1. FACILITIES
   - A. Sufficient space for refractive index liquids, chemical storage, and sample receiving.
   - B. Space available for processing reports.
   - C. Facilities clean, with adequate lighting, ventilation and reasonably free from dust and drafts.
   - D. Negative flow velocity of 100 ft/min monitored in biohazard/asbestos hoods equipped with HEPA filters pores 0.2 µm.
   - E. A table for optical properties of asbestos-form minerals.
   - F. Date HEPA filter changed: _____________________
   - G. Maintenance of a contamination-free, asbestos-controlled work space.

COMMENTS: __________________________________________

2. COLLECTION PROCEDURES
   - A. Samples for analysis of asbestos content.
   - B. Proper and legible sample identification, includes:
      - 1. Type of sample
      - 2. Location
      - 3. Date of sampling
      - 4. Time
      - 5. Collector
   - C. Written sampling instructions available for collection personnel.
   - D. Instructions acceptable in detail and accuracy.

COMMENTS: __________________________________________

3. LABORATORY RECORDS
   - A. Results available for inspection.
   - B. Notification log maintained including the date, time and person notified (esp. for commercial laboratories!).
   - C. All records and raw data retained for 5 years.
   - D. Acceptable reporting form for recording results.

COMMENTS: __________________________________________

4. INSTRUMENTATION AND EQUIPMENT
   - A. Sample Container
      - 1. Container type: □ Plastic bag, or wide mouth plastic container
         □ Other: __________________________________________
      - 2. Sample containers in good condition.
      - 3. Cleanliness check done on each batch of containers.
   - B. Polarized Light Microscopy (PLM)
      - 1. The substage polarizer and the analyzer are oriented at 90 degrees to one another. (The requirements are that the orientations are known, that they are normal to one another, and that the accessory slot be 45° to the privileged directions of the polarizer and analyzer).
      - 2. The ocular crosshairs coincide with the privileged directions of the polarizer and the analyzer.
3. The objectives are centered to prevent any grains from leaving the field of view during stage rotation.
4. The substage condenser and iris diaphragm are centered in the optic axis.
5. Binocular or monocular with cross hair reticle and objectives with magnifications of 10X, 20X, 40X.
6. Dispersion staining objective.
7. Light source: ____________, filter available:

C. 1. Sampling Utensils (razor knives, forceps, probes, needles, etc.).
2. Mortar and pestle.

D. 1. Instrument operation manual complete and available to the analyst.
2. Written instrument operating conditions established and available to the analyst.
3. Instruments are in good operating condition, with repair and maintenance logs kept.
4. Proper venting for all instruments.

COMMENTS: __________________________________________________________

5. SAMPLE PREPARATION
   A. Log of sample preparation maintained and includes the following:
      Date
      Sample ID No.
      Sampler preparer
      Teased apart
      Crushed, milling, sifting
      Physical treatment: Matrix dissolved with solvent:
      Heat treatment: ashed at _______ C, in
      Chemical treatment: matrix washed with:
   B. By using forceps to sample at several places from the bulk material
      Forcep samples are immersed in a refractive index liquid on a microscopic slide, teased apart
      To homogenize the sample or eliminate interferences
      Ashing: sample not heated over 500°C

COMMENTS: __________________________________________________________

6. CALIBRATION PROCEDURES
   A. Standard refractive index liquids for 1.490 - 1.570, and 1.590 - 1.720 log maintained; source, lot. number, date calibrated, and expiration date.
   B. Refractive index liquids for dispersion staining 1.550, 1.605, 1.630.
   C. Asbestos Reference Sample set; from:
      Amosite-asbestos/source:
      Tremolite-asbestos/source:
      Actinolite-asbestos/source:
   D. PLM microscope alignment procedures completed. (Centering the stage, orientation of the polars, Kohler illumination alignment).

COMMENTS: __________________________________________________________

7. FIBER IDENTIFICATION, SEMI-QUANTITATION
Analysts determine and record the following optical and other physical properties.
   A. Laboratory Blanks (using asbestos-free materials, friable, non-friable, etc.).
   B. For bulk examination:
      1. Homogeneity
      2. Texture
      3. Color

COMMENTS: __________________________________________________________

AS - 2 01/95
C. For PLM examination:
   □ 1. Morphology
   □ 2. Color and pleochroism.
   □ 3. Index of refraction parallel and perpendicular to elongation.
   □ 5. Extinction characteristics.
   □ 7. Other distinguishing characteristics.
   □ 8. Estimated amount of asbestos.
   □ 9. Results of analysis (see TEST REPORT).

COMMENTS:

8. QUANTITATION OF ASBESTOS CONTENT BY POINT-COUNTING METHOD
   □ A. Quantitation is performed by a point-counting procedure.
   □ B. Use an ocular reticle (cross-hair or point array).
   □ C. Record the number of points.
   □ D. Score only points directly over asbestos fibers or nonasbestos matrix material.
   □ E. “Asbestos fibers” are defined as: __________________________________________
   □ F. Must count a total of 400 points over at least eight (8) different preparations.
   □ G. Count fifty (50) non-empty points on each preparation using:
      □ 1. A cross-hair reticle and mechanical stage; or
      □ 2. A reticle with 25 points (chalkley point array).
   □ H. Samples with mixtures of isotropic and anisotropic materials.
   □ I. The percent asbestos is calculated as follows (in point-counting):
      □ 1. \( \% \text{ asbestos} = \frac{a}{n} \times 100\% \)
         \( a \) = number of asbestos counts
         \( n \) = number of non-empty points counted (400)
      □ 2. If \( a = 0 \), report “no asbestos detected”
      □ 3. If \( 0 < a \leq 3 \), report “< 1% asbestos

COMMENTS:

9. QUALITY CONTROL
   □ A. Quality Assurance plan up-to-date and accessible to analyst.
   □ B. Detection Limits (RLs and DLRs) are well-documented and reasonable.
   □ C. Replicates:
      □ 1. 10% or at least once per batch.
      □ D. Confirmation of the qualitative and quantitation results by a second analyst, done by separate mounting of slides.

COMMENTS:

10. TEST REPORTS
   □ A. Procedures are by acceptable methods and are referenced in final report.
   □ B. The following is reported for each sample:
      □ 1. A statement is made if the sample is inhomogeneous, and subsamples of the components were analyzed separately.
      □ 2. Physical description of the sample.
      □ 4. Estimate of the relative abundance of each type of asbestos present.
      □ 5. Identity of other fibrous materials and matrix materials.
      □ 6. Estimate of the relative abundance of other fibrous materials present.
      □ 7. Analysis date.
   □ C. Separate components (e.g. layers) are reported separately and are combined in proportion to their
abundances and a single analysis is provided for the sample.

☐ D. If analyses contracted out to another laboratory, the name of that laboratory should be listed.

COMMENTS: ____________________________________________________________

☐ 11. A. TYPES OF PROFICIENCY ANALYTICAL TESTING PROGRAM THE LABORATORY PARTICIPATED:

☐ 1. Research Triangle Institute (RTI) (919) 541-6800
☐ 2. American Industrial Hygiene Association (AIHA) (216) 873-AIHA
☐ 3. National Institute of Standards and Technology (NIST)
☐ 4. Other:

B. Results of the latest round of PE samples.

☐ 1. PE sample I.D.:
☐ 2. Acceptable items:
☐ 3. Not acceptable items:

COMMENTS: ____________________________________________________________

☐ 12. METHOD REFERENCES AVAILABLE IN THE LABORATORY:

☐ A. General reference text on optical mineralogy or crystallography.


☐ C. ASTM standard method of testing for Asbestos Containing Materials by Polarized Light Microscopy, ASTM D22.05.

☐ D. Interim method for the Determination of Asbestos in Bulk Insulation Samples, EPA-600/M4-82-020 December 1982.


☐ I. NIOSH Method 7400 (counting fibers in air).

COMMENTS: ____________________________________________________________

☐ 13. A. Number of analysts took PLM courses or its equivalent to detect asbestos in bulk samples:
From:

_________ McCrone Research Institute
_________ NIOSH
_________ ACS accredited University:
_________ or

In order to be qualified to make the laboratory operational, able to conduct polarized light microscopy and its application to crystalline materials including the measurement of the index of refraction by the immersion method through Becke line technique and/or dispersion staining, each laboratory must have at least one such trained analyst.

B. The laboratory maintains records of asbestos training for each of the staff members.

COMMENTS: ____________________________________________________________