISTS ARE MAINTAINED IN THE SEOC – CONTACT BOOK

Note: County Designations
 HC – Hancock County, WV
 BR – Brooke County, WV
 OH – Ohio County, WV
 MAR – Marshall County, WV
 COL – Columbiana County, Ohio
 Beaver County is located in Pennsylvania

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TAB 3

Equipment / Supplies / Reference Material

SEOC - Charleston, WV

Radiological Emergency Preparedness Plan and Procedures
West Virginia Emergency Operations Plan
Hancock County Radiological Emergency Plan
SEOC Accident Assessment Procedure

BVPS - EOF - Shippingport, PA

WV State Representative Procedure
WV REP Plan

HCEOC - New Cumberland, WV

HCEOC Accident Assessment Procedure
2 Each - Ludlum Model 3
2 Each - Ludlum Model 9-3
2 Each - Model H - 809C Portable Air Sampler
2 Each – CVD 700 Survey Meter
3 Each - Dosimetry Packets, containing:

CDV-730 Dosimeter
CDV-742 Dosimeter
TLD
KI
Report Form

Emergency Worker Decontamination Center (EWDC) - New Cumberland ,WV

Protective Clothing

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TAB 4

Protective Action Guidelines - Emergency Workers

Emergency Dose Limits for ALL Emergency Workers (EWs) is 5 rem TEDE, except for:

DOSE LIMIT (TEDE*)	FUNCTION
5 rem	<i>EWs assigned to duties inside the Plume Exposure EPZ</i>
10 rem	EWs assigned to the care of special populations (i.e., nursing homes, hospitals, jails) or special facilities (i.e., water treatment facilities) where protective actions are being implemented.
25 rem	EWs assigned to tasks inside the Plume Exposure EPZ for lifesaving or protection of large populations.
*** > 25 rem	EWs voluntarily accepting the risk exceeding the PAG to save lives or protect large populations

NOTE: During any incident, the WVBPH may decide to lower these dose limits.

* *TEDE – total effective dose equivalent*

*** *Trained personnel may exceed the 25 Rem TEDE limit for the functions identified in the chart with prior notification and permission granted by BPH.*

All exceptions to dose limits must be approved by county health officer.

Note: TEDE refers to the sum of internal and external worker exposures, however, the Emergency Workers (EW) may only have access to direct reading dosimeters (DRD) for assessment of external dose (measured in units of Roentgens or R). If air samples or dose projection data for external dose rate with estimates of exposure for internal body burdens of inhaled or ingested radioactive materials exceed the dose limits above (reported in rem), the Accident Assessment Coordinator will inform the Accident Assessment Manager at the State EOC for communication to the County EOC and Field Monitoring Teams

For X- or gamma radiation the Quality Factor of the radiation is 1; the relative biological effect is the same for the external exposure (R) and absorbed dose (units of Rad or Gray) due to penetrating gamma radiations from potential source terms involving radioactive concentrations in the effluent. The exposures measured using DRD are recorded in units of Roentgen (R). Information from BVPS Assessment and Projection staff indicating a EDE/TEDE ratio other than 1 will result in lower dose limits and turn back values. In some cases, the dose limits/turn back values may be significantly lower.

The dose assessment software or bioassay testing will provide data to calculate internal organ dose due to the presence of airborne radioactivity or particulates deposited during the plume phase, measured directly in air samples or predicted in plume models. The unit of whole body dose equivalent (rem) is used to report the worker dose due to the summation of both internal exposure and external exposure. The unit may be reported in rem or milliSievert.

TAB 4 (cont.)

TURN - BACK VALUE - Established Dose Limits at which an EW should leave the area if he receives no further directions. Except for life-saving tasks by EW, the *Turn - Back Value is 2 R for all EWs with a dose limit of 5 R and 12.5 R for EWs is one half of their dose limit in the table above, 12 R for EWs with a dose limit of 25 R, based on the CDV-730 Dosimeter having a range of 0-20 R.* Declared pregnant workers are not authorized to work inside the plume exposure pathway EPZ.

ADMINISTRATIVE REPORTING LIMITS: EWs are to report readings at least once every half hour, and in one (1) R increments to their supervisor and/or to their dosimetry coordinator: 1 R, 2 R, 3 R, 4 R, 5 R, etc. Dosimetry coordinators are to report readings of 2 R and greater to the county radiological officer.

DECLARED PREGNANT WORKERS: EWs that have declared a pregnancy are not permitted to work in the EPZ.

Potassium Iodide (KI): Administer KI at the projected dose of 5 rem to the Thyroid CDE to Emergency workers and the general public or special populations within the 10-mile EPZ.

TAB 5

Protective Action Guidelines - General Population

Protective Action	PAG	Comments
Evacuation (or Shelter)	1 - 5 rem TEDE (Total of the External Dose and the Internal Dose). 5 - 25 rem Thyroid CDE 50 - 250 rem Skin CDE	Evacuation (or for some situations, sheltering) should normally be initiated at 1 Rem
Administration of Potassium Iodine (KI).	<u>5 rems thyroid CDE</u>	Workers and the general public, including special populations within the 10-mile EPZ

- (1) Although the PAG is expressed as a range, it is emphasized that under normal conditions, evacuation of the public is usually justified when the projected dose to an individual is one (1) rem.
- (2) Sheltering may be the preferred protective action when it will provide protection equal to or greater than evacuation, based on consideration of factors such as source term characteristics, plume movement, or other site-specific conditions.
- (3) Under unusually hazardous environmental conditions, use of sheltering at projected doses up to 5 rems to the general public (and up to 10 rems to special groups) may become justified.
- (4) Sheltering should never be relied upon at projected doses greater than 10 rem.

*While a Dose of 50 - 250 rem skin CDE is listed as a PAG, the 1 - 5 rem TEDE or 5 - 25 rem Thyroid CDE will likely happen first.

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TAB 6**Possible PARs**

NOTE: This is for reference only.

BVPS:

EVACUATE 2 miles - 360 Degrees, and SHELTER remainder of 10 Mile EPZ
 EVACUATE 2 miles - 360 Degrees, and 5 miles Downwind Wedge, and SHELTER
 remainder of 10 Mile EPZ
 EVACUATE 5 miles - 360 Degrees, and SHELTER remainder of 10 Mile EPZ
 EVACUATE 2 miles - 360 Degrees, and 10 miles Downwind Wedge, and SHELTER
 remainder of 10 Mile EPZ
 EVACUATE 10 miles - 360 Degrees

Additional WV / HC PARs:

- Close schools
- Evacuate schools
- Evacuate nursing homes/special needs people
- Shelter livestock - use stored feed and water
- Close "Transient Locations" i.e. parks, campgrounds, boat docks, etc.
- Shelter entire 10 Mile EPZ
- Evacuate entire 10 Mile EPZ

NOTES: Hancock County will either evacuate or shelter the entire 10 Mile EPZ. Do not use the "Downwind Wedge" to evacuate part / shelter part.

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TAB 7

MONITORING - DOSE PROJECTION

- A. Both permanently mounted, and field monitoring points have been established throughout the 10-mile emergency planning zone (EPZ) to be used in the event of an incident at the Beaver Valley Power Station (BVPS). These stations were established by the West Virginia Bureau for Public Health with assistance from WVDHSEM, Beaver Valley Power Station and the HCDHSEM. Location descriptions and maps of the permanent and field monitoring points is contained in the Field SOP manual.
- B. The permanently mounted monitors are Landauer P9 or equivalent LUXEL dosimeters which are environmental/low level dosimeters. The dosimeters have been located permanently at twelve monitoring stations in Hancock County. **The dosimeters are used to establish background radiation and are read once quarterly under normal conditions.** In the event of an incident at the facility, the TLDs will be read after the incident is over to determine any readings above background level.
- C. The WV BPH is responsible for personnel radiation dose monitoring. All monitoring resources, both equipment and manpower, are outlined in this annex.
- D. In the event of a Site Area Emergency or General Emergency, federal monitoring and dose projection assistance will be provided through FEMA Region III. At the federal level, Federal agencies are activated through the Federal Radiological Emergency Response Plan (FRERP). These federal agencies will provide information and assistance to the West Virginia Bureau for Public Health and are activated by FEMA Region III upon notification from PEMA or WVDHSEM of a Site Area Emergency or a General Emergency.
- E. The West Virginia BPH has developed procedures for monitoring and performing dose projections for accidents at the BVPS.
- F. The facility operator is the most appropriate source for obtaining monitoring data and information.
- G. Radioactive release data will be supplied by the facility operator from onsite effluent monitoring equipment or, in the case of unmonitored pathways (e.g., containment failure), from projected source terms. The facility will also do radioactivity monitoring in the environs of the facility.

- H. Atmospheric turbulence data will be supplied by the facility operator. Onsite meteorological instruments provide data for making this determination. As part of the facility's emergency preparedness planning, the facility operator shall supply the State suitable isopleth overlays and to-scale maps or, if another method of determining atmospheric dispersion is in use at the facility, the facility operator will make available information on that method, and any data necessary to verify facility projections in the event of an emergency.
- I. Wind speed and direction will also be provided by the facility operator, however, in the absence of facility data, information is available from other weather sources, such as the National Weather Service, or airports.
- J. The facility will also provide data on the source height. If this information is not given, it must be assumed to be zero (0).
- K. Given the input data, the methodology described in the procedures will lead to an estimation of the instantaneous air concentration at a specific point. From this data, the dose projection can be calculated.

TAB 8**Definitions / Acronyms**

Absorbed dose- The energy imparted to matter by ionizing radiation per unit mass of irradiated material at the place of interest.

Accident Assessment - Determining the severity / impact of the accident and actions to limit that impact.

CDE - Committed Dose Equivalent - Dose assigned to a particular organ.

CEDE - Committed Effective Dose Equivalent – the sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to each of these organs or tissues.

CPM - Counts Per Minute.

Dose – Absorbed dose or dose or dose equivalent.

Dose Assessment - The taking of the estimated total Radiological Dose from the Dose Projection and determining the impact.

Dose equivalent- the product of the absorbed dose in tissue, quality factor and all other necessary modifying factors at the location of interest. The units of dose equivalent are the sievert (Sv) and rem.

Dose Limits - The total amount of Radiation an individual is allowed to receive in the event of an accident at the BVPS, as outlined in the **Protective Action Guidelines** in the WV & HC Plans.

Dose Projection - The calculation of radiation exposure or dose at a given location at some time in the future. Dose projections are performed in response to an actual or anticipated release of radioactive material to the environment.

EDE - External Effective Dose Equivalent- the sum of the products of the dose equivalent to each organ or tissue and the weighting factor applicable to each of the body organs or tissues that are irradiated.

EDE / TEDE Ratio - MIDAS dose model term referring to external dose vs. calculated TEDE dose.

Emergency Action Levels (EAL's) - Plant - specific indications, conditions, or instrument readings used to classify the emergency.

Emergency Classification Levels: Unusual Event, Alert, Site Area Emergency and General Emergency. BVPS Classifies the Emergency.

Field Readings - Actual sampling done in the field to verify the Dose Projection and Plume Location.

μCi/cc - Microcurie per cubic centimeter- the air concentration of radioactive material measured for a volume of air sampled in liters.

Plant Conditions - The actual status of the plant.

Protective Action Decisions (PADs) – Actual decision implemented by county or state officials and directly related to the PARs.

Protective Action Guidelines (PAGs): Established Dose Limits where action is taken for the protection of both the: GENERAL PUBLIC and the EMERGENCY WORKERS.

Protective Action Recommendation (PAR) - Actions that are recommended for the safety of the general public based on the accident.

Rem- The special unit of any of the quantities expressed as dose equivalent. The dose equivalent in rem is equal to the absorbed dose in rad multiplied by the quality factor (one [1] Sv = one one-hundredth [0.01] rem).

Sievert- The SI unit of any of the quantities expressed as dose equivalent. The dose equivalent in Sievert is equal to the absorbed dose in gray multiplied by the quality factor (one [1] Sv = one hundred [100] rem).

Types of PARs: Shelter - Going inside, closing all doors and windows, and shutting off outside air intake. Evacuation -The actual leaving of the 10 mile EPZ.

TEDE - Total Effective Dose Equivalent – the sum of the deep dose equivalent for external exposures and the committed effective dose equivalent for internal exposures.

Turn - Back Value - Established Dose Limits at which an Emergency Worker (EW) should leave the area if he receives no further directions. The Turn - Back Value is 2.5 R for all emergency workers allowed 5 rem TEDE.

TAB 9**WEST VIRGINIA POLICY REGARDING THE ADMINISTRATION OF POTASSIUM IODIDE AS A THYROID BLOCKING PROPHYLAXIS****A. POLICY**

It is the policy of the State of West Virginia that in the event of a nuclear accident at the Beaver Valley Power Station (BVPS) in Shippingport, Pennsylvania affecting Hancock County, West Virginia, that potassium iodide administration will be considered as a protective action for the general public, special populations, and emergency workers on a voluntary basis and only at the discretion and approval of the Commissioner, or designee, West Virginia Bureau for Public Health (BPH).

B. RATIONALE

Evacuation will remain the primary protective action for a nuclear power reactor accident involving a loss of containment and a release of radioactive material to the environment. The Food and Drug Administration (FDA) states in 46 FR No. 108 (about thyroid prophylaxis): *“Evacuation when it is a logistically feasible option, is a more effective method of reducing (or eliminating) thyroid exposure and may be a more desirable protective measure, especially for the population at high risk from such exposure (i.e., infants, children, and pregnant women).”* Members of the public who are capable of evacuation must evacuate when instructed.

BPH will advise the public to administer KI when a release of radioiodine is imminent or in progress that is projected to deliver 5 rem CDE to the thyroid. The individual decision to take KI tablets by any individual of the public is voluntary.

Sheltering protective measures (e.g., staying indoors) or the use of respiratory protective devices (especially for emergency workers) should also be considered when evacuation is not feasible or deemed not necessary.

C. RECOMMENDED ADMINISTRATION

Implementation of this potassium iodide policy will be coordinated by the West Virginia Division of Homeland Security and Emergency Management and the Hancock County Office of Emergency Management.

BPH recognizes that evacuation is the most effective means of assuring protection of the public in the unlikely event of an accident at a nuclear power plant. The advisement to begin taking KI in the event of a nuclear power plant general emergency will be given by the Commissioner, or designee, of West Virginia Bureau for Public Health. This recommendation will be for all categories of individuals (i.e., public, emergency workers, and special populations) to take their potassium iodide (KI) tablets at the same time.

It will be considered as a protective action for emergency workers on a voluntary basis and only at the discretion and approval of the Commissioner, or designee, WVBPH.

The potassium iodide for emergency workers will be stored in Hancock County under the control of the Hancock County Office of Emergency Management Director. It will be distributed at the same time that dosimetry is issued to the emergency workers.

Doses of KI for the public (allocated 2 doses per person) are stored in a climate-controlled environment in Hancock County and available through the Hancock County Health Department. Doses of KI are available in two quantities, adults (130 mg each) and children (65 mg each). Additional supplies of KI may be located, during an emergency involving a release of radioiodine, at the mass care centers established by HCEOC.

D. DOSE GUIDELINES

To minimize the risk of potential side effects, only the recommended dosage should be taken. One KI dose protects against thyroid uptake of radioiodine for about 24 hours. ***Taking more than a single dose at any one time increases the risk of side effects without providing additional benefit.*** If circumstances prevent an individual from evacuating and he/she is exposed to the airborne radioactive release plume, it is recommended that the appropriate KI dose be taken once each day for the *duration of the radioactive plume exposure period*. If at all possible, potassium iodide must be taken prior to exposure to radioiodine to be completely effective. Approximately 30 minutes are required for the onset of blocking following administration. A substantial benefit is obtainable, when the potassium iodide is administered within 3 to 4 hours following an acute exposure to radioiodine. Limited benefits are obtainable up to 12 hours following exposure. The radioiodine which is not taken up by the thyroid will be eliminated from the body in about 48 hours; however, some recirculation is possible, so potassium iodide should be administered (about 130 mg/day) for 3 to 10 days following acute exposure.

This administration is based upon a determination involving the best judgment of health officials that an individual or group of individuals is/are likely to be or have been exposed to radioactive forms of iodine such that exposure to the thyroid may meet or exceed 5 rem.

Individuals with known thyroid disorders or allergies towards iodine should avoid the use of potassium iodide. The adverse reaction rate of orally administered potassium iodide appears to be very small. Potential reactions are: gastrointestinal upset, iodide-induced hypothyroidism or hyperthyroidism, angioedema, hemorrhage, fevers, periarterites, hives, and anaphylactic (hypersensitivity) reactions.