Concept for Open Circuit CBRN SCBA in combination with Non-Powered CBRN Air-Purifying Tight-Fitting respirators and/or Powered Air-Purifying Tight-Fitting respirators

I. General Requirements

- A. 42 CFR 84 requirements
 - 1. Subpart A: General Provisions
 - 2. Subpart B: Application for Approval
 - 3. Subpart D: Approval and Disapproval
 - 4. Subpart E: Quality Control
 - 5. Subpart F: Classification of Approved Respirators
 - 6. Subpart G: General Construction and Performance

B. No type of disconnection or reconnection shall be permitted which could in anyway open the breathing circuit to ambient air when switching modes of operation

C. Breathing circuits must be designed such that no backflow can occur from one mode to the other, including during switching operations

D. Powered air purifying combination units must function and meet all of the requirements for non-powered units in the event of blower failure

II. Combination Unit Specific Requirements:

A. Indicator of Operation Mode: Each respirator has an indicator which identifies to the user the mode of operation (air purifying or air supplied).B. The indicator must be distinguished and be readily apparent to the user without manipulation of the respirator by the user.

C. Entire combination unit, when operated in any mode, must properly and acceptably function when subjected to most stringent tests/conditioning applicable to either combination

III. Breathing Resistance, Canister:

A. Breathing Resistance will use criteria established in the CBRN APR standard

IV. Field of View:

A. Visual Field Score (VFS) will be established in accordance with the existing CBRN APR method

V. Lens Material Haze, Luminous Transmittance and Abrasion Resistance:

A. The Material Haze, Luminous Transmittance and Abrasion Resistance will be established in accordance with the existing CBRN APR method

VI. Carbon Dioxide:

A. maximum allowable average inhaled carbon dioxide concentration less than or equal to 1% operated in any mode including PAPR blower off as tested in accordance with existing NIOSH STPs

VII. Hydration (if so equipped):

A. Hydration systems will be tested using existing CBRN APR requirements

VIII. Canister Test Challenge and Test Breakthrough Concentrations:

- A. Only canisters permitted.
- B. Gas/vapor test challenges and breakthrough concentrations will be established using the CBRN APR standard criteria

IX. Canister Capacity:

A. In accordance with CBRN APR or CBRN PAPR standard requirements.

X. Particulate/Aerosol Canister:

A. In accordance with CBRN APR or CBRN PAPR standard requirements.

XI. Service Life Testing, High Flow:

A. Each canister of non-powered systems to provide minimum service life time of 5 minutes when tested at a flow rate of 100 liters per minute, 50+- 5 percent relative humidity and $25 + 5^{\circ}$ C for each of the gases/vapors.

XII. Low Temperature/Fogging:

A. The low temperature/fogging requirements will be established using the CBRN APR standard criteria.

B. Respirator must perform properly in all operating modes.

C. All indicators, alarms, etc. must function as intended, remain accurate, and clearly indicate desired information

XIII. Communications:

A. Communication requirements will be established using the CBRN APR standard criteria

XIV. Durability Conditioning (environmental, transportation shock and survivability):

- A. NIOSH STP CBRN-0311
- B. Applies to entire respirator (including SCBA portion) except drop test

C. Containers: subjected to conditioning in manufacturer-specified minimum packaging configuration.

D. Only canisters subjected to drop test in its designated minimum packaging configuration.

E. User's instructions (UI) shall identify minimum packaging configuration F. Over cases may not be a substitute for the minimum packaging configuration and will not be used in durability conditioning of the application

XV Gasket, Mechanical Connector:

A. Applies to non-powered only

B. Rubber Gasket Physical and Chemical Properties meet requirements as identified in CBRN APR standard

XVI. Canister Dimensions and Weight

- A. Applies to APR for face mask mounted canisters only for compliance with APR Interoperability.
- B. Meets requirements identified in the CBRN APR standard

XVII. Tolerance Analysis:

- A. Criteria will be established using the CBRN APR standard criteria.
- B. Combination SCBA/APR/PAPR will require interoperability.

XVIII. Practical Performance: Modified Laboratory Protection Level (LRPL) Test:

A. For all- Tested in the heaviest and fully accessorized configuration

B. For non-powered LRPL \geq 2000 for requested configuration

C. For non-powered for compliance with APR Interoperability: Modified LRPL performed using additional respirators fitted with a canister weighted to 500 grams and sized to the maximum (8 additional tests same as APR) LRPL \geq 2000 D. For powered: LRPL \geq 10,000 in heaviest and fully accessorized configuration

XIX. Chemical Agent Permeation and Penetration Resistance Against Distilled Mustard (HD) and Sarin (GB) Agent Test Requirement

A. Requirements will be established using the CBRN SCBA standard criteria

XX. Other areas.

- A. Additional requirements may be added.B. Requirements above may be modified.