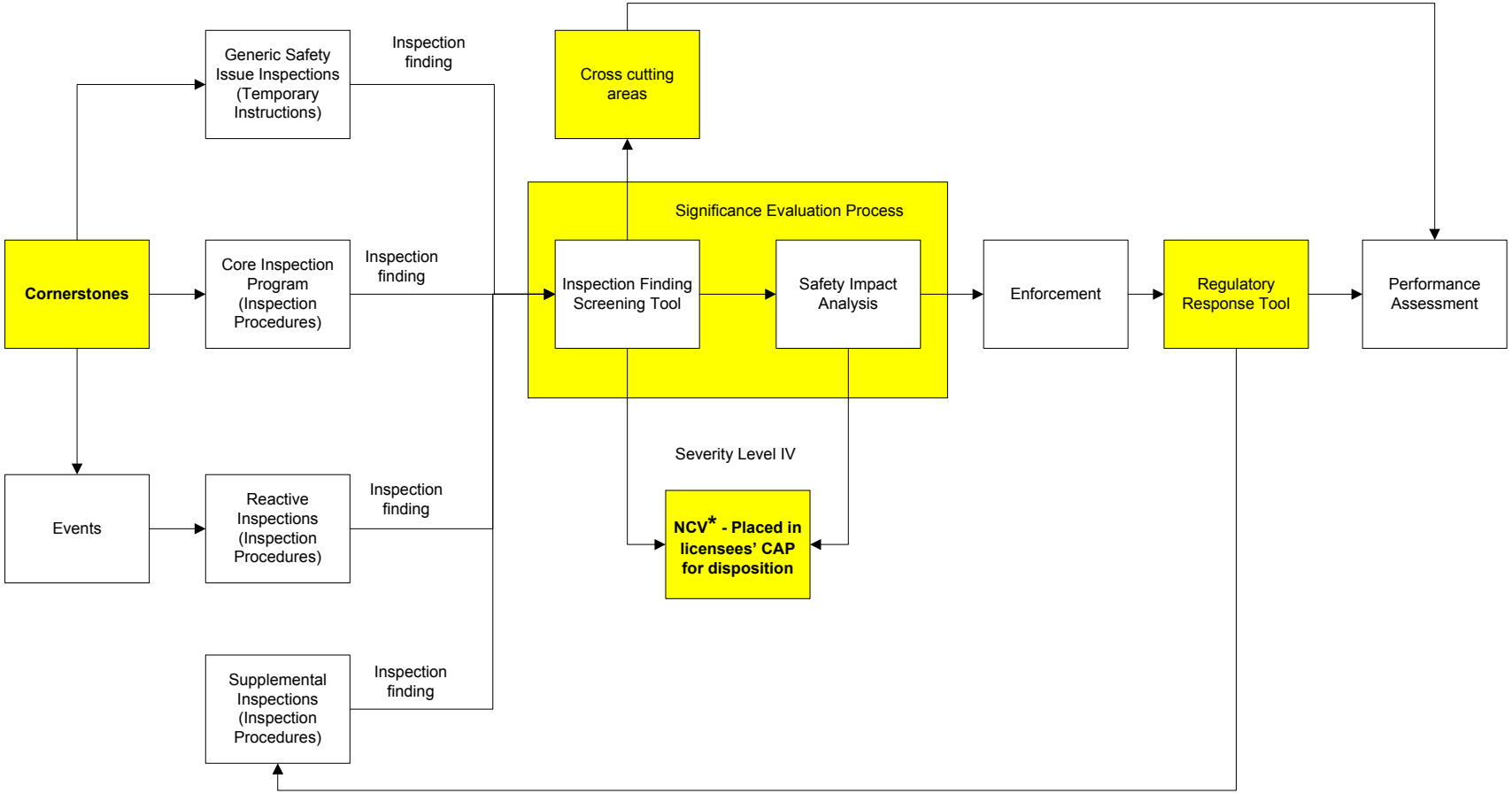
U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

Fuel Cycle Oversight Enhancements

Draft Enhanced FCOP



Yellow blocks indicate new elements that might be present in the revised fuel cycle oversight process
Bolded text in yellow blocks indicate current efforts to revise the fuel cycle oversight process

Inspection finding = a non-compliance with NRC regulations or license conditions that is greater than minor (see Section 2.3.1 of the NRC Enforcement Policy for more information on minor violations)

CAP = Corrective Action Program

Cross cutting areas = Human Performance, CAP, and Safety Conscious Work Environment

* Placing the Severity Level IV violation in the CAP is not the only criterion to disposition it as a Non Cited Violation (NCV). Criteria similar to those in Section 2.3.2.a of the NRC Enforcement Policy must be met.

CAP Criteria Implementation Results

- Policies, Programs, and Procedures

  Licensee staff, supervisors, and managers identify, report, assess, and correct safety and security issues in a timely and effective manner

- Identification and Reporting

  Safety and security issues are recognized and promptly reported in a comprehensive manner that results in the timely and effective assessment of issues and communication of status to appropriate staff

CAP Criteria Implementation Results

- Significance Assessment & Causal Evaluation

  Actual and potential significance of issues are appropriately assessed to determine the timing and scope of response; causal evaluations effectively identify issue causes and contributing factors

- Development & Implementation of Corrective Actions

  Timely and effective identification and implementation of corrective actions that prevent recurrence of the same or similar issues

CAP Criteria Implementation Results

- Assessment of Effectiveness

  Assessment processes confirm that licensee staff, supervisors and managers identify, report, assess, and correct safety and security issues in a timely and effective manner

CAP Criteria Clarifications

- Part C, Significance Assessment and Causal Evaluation of Safety and Security Issues revised to clarify need to consider reportability of an issue or related condition, fact or circumstance per 10 CFR 20, 21, 30, 40, 70, 76, etc.
- A regulatory compliance issue is a safety issue

CAP Criteria Clarification

- Routine assessment of CAP implementation performed within current baseline inspection procedures; additional biennial CAP comprehensive inspection.
- Implementation of CAP that complies with criteria is one element that may be considered in a decision to change the baseline inspection program as part of the Licensee Performance Review process.
- Development of cornerstones is expected to have a direct impact on the baseline inspection program.

CAP Acceptance Process

- Option 1
  - Licensee submits CAP that meets criteria in license amendment application
  - When amendment is issued, NRC will implement revised Enforcement Policy that will allow inspectors to non-cite SL IV violations as described
  - NRC will assess CAP adequacy during routine, reactive, and special inspections and biennial comprehensive CAP inspection

CAP Acceptance Process

- Option 1 (continued)
  - Conduct of first comprehensive CAP inspection within 12 months of amendment
  - Other issues with Option 1
    - Implementation mid to late FY12
    - Develop inspection and enforcement guidance for CAP violations to ensure CAP program performance that impacts its effectiveness is corrected

CAP Acceptance Process

- Option 2
  - Licensee informs NRC that they have implemented CAP that meets criteria and is ready for inspection
  - NRC inspects CAP to confirm that licensee's CAP meets established criteria
  - If inspection results indicate CAP is effective, NRC will implement revised Enforcement Policy that will allow inspectors to non-cite SL IV violations as described (revised NCV policy)

CAP Acceptance Process

- Option 2 (continued)
  - NRC will confirm continued CAP adequacy during routine, reactive and special inspections
  - Other issues with Option 2
    - Inspect CAPs in CY12 as licensee's assert readiness
    - No violations based on inspection results.
    - Identify CAP inspection results that would preclude initial or continued application of revised NCV policy
    - Identify process to reinstate application of revised NCV policy

CAP Inspection Program

- Initial, comprehensive inspection to assess implementation of CAP criteria and CAP effectiveness; results determine if revised NCV policy is implemented.
- Review of CAP data and trends during routine reviews and inspections
- Assessment of CAP performance associated with specific events or escalated enforcement
- Periodic (biennial) comprehensive assessment

CAP Adequacy Determination

- NRC would cease to apply the revised NCV policy if CAP inspection results cause the NRC to conclude that the licensee CAP is ineffective
- This conclusion could be based on a failure to implement one or more of the five CAP criteria that results in a failure to adequately identify, report, assess, evaluate or correct numerous or significant safety and security issues.
- NRC would apply revised NCV policy if CAP implementation is improved and determined effective by NRC inspection

CAP Adequacy Determination

- Licensee insights on
  - How to assess CAP performance
  - How to characterize inadequate performance in the five CAP criteria

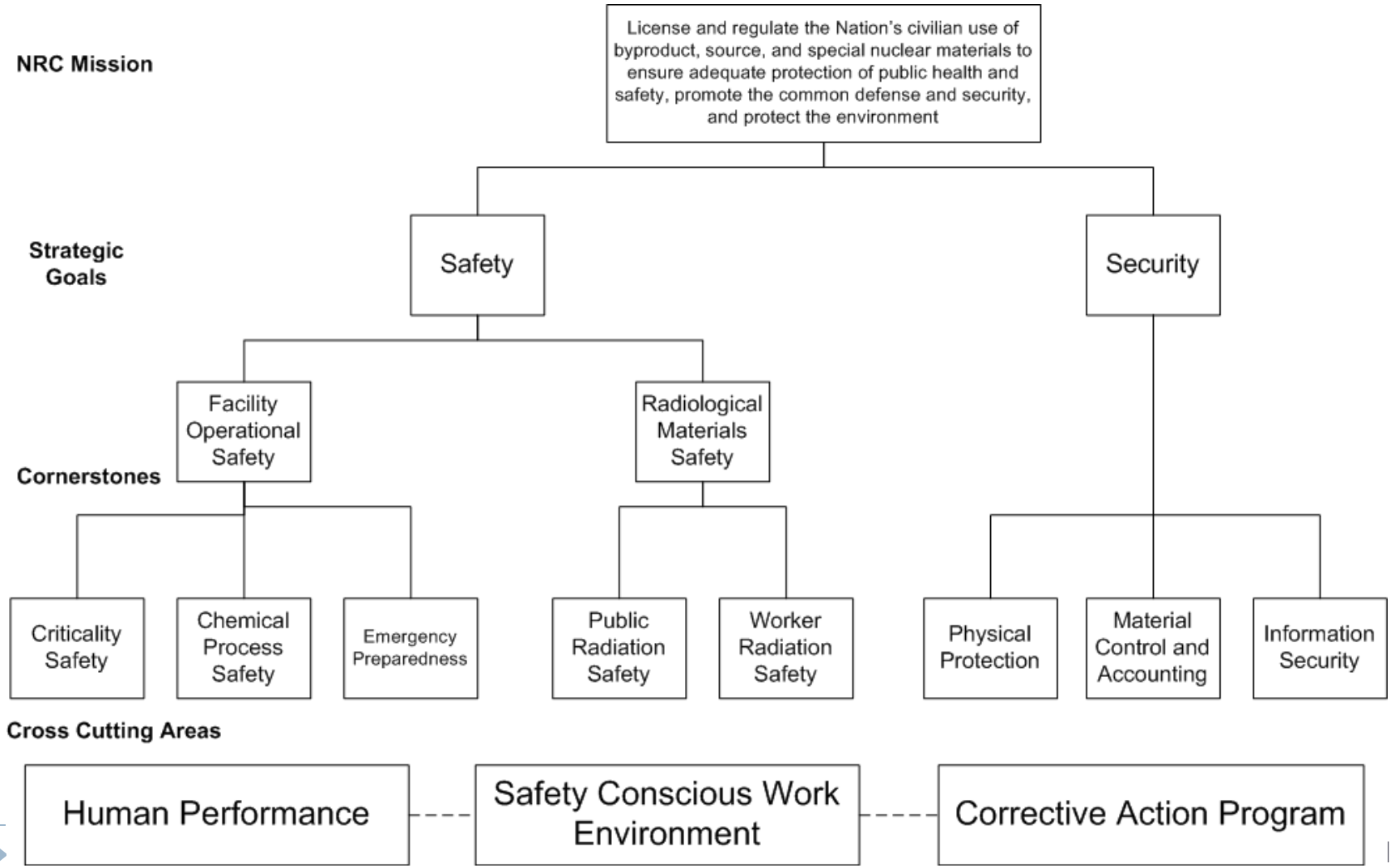
Enforcement Policy Revision

- Objectives of Revision
  - Per Commission's directive, "propose revisions to provide fuel cycle licensees with credit for effective corrective action programs".
  - Credit (NCV Enforcement Policy) for effective CAP similar to that applied to power reactors
  - Keep it simple

Enforcement Policy Revision

- In keeping with objectives and for consistency and clarity, staff recommend:
  - Modify Policy by changing title of section 2.3.2.a to include certain fuel cycle facilities as defined in footnotes
  - Footnotes would clarify that the fuel facilities to which this policy would be applied are those which have a CAP program that the NRC has independently determined by inspection to be effective as described in NMSS inspection manual

Cornerstones



Criticality Safety Cornerstone

- Objective - ensure that nuclear criticality safety (NCS) controls and items relied on for safety (IROFS) protect worker and public health and safety by preventing criticalities. This includes ensuring adequate NCS analyses and ensuring the availability, reliability, and capability of NCS controls and IROFS.

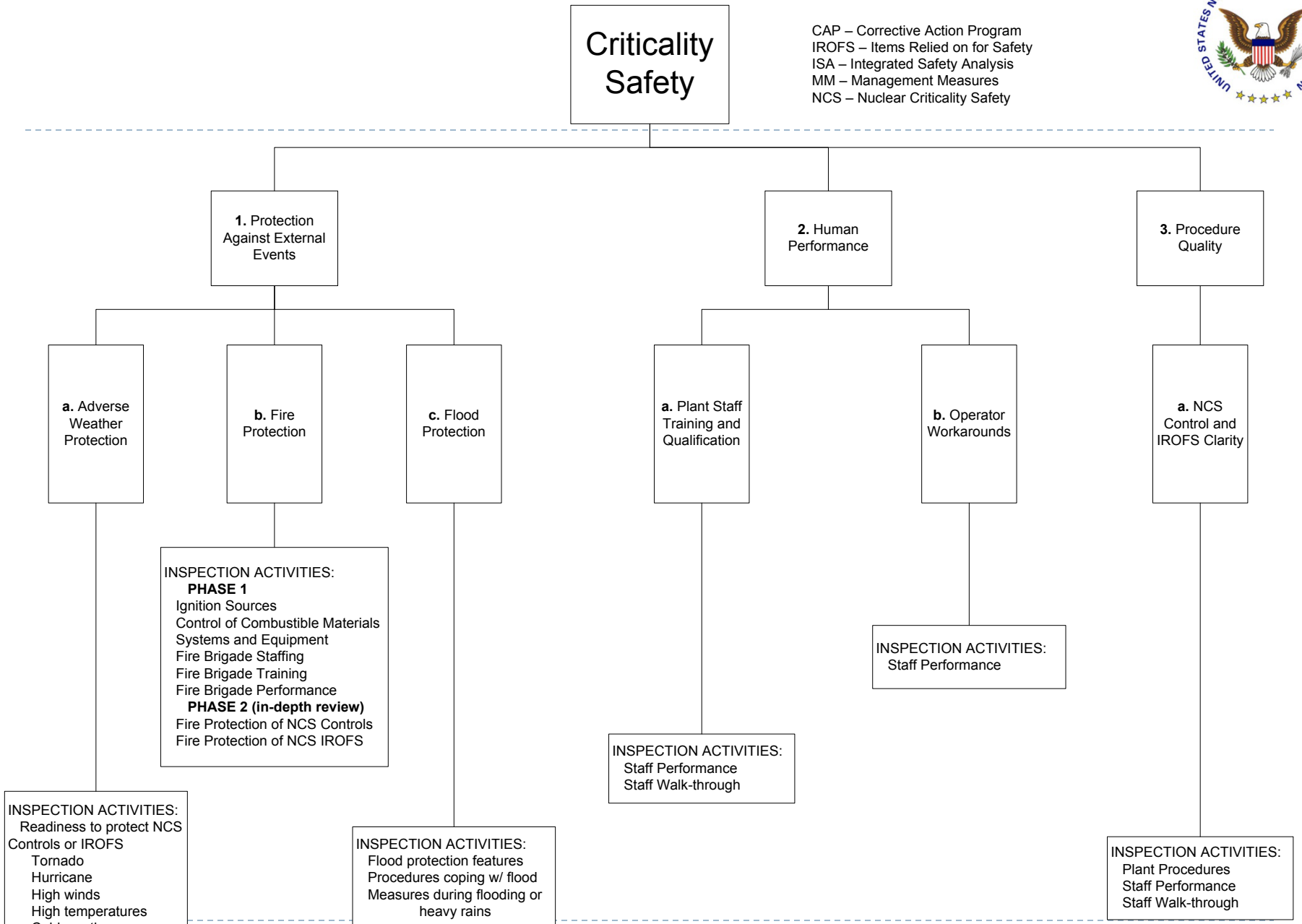
- Desired results - demonstration that there is reasonable assurance that inadvertent nuclear criticality events will be prevented.

- Key Attributes and Scope of inspection – see diagram.

- Metrics – regulations, license, ISA , or safety analysis.

Criticality Safety

CAP – Corrective Action Program
IROFS – Items Relied on for Safety
ISA – Integrated Safety Analysis
MM – Management Measures
NCS – Nuclear Criticality Safety



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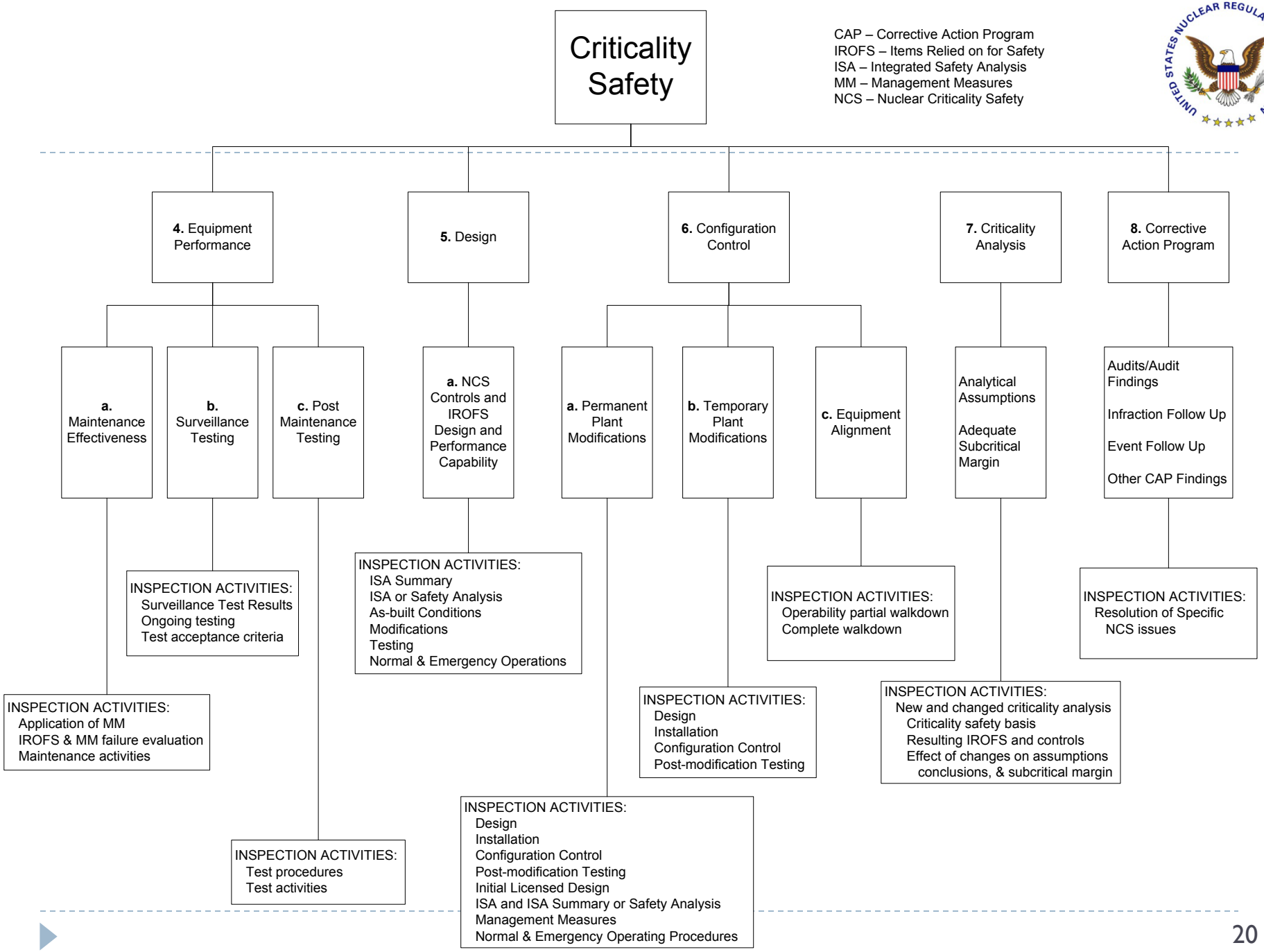

Chemical Process Safety Cornerstone

- Objective - ensure that chemical process safety IROFS or controls protect worker and public health and safety by preventing and or controlling chemical releases (for those chemicals under NRC jurisdiction per the Memorandum of Understanding (MOU) with the Occupational Health and Safety Administration (OSHA)) that could cause intermediate or high consequences (as defined in 10 CFR Part 70). This includes ensuring adequate chemical process safety analyses and ensuring the availability, reliability, and capability of chemical process safety controls or IROFS.

- Desired results - demonstration that there is reasonable assurance that chemical process upsets do not affect the safe handling of licensed materials, and that workers, members of the public, and the environment are protected from chemical and radiological effects of licensed materials, hazardous chemicals produced from processing licensed materials, and plant conditions which affect the safety of licensed materials (those areas under the NRC/OSHA MOU). Chemical impacts and any resultant radiological impacts from accidents are less than those defined in 10 CFR Part 70 or the safety analysis.

- Key Attributes and Scope of inspection – see diagram.

- Metrics – regulations, license, ISA or safety analysis.

Chemical Process Safety

CAP – Corrective Action Program
CPS – Chemical Process Safety
IROFS – Items Relied on for Safety
ISA – Integrated Safety Analysis
MM – Management Measures

1. Protection Against External Events

- **a.** Adverse Weather Protection
  - INSPECTION ACTIVITIES:
    - Readiness to protect CPS Controls or IROFS
      - Tornado
      - Hurricane
      - High winds
      - High temperatures
      - Cold weather
      - Other adverse weather
- **b.** Fire Protection
  - INSPECTION ACTIVITIES:
    - **PHASE 1**
    - Ignition Sources
    - Control of Combustible Materials
    - Systems and Equipment
    - Fire Brigade Staffing
    - Fire Brigade Training
    - Fire Brigade Performance
    - **PHASE 2 (in-depth review)**
    - Fire Protection of CPS Controls
    - Fire Protection of CPS IROFS
- **c.** Flood Protection
  - INSPECTION ACTIVITIES:
    - Flood protection features
    - Procedures coping w/ flood
    - Measures during flooding or heavy rains

2. Human Performance

- **a.** Plant Staff Training and Qualification
  - INSPECTION ACTIVITIES:
    - Staff Performance
    - Staff Walk-through
- **b.** Operator Workarounds
  - INSPECTION ACTIVITIES:
    - Staff Performance

3. Procedure Quality

- **a.** CPS Control or IROFS Clarity
  - INSPECTION ACTIVITIES:
    - Plant Procedures
    - Staff Performance
    - Staff Walk-through

Chemical Process Safety

CAP – Corrective Action Program
CPS – Chemical Process Safety
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4. Equipment Performance

a. Maintenance Effectiveness

INSPECTION ACTIVITIES:
- Application of MM
- IROFS & MM failure evaluation
- Maintenance activities

b. Surveillance Testing

INSPECTION ACTIVITIES:
- Surveillance Test Results
- Ongoing testing
- Test acceptance criteria

c. Post Maintenance Testing

INSPECTION ACTIVITIES:
- Test procedures
- Test activities

5. Design

a. CPS Controls or IROFS Design and Performance Capability

INSPECTION ACTIVITIES:
- ISA Summary
- ISA or Safety Analysis
- As-built Conditions
- Modifications
- Testing
- Normal & Emergency Operations

6. Configuration Control

a. Permanent Plant Modifications

INSPECTION ACTIVITIES:
- Design
- Installation
- Configuration Control
- Post-modification Testing
- Initial Licensed Design
- ISA and ISA Summary or Safety Analysis
- Management Measures
- Normal & Emergency Operating Procedures

b. Temporary Plant Modifications

INSPECTION ACTIVITIES:
- Design
- Installation
- Configuration Control
- Post-modification Testing

c. Equipment Alignment

INSPECTION ACTIVITIES:
- Operability partial walkdown
- Complete walkdown

7. Corrective Action Program

- Audits/Audit Findings
- Infraction Follow Up
- Event Follow Up
- Other CAP Findings

INSPECTION ACTIVITIES:
- Resolution of Specific CPS issues

Emergency Preparedness Cornerstone

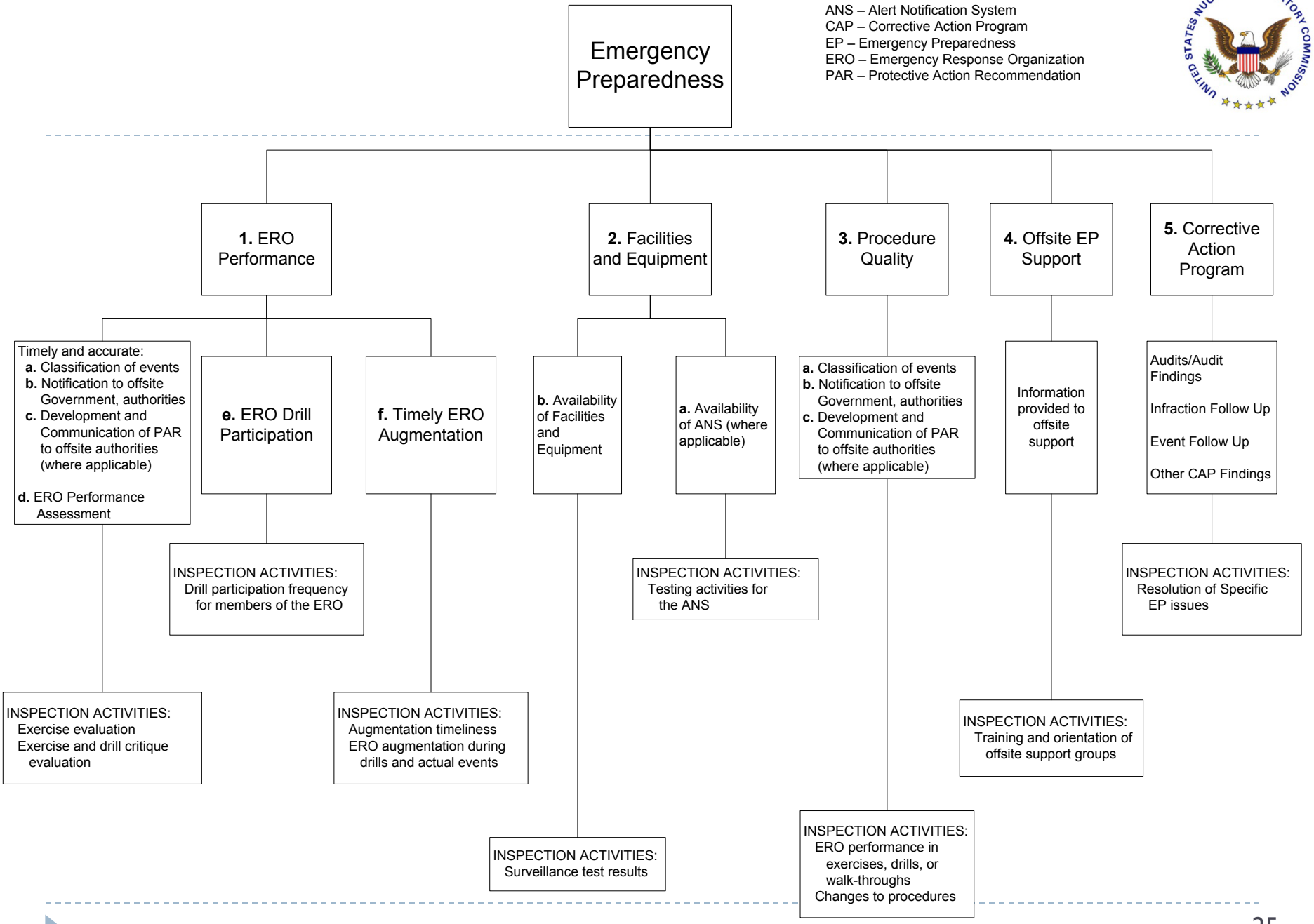
- Objective - ensure that the license is capable of implementing adequate measures to protect public health and safety in the event of a radiological or chemical emergency (for those chemicals under NRC jurisdiction).

- Desired results - demonstration that there is reasonable assurance that the licensee can effectively implement its emergency plan to adequately protect the public health and safety in the event of a radiological or chemical emergency.

- Key Attributes and Scope of inspection – see diagram.

- Metrics – regulations, license, and Emergency Plan.

ANS – Alert Notification System
CAP – Corrective Action Program
EP – Emergency Preparedness
ERO – Emergency Response Organization
PAR – Protective Action Recommendation



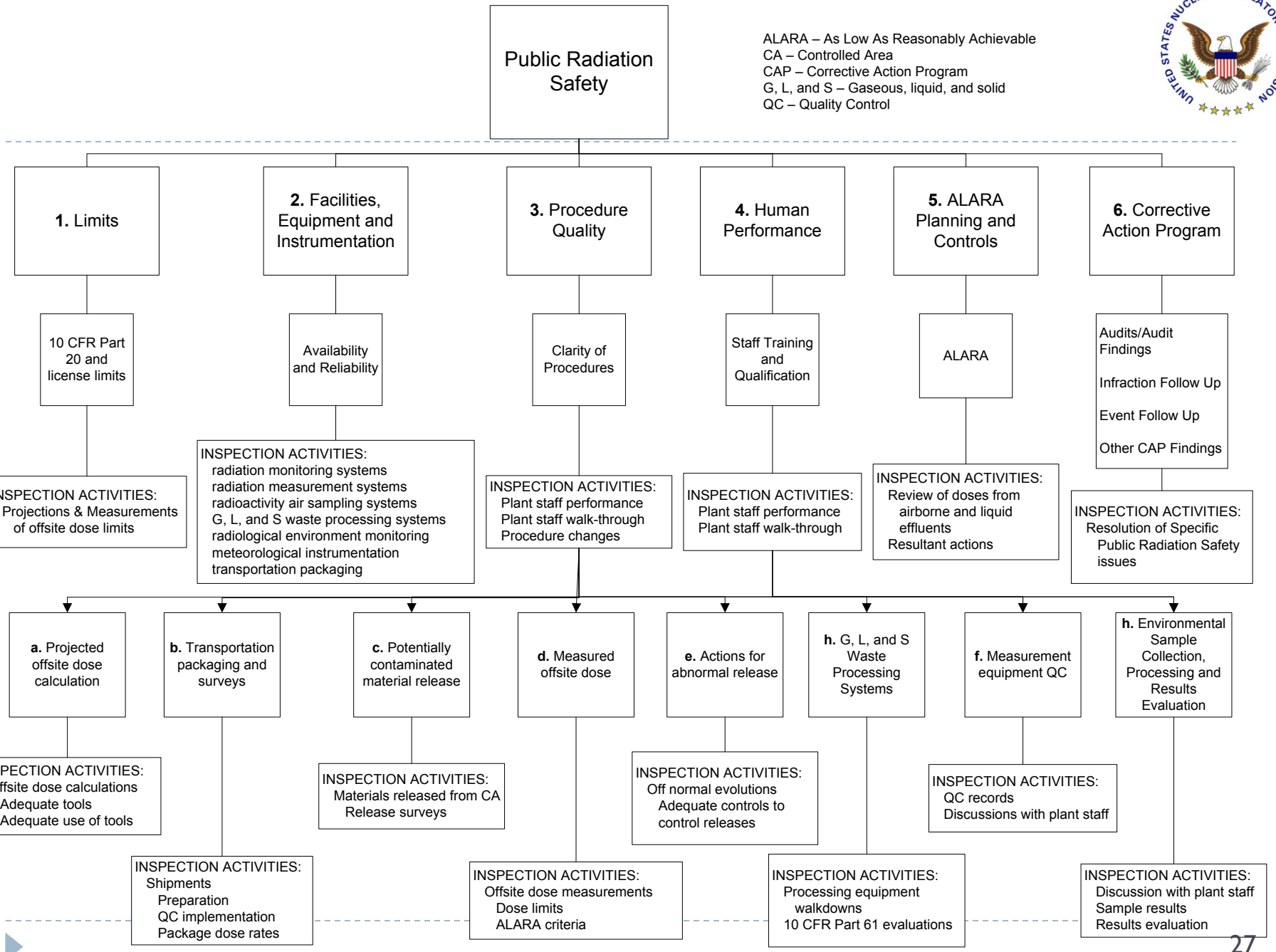
Public Radiation Safety Cornerstone

- Objective - ensure adequate protection of public health and safety from exposure to radioactive effluents from normal (non-accident) plant operations.

- Desired results - demonstration that there is reasonable assurance that members of the public and the environment are protected from exposure to radioactive material (for non-accident situations) such that the requirements in 10 CFR Parts 20, 61, and 71 and license conditions are met and that doses are as low as is reasonably achievable (ALARA).

- Key Attributes and Scope of inspection – see diagram.

- Metrics – regulations and license.


Public Radiation Safety
ALARA – As Low As Reasonably Achievable
CA – Controlled Area
CAP – Corrective Action Program
G, L, and S – Gaseous, liquid, and solid
QC – Quality Control
1. Limits
2. Facilities, Equipment and Instrumentation
3. Procedure Quality
4. Human Performance
5. ALARA Planning and Controls
6. Corrective Action Program
10 CFR Part 20 and license limits
Availability and Reliability
Clarity of Procedures
Staff Training and Qualification
ALARA
Audits/Audit Findings
Infraction Follow Up
Event Follow Up
Other CAP Findings
INSPECTION ACTIVITIES:
Projections & Measurements of offsite dose limits
INSPECTION ACTIVITIES:
radiation monitoring systems
radiation measurement systems
radioactivity air sampling systems
G, L, and S waste processing systems
radiological environment monitoring
meteorological instrumentation
transportation packaging
INSPECTION ACTIVITIES:
Plant staff performance
Plant staff walk-through
Procedure changes
INSPECTION ACTIVITIES:
Plant staff performance
Plant staff walk-through
INSPECTION ACTIVITIES:
Review of doses from airborne and liquid effluents
Resultant actions
INSPECTION ACTIVITIES:
Resolution of Specific Public Radiation Safety issues
a. Projected offsite dose calculation
b. Transportation packaging and surveys
c. Potentially contaminated material release
d. Measured offsite dose
e. Actions for abnormal release
h. G, L, and S Waste Processing Systems
f. Measurement equipment QC
h. Environmental Sample Collection, Processing and Results Evaluation
INSPECTION ACTIVITIES:
Offsite dose calculations
Adequate tools
Adequate use of tools
INSPECTION ACTIVITIES:
Shipments
Preparation
QC implementation
Package dose rates
INSPECTION ACTIVITIES:
Materials released from CA
Release surveys
INSPECTION ACTIVITIES:
Offsite dose measurements
Dose limits
ALARA criteria
INSPECTION ACTIVITIES:
Off normal evolutions
Adequate controls to control releases
INSPECTION ACTIVITIES:
Processing equipment walkdowns
10 CFR Part 61 evaluations
INSPECTION ACTIVITIES:
QC records
Discussions with plant staff
INSPECTION ACTIVITIES:
Discussion with plant staff
Sample results
Results evaluation

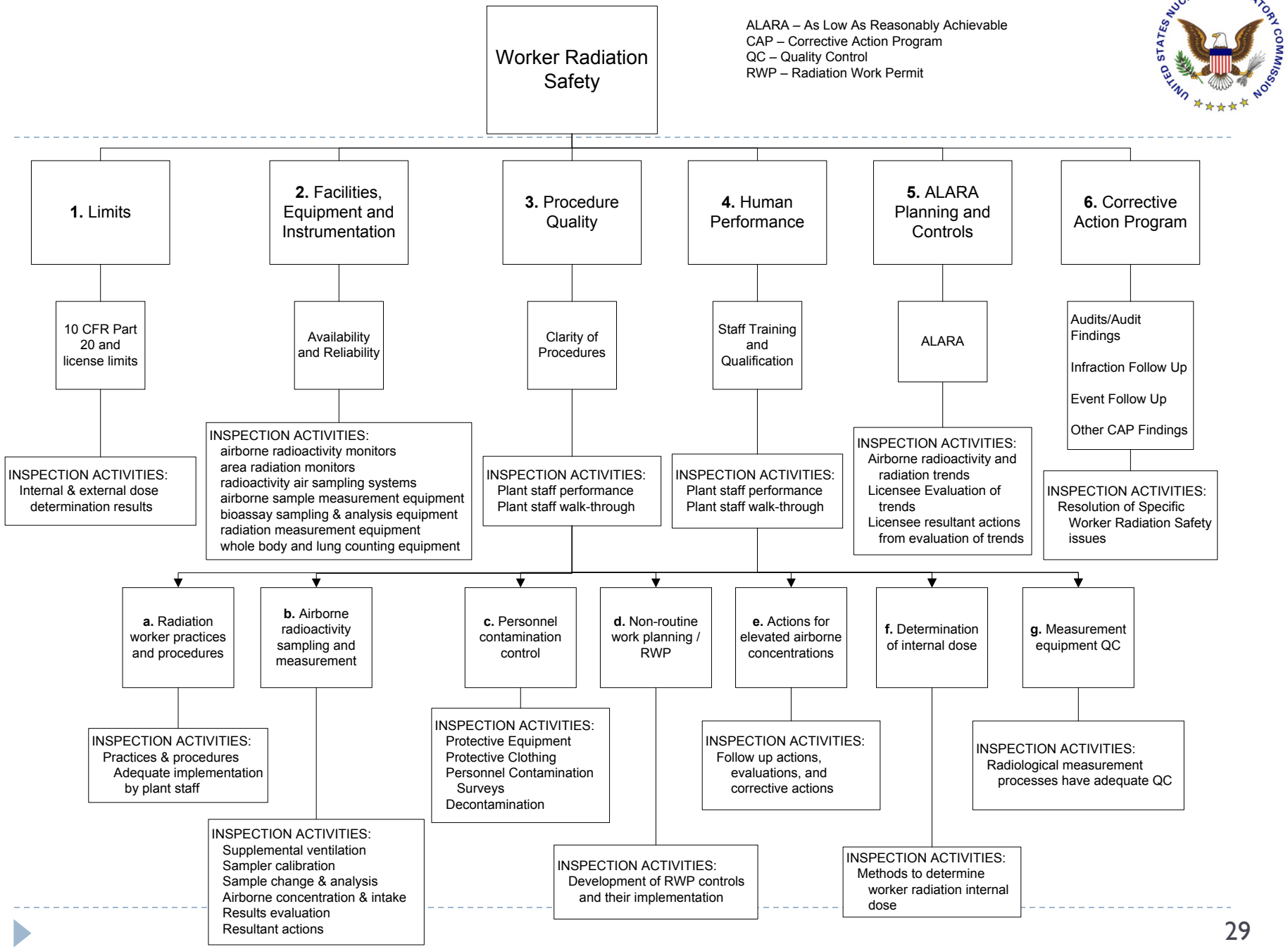
Worker Radiation Safety Cornerstone

- Objective - ensure adequate protection of worker health and safety from exposure to radiation and radioactive materials during normal (non-accident) fuel cycle facility operation.

- Desired results - demonstration that there is reasonable assurance that workers are protected from exposure to radiation and radioactive materials (for non-accident situations) such that the limits in 10 CFR Part 20 and in license conditions are met and that such doses are ALARA.

- Key Attributes and Scope of inspection – see diagram.

- Metrics – regulations and license.


Worker Radiation Safety
ALARA – As Low As Reasonably Achievable
CAP – Corrective Action Program
QC – Quality Control
RWP – Radiation Work Permit
1. Limits
2. Facilities, Equipment and Instrumentation
3. Procedure Quality
4. Human Performance
5. ALARA Planning and Controls
6. Corrective Action Program
10 CFR Part 20 and license limits
Availability and Reliability
Clarity of Procedures
Staff Training and Qualification
ALARA
Audits/Audit Findings
Infraction Follow Up
Event Follow Up
Other CAP Findings
INSPECTION ACTIVITIES:
Internal & external dose determination results
INSPECTION ACTIVITIES:
airborne radioactivity monitors
area radiation monitors
radioactivity air sampling systems
airborne sample measurement equipment
bioassay sampling & analysis equipment
radiation measurement equipment
whole body and lung counting equipment
INSPECTION ACTIVITIES:
Plant staff performance
Plant staff walk-through
INSPECTION ACTIVITIES:
Plant staff performance
Plant staff walk-through
INSPECTION ACTIVITIES:
Airborne radioactivity and radiation trends
Licensee Evaluation of trends
Licensee resultant actions from evaluation of trends
INSPECTION ACTIVITIES:
Resolution of Specific Worker Radiation Safety issues
a. Radiation worker practices and procedures
b. Airborne radioactivity sampling and measurement
c. Personnel contamination control
d. Non-routine work planning / RWP
e. Actions for elevated airborne concentrations
f. Determination of internal dose
g. Measurement equipment QC
INSPECTION ACTIVITIES:
Practices & procedures
Adequate implementation by plant staff
INSPECTION ACTIVITIES:
Supplemental ventilation
Sampler calibration
Sample change & analysis
Airborne concentration & intake
Results evaluation
Resultant actions
INSPECTION ACTIVITIES:
Protective Equipment
Protective Clothing
Personnel Contamination Surveys
Decontamination
INSPECTION ACTIVITIES:
Development of RWP controls and their implementation
INSPECTION ACTIVITIES:
Follow up actions, evaluations, and corrective actions
INSPECTION ACTIVITIES:
Methods to determine worker radiation internal dose
INSPECTION ACTIVITIES:
Radiological measurement processes have adequate QC

Integrated Schedule

- Integrated schedule under development
- Development of significance evaluation process and associated thresholds of performance, cross cutting areas, and regulatory response tool.
- Considerations for Pilot
  - Two cornerstones
    - Criticality safety and any other deterministic cornerstone
    - Consideration of facilities
  - Benchmark of significance evaluation process and associated thresholds of performance with past and hypothetical violations.