RADIOLOGICAL AWARENESS TRAINING

OFFICE OF RADIATION CONTROL
ALABAMA DEPARTMENT OF PUBLIC HEALTH
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P. O. BOX 303017, MONTGOMERY, AL 36130-3017
T: 334.290.6244 F: 334.285.9342
WWW.ALABAMAPUBLICHEALTH.GOV/RADIATION

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DUTY OFFICER 334.324.0076

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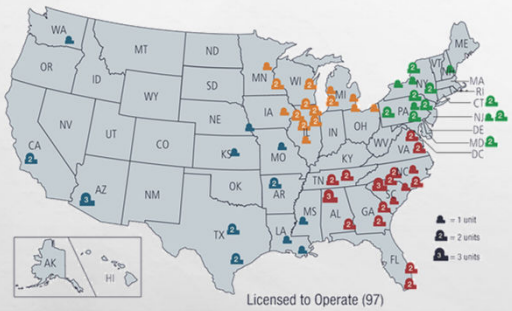
NUCLEAR POWER PLANTS

U.S. Operating Commercial Nuclear Power Reactors



Licensed to Operate (97)

U.S.NRC
As of August 2019

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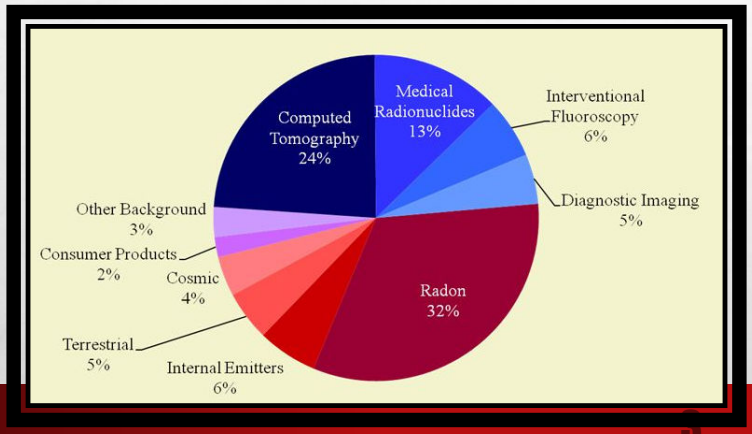
AVERAGE ANNUAL RADIATION DOSE PER U.S. CITIZEN



- 620 MREM/YEAR
  - ~310 MREM FROM NATURAL RADIATION
  - ~310 MREM FROM MAN-MADE RADIATION
  - <1 MREM FROM NUCLEAR POWER GENERATION

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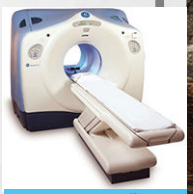
SOURCES AND USES OF RADIOACTIVE MATERIAL

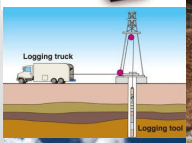
SOURCES

- INDUSTRIAL SOURCES
- RADIOPHARMACEUTICALS
- CONSUMER PRODUCTS
- NUCLEAR FUELS
- RADIOACTIVE WASTE

USES

- MEDICAL
  - DIAGNOSTIC TESTING
  - THERAPY
  - RESEARCH
- INDUSTRIAL
  - RADIOGRAPHY
  - OIL AND GAS WELL-LOGGING
  - THICKNESS AND LEVEL GAUGES
- FIXED NUCLEAR FACILITIES
  - NUCLEAR POWER PLANTS





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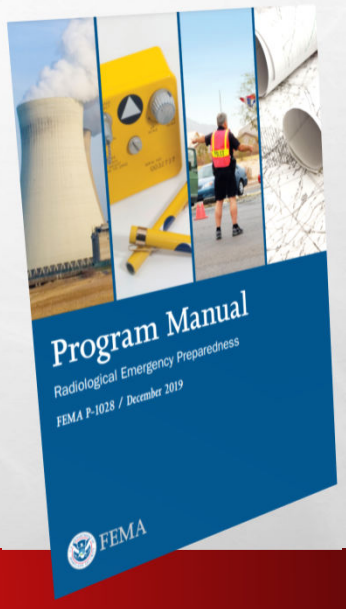
ALABAMA RADIOLOGICAL EMERGENCY RESPONSE PLAN

- PLAN FOR OFF-SITE EMERGENCY RESPONSE AND RECOVERY.
- UTILITY IS RESPONSIBLE FOR ON-SITE RESPONSE AND RECOVERY.



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EMERGENCY CLASSIFICATIONS

- NOTIFICATION OF UNUSUAL EVENT
- ALERT
- SITE AREA EMERGENCY
- GENERAL EMERGENCY

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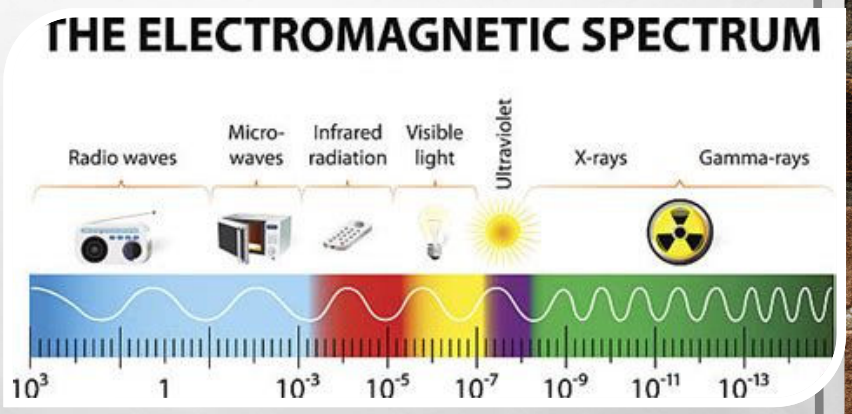
TYPES OF RADIATION

- NON-IONIZING
  - RADIO WAVES
  - TV WAVES
  - INFRARED WAVES
  - MICROWAVES
- IONIZING
  - ULTRAVIOLET WAVES
  - GAMMA RAYS
  - X-RAYS
  - COSMIC RAYS
  - ALPHA & BETA PARTICLES



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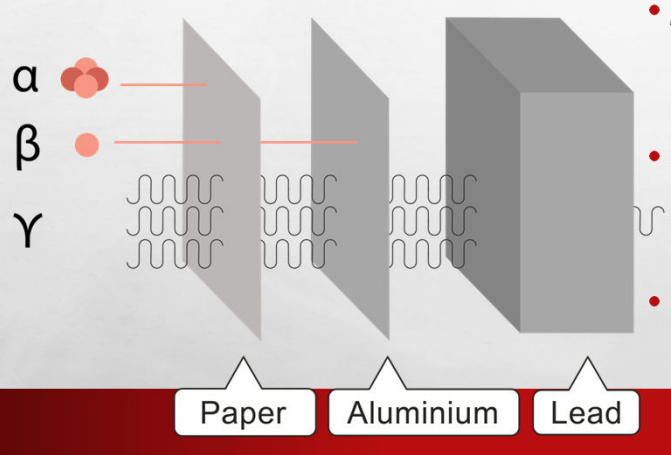
TYPES OF IONIZING RADIATION



- ALPHA
  - TRAVELS A FEW INCHES IN AIR
  - INTERNAL HAZARD
  - SHIELDED BY PAPER
- BETA
  - TRAVELS A FEW FEET IN AIR
  - INTERNAL/EXTERNAL HAZARD
  - SHIELDED BY PLASTIC OR SKIN
- GAMMA
  - TRAVELS A FEW HUNDRED FEET IN AIR
  - INTERNAL/EXTERNAL HAZARD
  - SHIELDED BY LEAD OR THICK CONCRETE

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ALWAYS USE THIS!

- ALARA
  - AS LOW AS REASONABLY ACHIEVABLE

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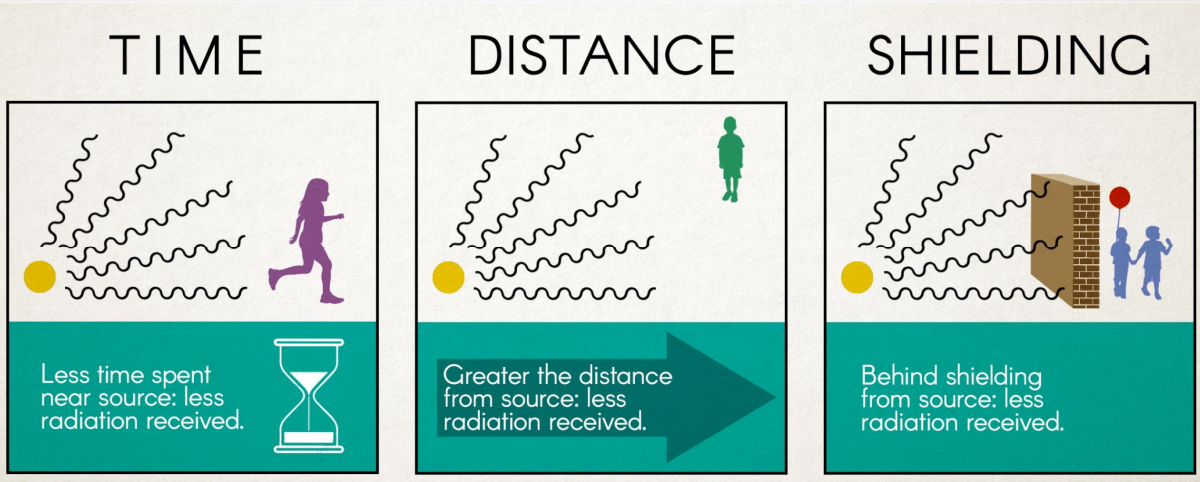
CONTROLLING EXPOSURE



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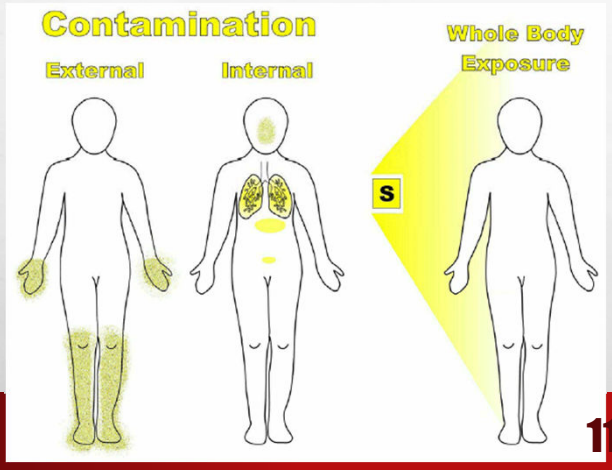
EXPOSURE VS. CONTAMINATION AND DECONTAMINATION



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BIOLOGICAL EFFECTS OF RADIATION

- EFFECTS FROM LOW DOSES OF RADIATION ARE PREDICTED BASED ON STUDIES OF INDIVIDUALS AND GROUPS THAT RECEIVED LARGE DOSES OF RADIATION OVER 100 YEARS OF STUDY FOCUSING ON 4 GROUPS
  - EARLY RADIATION WORKERS
  - SURVIVORS OF HIROSHIMA AND NAGASAKI
  - PEOPLE INVOLVED IN RADIATION ACCIDENTS AT NUCLEAR FACILITIES
  - CANCER PATIENTS

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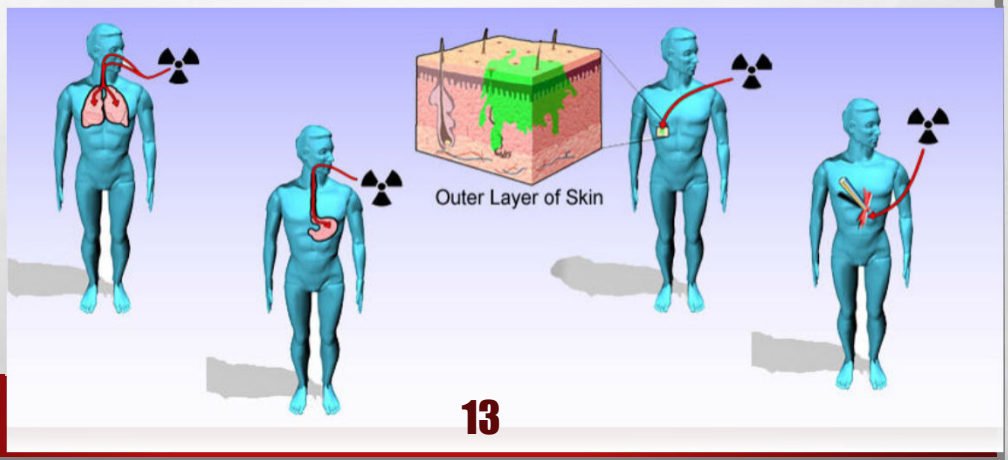
RADIATION PATHWAYS

- BIOLOGICAL PATHWAYS THAT CAN INTRODUCE INTERNAL CONTAMINATION INCLUDE THE FOLLOWING:
  - INHALATION
  - INGESTION
  - ABSORPTION
  - INJECTION



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RADIATION & OUR FIVE SENSES

- WE ARE AWARE OF OUR ENVIRONMENT THROUGH OUR FIVE SENSES.
- BUT, WE MUST RELY ON INSTRUMENTS TO DETECT TO PRESENCE OF RADIATION.

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REM
(ROENTGEN EQUIVALENT IN MAN)

1,000 mR = 1 R

1R = 1 Rad = 1 rem

UNIT OF BIOLOGICAL DAMAGE CAUSED BY DIFFERENT TYPES OF IONIZING RADIATION.

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RADIATION EXPOSURE

- DOSIMETER = ODOMETER
- ACCUMULATED EXPOSURE

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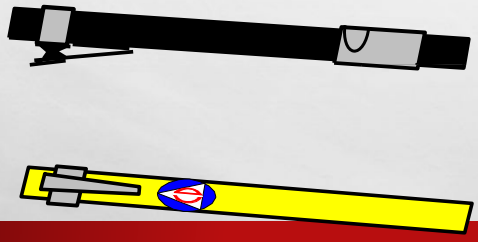
DIRECT-READ DOSIMETERS (DRD) A.K.A. POCKET DOSIMETERS

- RECORDS RADIATION IMMEDIATELY
- MEASURES IN…
  LOW RANGE (MR)
  OR
  HIGH RANGE (R)



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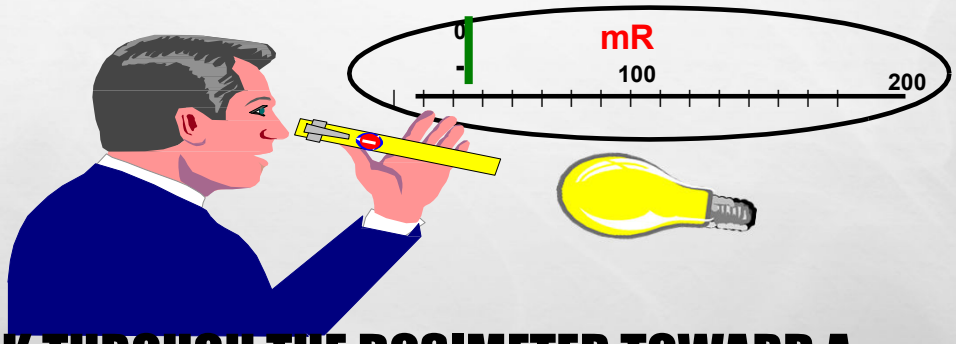
READING A POCKET DOSIMETER



- LOOK THROUGH THE DOSIMETER TOWARD A LIGHT SOURCE.

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CDV 750 DOSIMETER CHARGER

Clamp

Clamp Trigger

Discharge Button

Generator Lever

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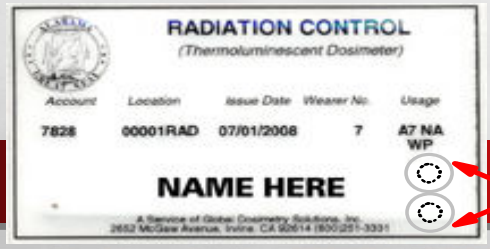
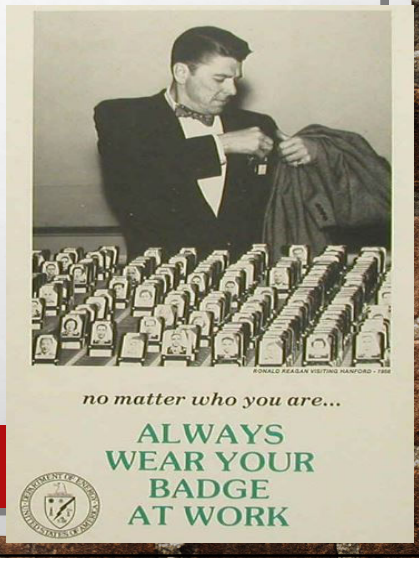
THERMOLUMINESCENT DOSIMETER

- **RECORDS RADIATION DOSE FOR LEGAL/PERMANENT EXPOSURE RECORDS**
- **RESULTS NOT IMMEDIATELY AVAILABLE**



Lithium Fluoride Chips



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TEDE
(TOTAL EFFECTIVE DOSE EQUIVALENT)

- TOTAL DOSE
  - = EXTERNAL DOSE + INTERNAL DOSE
  - = 2 X EXTERNAL DOSE
- TEDE = 2 X POCKET DOSIMETER READING

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RADIATION DOSAGE LIMITS FOR EMERGENCY WORKERS

EMERGENCY WORKERS (EW)
PERSONNEL/EQUIPMENT MONITORS (PEM)
Radiation Dosage Limits
TEDE (Total Effective Dose Equivalent)

EW: Protecting Property, Patrolling Evacuated Areas, and Manning Check Points
PEM: Monitoring evacuees/EWs and equipment for radiation contamination.

	TEDE	Dosimeter
Seek Relief	200 mrem	100 mR
Daily Maximum	1 rem	500 mR
MAXIMUM for ACCIDENT	5 rem	2.5 R
Evacuating Known Residents	10 rem	5 R
Fighting Residence Fires	10 rem	5 R
Life Saving	25 rem	12.5 R

Alabama Radiation Control

FOR EWs and PEMs

-All emergency workers are advised to make a reasonable effort to limit their total dose, while at the same time accomplishing their emergency responsibilities.
-Read dosimeters and record at least every 30 minutes.
-Do not take Potassium Iodide (KI) until instructed by your county EMA.
-Control your exposure to radiation by your time, distance and shielding.

FOR PEMs ONLY

-Contamination level in Alabama is (2x) twice background (open window) and will warrant decontamination.
-Monitoring technique: 1 inch away and move 1-2 inches per second.
-On lowest scale (x0.1), the Ludlum 14C meter scale will read 0-600 cpm.
-Do a response check and calibration verification, cover probe, and obtain background.
-Use CPM scale when monitoring for contamination.

Alabama Radiation Control

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KI
(POTASSIUM IODIDE)

- THYROID BLOCKING AGENT
- SATURATES THE THYROID GLAND WITH NONRADIOACTIVE IODINE (I-127)
- HELPS PREVENT RADIOACTIVE IODINE (I-131) FROM BEING ABSORBED INTO THE THYROID

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CONTACT US ANYTIME!

RADIOLOGICAL EMERGENCY ASSISTANCE CONTACTS

USE FOR INCIDENTS INVOLVING RADIOACTIVE MATERIAL

24-hour
State EOC Communication Center
(205) 280-2310
(800) 843-0699

If contact is not established, please call:
Alabama Radiation Control Duty Officer
(334) 324-0076

For additional contacts, please call the following:
Radiation Control Office (334) 206-5391

NAME	CELL
David Torberville	(334) 314-6323
Myron Riley	(334) 224-4035
Nick Swindall	(334) 322-8397
Neil Maryland	(334) 322-8031
Kevin Hicks	(334) 314-6326
Cason Coan	(334) 320-3457

*Current as of January 1, 2020
*Destroy all Earlier Editions

Alabama Department of Public Health
Office of Radiation Control
Montgomery, AL

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ADPH-RAD-1/REV 1-20

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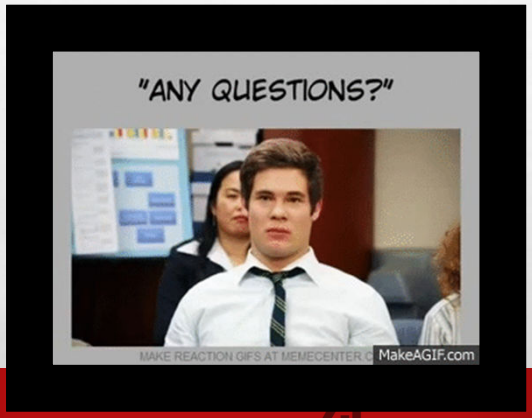
THANK YOU!


"ANY QUESTIONS?"
MAKE REACTION GIFS AT MEMECENTER.C
MakeAGIF.com

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