ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: RECORD OF CHANGES AND REVISIONS | FORM NO. 1000.06A

EMERGENCY PLAN PROCEDURE | REV. #12 PC #

Safety Related YES ✓ NO ☐

EMERGENCY SUPPLIES & EQUIPMENT
1903.60 REV. 7

Safety Related

UN-Controlled Copy # 108

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33	5		69	5										
34	5		70	5										
35	5		71	5										
36	5		72	5										

APPROVED BY:

James M Levine
(General Manager)

APPROVAL DATE
9/8/83

REQUIRED EFFECTIVE DATE:

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: CONTROL ROOM KIT

FORM NO. 1903.60A

REV. # 7 PC #

CHECKLIST

Page 3 of 9

Instrument	Type	S/N	Cal. Due Date	Batt. Check	(1)Operation/ (2)Response/ (3)Inspected	(4)Batt Remove/ (5)Plugged in/ (6)Charged	Instr. Off
Respirator	Cann.				(3)		
Respirator	Cann.				(3)		
Respirator	Cann.				(3)		
Respirator	Cann.				(3)		
Respirator	Cann.				(3)		
Respirator	Cann.				(3)		
Respirator	Cann.				(3)		
Respirator	Cann.				(3)		
Respirator	Cann.				(3)		
Respirator	Cann.				(3)		
Respirator	Cann.				(3)		
Respirator	Cann.				(3)		
Respirator	Cann.				(3)		
Check Source							
Check Source							
Watch							
Dosimeter Charger					(1)		
					(1)	(4)	
Dosimeter	0-200R						
Dosimeter	0-5R or 0-10R						
Dosimeter	0-200mR or 0-500mR						

*Where applicable

Checked By _____ Date _____

Reviewed By _____

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: TECHNICAL SUPPORT CENTER KIT

FORM NO. 1903.60G

REV. # 7 PC #

CHECKLIST

Instrument	Type	S/N	Cal.Due Date	Batt. Check	(1)Operation (2)Response/ (3)Inspected	(4)Batt Remove/ (5)Plugged in/ (6)Charged	Instr. Off
Frisker	RM-14				(2)	(5,6)	
Detection Chamber	HP-210						
Check Source							
Check Source							
Dosimeter	0-200mR or 0-500mR						
Dosimeter Charger					(1)	(4)	
Calculator					(1)		
Pocket Computer	TRS-80				(1)		
Cassette Recorder					(1)	(4)	
Flashlight					(1)	(4)	
Flashlight					(1)	(4)	
Flashlight					(1)	(4)	

Corrective Actions*	Init./Date*

*Where applicable

Checked By _____ Date _____

Reviewed By _____

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: TECHNICAL SUPPORT CENTER KIT

FORM NO. 1903.60C

REV. #7 PC #

INVENTORY LIST

Page 3 of 4

Equipment	Required Quantity	Actual Quantity	Init.	Corrective Actions*	Init./ Date*
SURVEY INSTRUMENTS	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX				
Frisker w/Detection Chamber	1 ea.				
Check Source	1				
PERSONNEL MONITORING EQUIPMENT	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX				
(0-200 mR or Dosimeter 0-500 mR)	20				
Charger	1				
TLD Badge (include 1 as background)	15				
BATTERIES (Batteries not contained within an instrument should be replaced during the first quarter inventory).					/ Initials/Date
"D" Cell	6				
"AA" Cell	12				
Type 675	4				
MISCELLANEOUS	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX				
Pencil	12				
Note Pad	3				
Clipboard	2				
Overlays	1 set				
Pocket Computer	1				

*Where applicable

Inventory By ______________________ Date ________________

Reviewed By ______________________

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: FIELD MONITORING KIT A

FORM NO. 1903.60F

REV. # 7 PC #

CHECKLIST

Instrument	Type	S/N	Cal. Due Date	Batt. Check	(1)Operation/ (2)Response/ (3)Inspected	(4)Batt Remove/ (5)Plugged in/ (6)Charged	Instr. Off
Ion Chamber					(2)		
Beta-Gamma Geiger Counter	E-530				(2)		
Detector	HP-270						
Frisker	RM-14				(2)	(5,6)	
Detector	HP-210						
Air Sampler	12VDC				(1)		
Check Source							
Watch					(1)		
Dosimeter	0-200mR or 0-500mR						
Dosimeter Charger					(1)	(4)	
Calculator					(1)		
Flashlight					(1)	(4)	
Flashlight					(1)	(4)	
Flashlight					(1)	(4)	

Corrective Actions*	Init./Date*

*Where applicable

** During the first quarter inventory or after extended use, recharge the battery pack for 15-18 hours. Contact the Emergency Planning Coordinators for the battery chargers.

Checked By _____ Date _____

Reviewed By _____

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: FIELD MONITORING KIT A

FORM NO. 1903.60F
REV. # 7 PC #

INVENTORY LIST

Equipment	Required Quantity	Actual Quantity	Init.	Corrective Actions*	Init./ Date*
SURVEY INSTRUMENTS	XXXXXXXXXXX	XXXXXXXXXX	XXXXXXX	XXXXXXXXXXXXXXX	XXXXXXX
High Range Ion Chamber	1				
Beta-Gamma Geiger Counter w/Probe	1				
Frisker w/Probe	1				
Air Sampler (12VDC)	1				
Sample Head	2				
Check Source	1				
SAMPLING SUPPLIES	XXXXXXXXXXX	XXXXXXXXXX	XXXXXXX	XXXXXXXXXXXXXXX	XXXXXXX
Watch	1				
Cloth Smear	20				
Paper Smear	25				
Particulate Filter	25				
Glassine Envelope	25				
Silver Zeolite Cartridge	25				
Completed Checklist in Front of Procedure Notebook	NA	N/A			
PERSONNEL MONITORING EQUIPMENT	XXXXXXXXXXX	XXXXXXXXXX	XXXXXXX	XXXXXXXXXXXXXXX	XXXXXXX
(0-200mR or Dosimeter 0-500mR)	6				
Charger	1				

*Where applicable

Inventory By _____ Date _____

Reviewed By _____

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: FIELD MONITORING KIT B

FORM NO. 1903.60C

REV. # 7 PC #

CHECKLIST

Instrument	Type	S/N	Cal. Due Date	Batt. Check	(1)Operation/ (2)Response/ (3)Inspected	(4)Batt Remove/ (5)Plugged in/ (6)Charged	Instr. Off
Ion Chamber							
Beta-Gamma Geiger Counter	E-530				(2)		
Detector	HP-270				(2)		
Frisker	RM-14				(2)	(5,6)	
Detector	HP-210						
Air Sampler	12VDC				(1)		
Check Source							
Watch					(1)		
Dosimeter	0-200mR or 0-500mR						
Dosimeter Charger					(1)	(4)	
Calculator					(1)		
Flashlight					(1)	(4)	
Flashlight					(1)	(4)	
Flashlight					(1)	(4)	

Corrective Actions*	Init./Date*

*Where applicable

** During the first quarter inventory or after extended use, recharge the battery pack for 15-18 hours. Contact the Emergency Planning Coordinators for the battery chargers.

Checked By _____ Date _____

Reviewed By _____

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: FIELD MONITORING KIT B

FORM NO. 1903.60C

REV. # 7 PC #

INVENTORY LIST

Page 3 of 4

Equipment	Required Quantity	Actual Quantity	Init.	Corrective Actions*	Init./ Date*
SURVEY INSTRUMENTS	XXXXXXXXXXX	XXXXXXXXXX	XXXXX X	XXXXXXXXXXXXXXX	XXXXXXX
High Range Ion Chamber	1				
Beta-Gamma Geiger Counter w/Probe	1				
Frisker w/Probe	1				
Air Sampler (12VDC)	1				
Sample Head	2				
Check Source	1				
SAMPLING SUPPLIES	XXXXXXXXXXX	XXXXXXXXXX	XXXXXXX	XXXXXXXXXXXXXXX	XXXXXXX
Watch	1				
Cloth Smear	20				
Paper Smear	25				
Particulate Filter	25				
Glassine Envelope	25				
Silver Zeolite Cartridge	25				
Completed Checklist in Front of Procedure Notebook	NA	N/A			
PERSONNEL MONITORING EQUIPMENT	XXXXXXXXXXX	XXXXXXXXXX	XXXXXXX	XXXXXXXXXXXXXXX	XXXXXXX
Dosimeter (0-200mR or 0-500mR)	6				
Charger	1				

*Where applicable

Inventory By _____ Date _____

Reviewed By _____

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: FIELD MONITORING KIT C

FORM NO. 1903.60H
REV. # 7 PC #

CHECKLIST

Instrument	Type	S/N	Cal. Due Date	Batt. Check	(1)Operation/ (2)Response/ (3)Inspected	(4)Batt Remove/ (5)Plugged in/ (6)Charged	Instr. Off
Ion Chamber Beta-Gamma Geiger Counter	E-530				(2)		
Detector	HP-270				(2)		
Frisker	RM-14				(2)	(5,6)	
Detector	HP-210						
Air Sampler	12VDC				(1)		
Check Source							
Watch					(1)		
Dosimeter	0-200mR or 0-500mR						
Dosimeter Charger					(1)	(4)	
Calculator					(1)		
Flashlight					(1)	(4)	
Flashlight					(1)	(4)	
Flashlight					(1)	(4)	

Corrective Actions*	Init./Date*

*Where applicable

** During the first quarter inventory or after extended use, recharge the battery pack for 15-18 hours. Contact the Emergency Planning Coordinators for the battery chargers.

Checked By _____ Date _____

Reviewed By _____

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: FIELD MONITORING KIT C — FORM NO. 1903.60H
REV. 07 PC #

INVENTORY LIST

Page 3 of 4

Equipment	Required Quantity	Actual Quantity	Init.	Corrective Actions*	Init./ Date*
SURVEY INSTRUMENTS	XXXXXXXXXXX	XXXXXXXXXX	XXXXXXX	XXXXXXXXXXXXXXX	XXXXXXX
High Range Ion Chamber	1				
Beta-Gamma Geiger Counter w/Probe	1				
Frisker w/Probe	1				
Air Sampler (12VDC)	1				
Sample Head	2				
Check Source	1				
SAMPLING SUPPLIES	XXXXXXXXXXX	XXXXXXXXXX	XXXXXXX	XXXXXXXXXXXXXXX	XXXXXXX
Watch	1				
Cloth Smear	20				
Paper Smear	25				
Particulate Filter	25				
Glassine Envelope	25				
Silver Zeolite Cartridge	25				
Completed Checklist in Front of Procedure Notebook	NA	N/A			
PERSONNEL MONITORING EQUIPMENT	XXXXXXXXXXX	XXXXXXXXXX	XXXXXXX	XXXXXXXXXXXXXXX	XXXXXXX
(0-200mR or Dosimeter 0-500mR)	6				
Charger	1				

*Where applicable

Inventory By _____ Date _____

Reviewed By _____

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: FIELD MONITORING KIT D

FORM NO. 1903.60I

REV. # 7 PC #

CHECKLIST

Instrument	Type	S/N	Cal. Due Date	Batt. Check	(1)Operation/ (2)Response/ (3)Inspected	(4)Batt Remove/ (5)Plugged in/ (6)Charged	Instr. Off
Ion Chamber Beta-Gamma Geiger Counter	E-530				(2)		
Detector	HP-270				(2)		
Frisker	RM-14				(2)	(5,6)	
Detector	HP-210						
Air Sampler	12VDC				(1)		
Check Source							
Watch					(1)		
Dosimeter	0-200mR or 0-500mR						
Dosimeter Charger					(1)	(4)	
Calculator					(1)		
Flashlight					(1)	(4)	
Flashlight					(1)	(4)	
Flashlight					(1)	(4)	

Corrective Actions*	Init./Date*

*where applicable

** During the first quarter inventory or after extended use, recharge the battery pack for 15-18 hours. Contact the Emergency Planning Coordinators for the battery chargers.

Checked By _____ Date _____

Reviewed By _____

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: FIELD MONITORING KIT D — FORM NO. ~~1903.60I~~

REV. #7 PC #

INVENTORY LIST — Page 3 of 4

Equipment	Required Quantity	Actual Quantity	Init.	Corrective Actions*	Init./ Date*
SURVEY INSTRUMENTS	XXXXXXXXXXX	XXXXXXXXXX	XXXXXXX	XXXXXXXXXXXXXX	XXXXXXX
High Range Ion Chamber	1				
Beta-Gamma Geiger Counter w/Probe	1				
Frisker w/Probe	1				
Air Sampler (12VDC)	1				
Sample Head	2				
Check Source	1				
SAMPLING SUPPLIES	XXXXXXXXXXX	XXXXXXXXXX	XXXXXXX	XXXXXXXXXXXXXXX	XXXXXXX
Watch	1				
Cloth Smear	20				
Paper Smear	25				
Particulate Filter	25				
Glassine Envelope	25				
Silver Zeolite Cartridge	25				
Completed Checklist in Front of Procedure Notebook	NA	N/A			
PERSONNEL MONITORING EQUIPMENT	XXXXXXXXXXX	XXXXXXXXXX	XXXXXXX	XXXXXXXXXXXXXXX	XXXXXXX
(0-200mR or Dosimeter 0-500mR)	6				
Charger	1				

*Where applicable

Inventory By _____ Date _____

Reviewed By _____

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: FIRST AID ROOM | FORM NO. 1903.60K
REV. # 7 PC #

CHECK LIST

Page 2 of 4

Equipment	Minimum Required Quantity	Actual Quantity	Init.	Corrective Actions*	Init./ Date*
DRUGS	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX				
Isuprel (Exp. Date)	(1 cc ea.) 2 amps				
Aqueous Ephinephrin 1:1000 (Exp. Date)	(1cc ea.) 2 amps				
Aminophylin (500 mg) (Exp. Date)	(500 mg ea) 2 amps				
Lasix (40 mg/amp) (Exp. Date)	(4 cc ea.) 2 amps				
Valium (10 mg/amp) (Exp. Date)	(2 cc ea.) 2 amps				
Morphine Sulfate (10 mg/cc) (Exp. Date)	(1 cc ea.) 2 amps				
Sodium Bicarbonate (44.6 meq) (Exp. Date)	2 amps				
Decadron (4 mg/cc) (Exp. Date)	(1 cc ea.) 4 amps				
Atropine (1 mg/cc) (Exp. Date)	(1 cc ea.) 2 amps				
Nubain (10 mg/cc) (Exp. Date)	(1 cc ea.) 2 amps				
IV Glucose (50% Dextrose) (Exp. Date)	(50 cc ea.) 2 amps				
Ringers Lactate Solution (Exp. Date)	2 liters				
Xylocaine (2%, Plain) (Exp. Date)	20 cc				
Xylocaine (2%, Cardiac) (Exp. Date)	2 amps				
Pontocaine Eye Drops (Exp. Date)	(5 cc) 1 btl.				
Betadine Skin Antiseptic	1 pt.				

*Where applicable

Inventory By ____________________ Date ______________

Reviewed By ____________________

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: FIRST AID ROOM FORM NO. 1903.60K
REV. # 7 PC #

INVENTORY LIST

Page 3 of 4

Equipment	Required Quantity	Actual Quantity	Init.	Corrective Actions*	Init./ Date*
FURNISHINGS	XXXXXXXXXXX	XXXXXXXXXX	XXXXXXX	XXXXXXXXXXXXXXX	XXXXXXX
Treatment Table	1				
Med Lite	1				
Dressing Can	1				
Orthopedic Stretcher	1				
MEDICAL SUPPLIES AND EQUIPMENT	XXXXXXXXXXX	XXXXXXXXXX	XXXXXXX	XXXXXXXXXXXXXXX	XXXXXXX
Blankets	4				
Stethoscope	1				
Sphygmometer	1				
Otoscope-Opthalmoscope w/Batteries	1				
Laryngoscope w/Batteries	1				
Aspirator w/Suction Probe	1				
Recusitation Bag	1				
Inflatable Splints	1 set				
Phisohex Dispenser Bottle	1				
Oral Thermometer	2				
Emesis Basin	2				
Tourniquet	3				
Sponge, Forcep (~6 inch, straight)	1				
Thumb Dressing Forceps (~4.5 inch)	1				

*Where applicable

Inventory By _____ Date _____

Reviewed By _____

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: FIRST AID ROOM
FORM NO. 1903.60K
REV. # 7 PC #

INVENTORY LIST

Page 4 of 4

Equipment	Required Quantity	Actual Quantity	Init.	Corrective Actions*	Init./ Date*
Splinter Forceps	1				
Bandage Scissors (~4.5 in.)	1				
Bandage Scissors (~6 in.)	1				
Airways	Asst.				
Oral Screw	1				
Endo Tracheal Tube	Asst.				
Guide for Insertion of Endo Tracheal Tube	1				
Syringe (Asepto, 50cc)	1				
Syringe w/Needle	Asst.				
Blood Chemistry Tube (Exp. Date)	6				
Suture Pack (Exp. Date)	2				
Abbocath	1				
IV Tubing	8 ft.				
Suture Material	Asst.				
Bandage Material	Asst.				
Bandage (Stretch)	Asst.				
Surgical Tape	Asst.				
Exam Gloves	1 box				
Surgical Gloves	6 pr.				

*Where applicable

Inventory By _____ Date _____

Reviewed By _____

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: TRANSMITTAL | FORM NO. 1013.02H

REV. # 12 PC #

Arkansas Nuclear One
Russellville, Arkansas
Date September 9, 1983

MEMORANDUM

TO: 108-NRC

FROM: ANO DOCUMENT CONTROL

SUBJECT: ANO MASTER PLANT MANUAL UPDATE

PROCEDURE NUMBER 1904.06 REV. # 3 PC # _____ TC # _____

PROCEDURE TITLE RADIOLOGICAL PLUME TRACKING AND DOSE INTEGRATION

PROCEDURE NUMBER _____ REV. # _____ PC # _____ TC # _____

PROCEDURE TITLE _____

PROCEDURE NUMBER _____ REV. # _____ PC # _____ TC # _____

PROCEDURE TITLE _____

| | PROCEDURE (S) HAS BEEN PLACED IN YOUR SET OF THE PLANT MANUAL.

|✓| PROCEDURE (S) SHOULD BE PLACED IN YOUR SET OF THE PLANT MANUAL.

NOTE: PLEASE RETURN SIGNED TRANSMITTAL TO DOCUMENT CONTROL - 4TH FLOOR:

SIGNATURE _____ DATE _____

UPDATED

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: RECORD OF CHANGES AND REVISIONS

FORM NO. 1000.06A

OFFSITE DOSE PROJECTIONS

REV. # 12 PC #

Safety Related YES ☒ NO ☐

RADIOLOGICAL PLUME TRACKING AND DOSE INTEGRATION
1904.06 REV. 3

Safety Related

UN- Controlled Copy # 108

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12	3													

APPROVED BY:

James M Levine
(General Manager)

APPROVAL DATE
9/8/83

REQUIRED EFFECTIVE DATE:

1.0 PURPOSE

This procedure provides a manual method for estimating the location of airborne radioactive materials offsite under changing release and meteorological conditions, and for estimating the maximum integrated dose commitments at 0.65, 2.0, 5.0, and 10.0 mile radii.

2.0 SCOPE

2.1 This procedure is applicable to airborne radioactive releases from either ANO-1 or ANO-2.

2.2 This procedure does not calculate the fine structure (actual distribution) of integrated doses offsite.

2.3 This procedure does not take into account effects caused by precipitation and terrain channelling.

2.4 The data generated from this procedure is used as input for procedure 1904.07, "Protective Action Recommendations" and no notifications are required.

3.0 REFERENCES

3.1 References Used in Procedure Preparation

3.1.1 Emergency Dose Calculation Package Methodology Manual, Applied Physical Technology, July 1981

3.2 References Used in Conjunction with this Procedure

3.2.1 1904.02, "Offsite Dose Projections - Pocket Computer Method"

3.2.2 1904.07. "Protective Action Recommendations"

3.3 Related ANO References

None

4.0 RESPONSIBILITIES

4.1 The Dose Assessment Supervisor in the Emergency Response Organization, or his designee, is responsible for long-term radiological plume tracking and dose integration.

4.2 The Duty Emergency Coordinator, or his designee, should initiate radiological plume tracking and dose integration as soon as possible after the TSC is activated and continue until relieved by the Dose Assessment Supervisor.

5.0 LIMITS AND PRECAUTIONS

5.1 Actual integrated doses will generally be lower than predicted by this procedure due to typical wind direction meander.

5.2 In order to be meaningful, the dose integration must cover the entire release period (i.e. all plume segments).

5.3 If dose calculations were made during the initial portion of a radioactive release incident using the GERMS computers, and these computers are no longer available, perform procedure Section 12.0 one time to convert the GERMS output into hand-calculation format.

6.0 DEFINITIONS

6.1 Plume Segment - An air parcel containing radioactive material emitted at a relatively uniform release rate and under relatively uniform meteorological conditions.

7.0 DOSE RATE PROJECTION SUMMARY

7.1 Transfer the dose projection input and output data from Form 1904.02D to Form 1904.06A for each dose projection as it is performed, i.e. therefore the oldest data will appear closer to the top of the form. Include all dose projections previously calculated by Control Room personnel since the beginning of the release. The time on Form 1904.06A refers to the time recorded on 1904.02A.

7.2 For each projection, compute the "segment length (miles)" by multiplying the then-current windspeed (mph) by the total elasped time between the current and previous data collection times (hours). Record the "segment length" on Form 1904.06A for each dose projection (plume segment).

NOTE: The elasped time for the first plume segment is the time period from the start of the release to the first data collection time.

7.3 Combine sequential dose projections which have similar meteorological and release rate characteristics into a single plume segment. This reduces subsequent plotting and integration tasks.

7.3.1 The criteria for grouping are:

Wind direction ± 10°
Wind speed ± 1 MPH under 5 MPH or ± 20% over 5 MPH
Stability class no change
Release rates ± 20%

All tolerances are expressed as maximum deviation from the first segment in the group. The characteristics of the combined segment are the average of the respective characteristics of the component segments.

7.3.2 Draw brackets on the left hand margin of 1904.06A to indicate the grouping of segments.

7.3.3 The characteristics of the combined segment are those of the first segment of the group.

8.0 PLUME CENTERLINE PLOTTING

8.1 Obtain a 360° protractor, ruler, stability class overlays, map, calculator, and pad of tracing paper (11" x 17", ruled 10 x 10 to the inch) from the appropriate emergency kit:

8.1.1 Technical Support Center

8.1.2 Emergency Control Center

8.2 Select an origin and north-south axis on the tracing paper, taking into consideration the general direction of plume development.

8.3 Refer to Form 1904.06A to determine the downwind direction and segment length of the most recently emitted plume segment.

8.4 Center the protractor on the origin of the tracing paper.

8.5 Turn the protractor until the downwind direction angle (indicated on the outer ring) is aligned with either the north or the south direction on the tracing paper.

8.6 Draw the segment centerline along the indicated side of the protractor's central straightedge, depending on whether the downwind angle was aligned with north or south on the paper.

8.7 Use a ruler to draw the plume segment length to scale (1" = 1 mile).

8.8 Mark the segment endpoint. This is the starting point for the next (older) plume segment.

8.9 Label the segment centerline with its initial release time. Mark the segment endpoint with the total broken-path plume length at that point.

8.10 Center the protractor over the starting point for the next older segment.

8.11 Refer to Form 1904.06A to determine the downwind directions and lengths of successively older plume segments, repeating Steps 8.5 through 8.10 until all plume segments have been plotted which fall within a 10-mile radius of ANO.

8.12 If any radioactive material released during the time when the GERMS computers were being used for dose calculations is still within 10 miles of ANO:

8.12.1 Obtain the "GERMS" centerline tracing prepared in Step 12.0 of this procedure.

8.12.2 Position the "GERMS" tracing over the centerline plot from 8.11.

8.12.3 Align the origin of the "GERMS" tracing with the outermost (oldest) point of the plot from 8.11, and ensure that the "north" arrows on the two pages are parallel.

8.12.4 Hold the plots together along one edge and slide a piece of carbon paper, inked side down, between the sheets.

8.12.5 Trace the "GERMS" centerline on to the plot from 8.11. Portions of the "GERMS" centerline more than 10 miles from ANO need not be transferred.

9.0 PLUME OUTLINE DRAWING

NOTE: This section must be completed only if a graphic plume drawing is required; normally once every 30 minutes. Also, it is not practical to draw the outline of portions of the plume which were previously tracked by the GERMS computers. For these portions, field data must be relied upon for plume width and dose rate information.

9.1 For each plume segment, beginning with the one emitted most recently:

9.1.1 Select the overlay corresponding to the atmospheric stability when that segment was released.

9.1.2 Using the total broken-path distance to the segment starting point (as recorded on the centerline plot), mark the segment starting point on the centerline of the stability overlay.

9.1.3 Place the overlay under the tracing paper bearing the centerline plot, aligning the segment starting points and centerlines.

9.1.4 Trace the bounding X/Q lines for the segment, connecting smoothly with the adjacent segment. (It is usually helpful to extend the boundary lines an inch or so beyond the segment endpoint).

9.2 Darken the plume outline.

9.3 Affix the tracing sheet to a 10-mile radius emergency planning map, aligning the north-south directions, and centering the starting point of the youngest plume segment over the plant site. Carbon paper may be used to transfer the plume centerline and outline to multiple emergency planning maps, if necessary.

10.0 DOSE COMMITMENT INTEGRATION

10.1 At the top, leftmost open column on Form 1904.06B, list the starting and ending times for the earliest segment not previously listed. Subtract the starting time from the ending time to determine the duration of this integration period in hours. A separate set of forms must be maintained for whole body and for child thyroid doses.

10.2 Using the data tabulated on Form 1904.06A, record the child thyroid and whole body dose rates associated with the plume segment currently crossing the radii listed on Pages 1-5 of 1904.06B. Record the centerline dose rate on the line for the sector where the intersection occurs.

NOTE: If portions of the plume were previously drawn by the GERMS computers, there will be no centerline data for them on Form 1904.06A. Use a best-guess interpolation of the field dose rates reported by the Offsite Monitoring Supervisor on Form 1904.01J or 1904.02E or in the emergency planning map side bar area.

10.3 Multiply the dose rates obtained in Step 10.2 times the duration to determine the incremental whole body and child thyroid integrated doses. Record these in the 'Δ' Dose column on the whole body and child thyroid worksheets (Form 1904.06B), on the appropriate sector/radius line.

NOTE: When the plume centerline falls between two sectors, add the incremental doses to both sectors.

10.4 For each sector/radius line on Form 1904.06B, add the entry in the current 'Δ' Dose column to the entry in the previous 'Σ' Dose column and record the new total integrated dose in the current 'Σ' Dose column. This will result in a running total being generated from left to right across the page.

NOTE: The integrated doses at all offsite locations are assumed to be zero prior to an incident; therefore, the first 'Σ' Dose column of an incident will equal the first 'Δ' Dose column.

10.5 Circle the highest integrated exposure value for each major radius (0.65, 1.0, 2.0, 5.0, and 10.0 miles) and for both dose types (whole body and child thyroid).

11.0 PROTECTIVE ACTION RECOMMENDATIONS

11.1 Recommend protective action in affected offsite subsectors when trends indicate that:

11.1.1 Whole body integrated dose may approach 1 R (1000 mR), or

11.1.2 Child thyroid integrated dose may approach 5 R (5000 mR).

11.2 Recommend protective action in affected onsite (exclusion area) subsectors when trends indicate that:

11.2.1 Whole body integrated dose may approach 0.5 R (500 mR), or

11.2.2 Child thyroid integrated dose may approach 1.0 R (1000 mR).

12.0 CONVERSION FROM GERMS TO MANUAL (TRS-80) CALCULATIONS

NOTE: This portion of the procedure should only be completed in case of failure of the GERMS computers during a radiological release incident. It is to be performed only once, immediately following the failure.

12.1 Transfer the "Release Start" and "Plume Update" times from the most recent Form 1904.01D to the "From (Time)" and "Until (Time)" lines in the leftmost column of each page of Form 1904.06B. Mark one set of Form 1904.02D's for "Whole Body", and one for "Child Thyroid".

12.2 Write "From GERMS" on the first-column "Duration (hr)" line.

12.3 Transfer the child thyroid cumulative doses from page 1 of the most recent Form 1904.01F to the leftmost "Σ Dose" column of the "child thyroid" set of 1904.06B forms. The sector # lines correspond exactly between the two forms, but the radii do not.

12.3.1 Copy the data from the 0.62 mile radius column of Form 1904.01F to page 1 (0.65 mile radius) of Form 1904.06B.

12.3.2 Copy the data from the 1.45 mile radius column of Form 1904.01F to page 2 (2.0 mile radius) of Form 1904.06B.

12.3.3 Copy the data from the 3.46 mile radius column of Form 1904.01F to page 3 (5.0 mile radius) of Form 1904.06B.

12.3.4 Copy the data from the 7.25 mile radius column of Form 1904.01F to page 4 (10.0 mile radius) of Form 1904.06B.

12.4 Transfer the whole body cumulative doses from the most recent page 2 of Form 1904.01F to the "whole body" set of 1904.06B forms as in 12.3 above.

12.5 Use Form 1904.01D to estimate the location of the plume centerline, and draw it on a full-sized emergency planning map.

12.6 Lay a sheet of tracing paper over the emergency planning map and trace the plume centerline.

12.7 Mark the location of the origin with an x-mark, label the "north" direction with an arrow and the letter N, and label the tracing with the words "GERMS CENTERLINE" and the "LAST UPDATE" time from Form 1904.01D.

12.8 If newer offsite dose data is available from Procedure 1904.02, return to Step 7.0 of this procedure.

13.0 ATTACHMENTS AND FORMS

13.1 Form 1904.06A - Dose Projection Summary

13.2 Form 1904.06B - Integrated Exposure Worksheet

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: DOSE PROJECTION SUMMARY

FORM NO. 1904.06A

REV. # 2 PC #

	DOSE PROJECTION SUMMARY (ACTUAL METEOROLOGY)		RADIUS	WHOLE BODY	CHILD THYROID
			(MILES)	(MR/HR)	(MR/Hr)
1.0	TIME: WINDSPEED:	(MPH)	0.65		
	DOWNWIND DIRECTION:	(DEG)	1.0		
	STABILITY CLASS:		2.0		
	BOUNDING X/Q:	(SEC/M^3)	5.0		
	SEGMENT LENGTH:	(MILES)	10.0		
	Q-GAS:	(Ci/Sec)			
	$Q\text{-}I_{131}$:	(Ci/Sec)			
	INITIAL:				
2.0	TIME: WINDSPEED:	(MPH)	0.65		
	DOWNWIND DIRECTION:	(DEG)	1.0		
	STABILITY CLASS:		2.0		
	BOUNDING X/Q:	(SEC/M^3)	5.0		
	SEGMENT LENGTH:	(MILES)	10.0		
	Q-GAS:	(Ci/Sec)			
	$Q\text{-}I_{131}$:	(Ci/Sec)			
	INITIAL:				
3.0	TIME: WINDSPEED:	(MPH)	0.65		
	DOWNWIND DIRECTION:	(DEG)	1.0		
	STABILITY CLASS:		2.0		
	BOUNDING X/Q:	(SEC/M^3)	5.0		
	SEGMENT LENGTH:	(MILES)	10.0		
	Q-GAS:	(Ci/Sec)			
	$Q\text{-}I_{131}$:	(Ci/Sec)			
	INITIAL:				
4.0	TIME: WINDSPEED:	(MPH)	0.65		
	DOWNWIND DIRECTION:	(DEG)	1.0		
	STABILITY CLASS:		2.0		
	BOUNDING X/Q:	(SEC/M^3)	5.0		
	SEGMENT LENGTH:	(MILES)	10.0		
	Q-GAS:	(Ci/Sec)			
	$Q\text{-}I_{131}$:	(Ci/Sec)			
	INITIAL:				
5.0	TIME: WINDSPEED:	(MPH)	0.65		
	DOWNWIND DIRECTION:	(DEG)	1.0		
	STABILITY CLASS:		2.0		
	BOUNDING X/Q:	(SEC/M^3)	5.0		
	SEGMENT LENGTH:	(MILES)	10.0		
	Q-GAS:	(Ci/Sec)			
	$Q\text{-}I_{131}$:	(Ci/Sec)			
	INITIAL:				

Reviewed By _____

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: INTEGRATED EXPOSURE WORKSHEET

FORM NO. ~~1904.06B~~

REV. # 3 PC #

☐ WHOLE BODY ☐ CHILD THYROID

FROM (TIME)													
UNTIL (TIME)													
DURATION (HR)													
SECTOR/RADIUS	Dose Rate	Δ Dose	Σ Dose	Dose Rate	Δ Dose	Σ Dose	Dose Rate	Δ Dose	Σ Dose	Dose Rate	Δ Dose	Σ Dose
1 0.65 mi												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
Initial												

NOTE: All dose rates in mR/hr. All doses in mR.

Reviewed By_____

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: INTEGRATED EXPOSURE WORKSHEET | FORM NO. 1904.06B | REV. # 3 | PC #

☐ WHOLE BODY ☐ CHILD THYROID

FROM (TIME)													
UNTIL (TIME)													
DURATION (HR)													
SECTOR/RADIUS	Dose Rate	Δ Dose	Σ Dose	Dose Rate	Δ Dose	Σ Dose	Dose Rate	Δ Dose	Σ Dose	Dose Rate	Δ Dose	Σ Dose
1 2.0 mi												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
Initial												

NOTE: All dose rates in mR/hr. All doses in mR.

Reviewed By_____

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: INTEGRATED EXPOSURE WORKSHEET

FORM NO. 1904.06B

REV. # 3 PC #

☐ WHOLE BODY ☐ CHILD THYROID

FROM (TIME)												
UNTIL (TIME)												
DURATION (HR)												
SECTOR/RADIUS	Dose Rate	Δ Dose	Σ Dose	Dose Rate	Δ Dose	Σ Dose	Dose Rate	Δ Dose	Σ Dose	Dose Rate	Δ Dose	Σ Dose
1 5.0 mi												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
Initial												

NOTE: All dose rates in mR/hr. All doses in mR.

Reviewed By _____

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: INTEGRATED EXPOSURE WORKSHEET

FORM NO. 1904.06B

REV # 3 PC #

☐ WHOLE BODY ☐ CHILD THYROID

FROM (TIME)												
UNTIL (TIME)												
DURATION (HR)												
SECTOR/RADIUS	Dose Rate	Δ Dose	Σ Dose	Dose Rate	Δ Dose	Σ Dose	Dose Rate	Δ Dose	Σ Dose	Dose Rate	Δ Dose	Σ Dose
1 10.0 mi												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
Initial												

NOTE: All dose rates in mR/hr. All doses in mR.

Reviewed By _____