NARRATIVE REPORT

1.0 **BUILDING INFORMATION**

South Engineering was originally constructed in 1907; a 1993 addition extended the building to the west. Although specific information could not be located, multiple renovations are evident.

South Engineering is a three-story, $35,500 \text{ ft}^2$ building which primarily serves as offices and classrooms for the science personnel.

The interior floor finishes included concrete, terrazzo, floor tile, and carpet; the interior wall finishes included gypsum wallboard, brick, concrete block, and plaster; and the interior ceiling finishes included ceiling tile, plaster, . The roofing system is a peaked shingled roof with the exterior of the structure being brick.

The piping systems were insulated; fiberglass insulation (without hard fittings), millboard pipe insulation (with residual hard fittings), and aircell pipe insulation (with hard fittings) are located in the building. HVAC systems located in the building consisted of steam unit heaters, steam radiators, and forced air furnaces equipped with heating/cooling coils.

2.0 ASBESTOS SURVEY INFORMATION

South Engineering was surveyed as part of a larger project on NDSU's Fargo, ND Campus. This report is part of "Volume 2" of a nine volume series. This report includes building specific information only; please refer to the opening section of "Volume 2" for methodologies, definitions, and other pertinent supporting information.

A total of 121 samples were collected from suspect asbestos-containing materials (ACM) from South Engineering on June 21, 2007 and an additional 11 samples were collected on April 18, 2008. Laboratory analysis results indicate **16 of these samples tested positive for asbestos**.

2.1 Suspect Materials Identified and Sampled

Aircell Pipe Insulation Millboard Pipe Insulation Hard Fittings on Millboard Insulation (residual) Strair Tread (2 types) Stair Tread Adhesive (2 types) Floor Tile (11 types) Floor Tile Mastic (10 types) Wire Insulation Penetration Putty Sink Undercoating (5 types) Carpet Mastic (4 types) Glue Puck (on chalkboards) **Textured Paint** Hard Plaster- Monocoat Hard Plaster- Basecoat Hard Plaster- Skimcoat Surfacing Material (brick pattern) Chalkboard Patch Material (2 types) Wall Patch Material Wall Texture (2 types) Gypsum Wallboard (8 types) Joint Compound (8 types) Baseboard Adhesive (2 types) Ceiling Tile (8 types) **Exterior Building Seam Caulk** Exterior Door Caulk Exterior Window Caulk Asphalt Shingle **Roof Tarpaper** Roof Flashing (2 types) **Roof Penetration Putty** Roof Caulk

The Asbestos Bulk Sample Results Table includes asbestos sampling data.

2.2 Asbestos Containing Materials

Aircell Pipe Insulation Millboard Pipe Insulation Hard Fittings on Millboard Insulation (residual) Mastic for 12" Gray Floor Tile with White/Brown Blotches Black Sink Undercoating (4 types) Glue Puck (on chalkboard) 12" Red Floor Tile Joint Compound (2 types) Roof Penetration Putty (around old chimney) Mastic for 12" Cream Floor Tile with Black Streaks Hard Fittings on Aircell Insulation (assumed) 9" Floor Tile and Mastic (assumed)

The ACM Locations/ Friable Materials Assessments Table includes ACM locations data.

2.3 Cost Estimates

Legend Technical Services Inc. estimates abatement costs (removal & disposal) of ACM for South Engineering as follows:

| ACM | QUANTITY | UNIT COST | TOTAL COST | | | | | |
|--|-----------------------|------------------------|-------------|--|--|--|--|--|
| Asbestos Aircell Pipe Insulation | 50 ft | \$25.00/ ft | \$1,250.00 | | | | | |
| Asbestos Millboard Pipe Insulation | 160 ft | \$25.00/ ft | \$4,000.00 | | | | | |
| Asbestos Floor Tile and/or Mastic | 7,340 ft ² | \$4.00/ft ² | \$29,360.00 | | | | | |
| Asbestos Sink Undercoating | 4 ea | \$150.00/ea | \$600.00 | | | | | |
| Asbestos Glue Pucks (on chalkboards) | 120 ft ² | \$7.50/ft ² | \$900.00 | | | | | |
| Asbestos Joint Compound | 1,238 ft ² | \$5.00/ft ² | \$6,190.00 | | | | | |
| Asbestos Penetration Putty | 1 ea | \$150.00/ea | \$150.00 | | | | | |
| Asbestos Hard Fittings on Aircell Insulation | 2 ea | \$25.00/ea | \$50.00 | | | | | |
| Total Abatement Cost: | | | | | | | | |

2.4 Survey Notes

LEGEND identified and sampled Joint Compound on gypsum wallboard from multiple renovation vintages in South Engineering. The joint compound associated with the renovations in rooms 212, 212A, 212B, and 212C and in rooms 220, 220A, 220B, and 220C tested positive for asbestos, only.

LEGEND identified and sampled a residual layer of hard fittings on millboard insulation in the crawlspaces; this residual material tested positive for asbestos. Due to the residual nature of the material, LEGEND was unable to accurately quantify the hard fittings on millboard insulation. The material was noted to be on the same pipes as the ACM millboard pipe insulation and should be abated while the ACM millboard pipe insulation is being abated.

LEGEND identified and sampled a 12" Gray Floor Tile with White/Brown Blotches in room 108/108A/108B with black mastic, room 118 with brown mastic, and room 208 with tan mastic.

The black mastic in room 108/108A/108B tested positive for asbestos, only; the black mastic may be a residual layer from a previous flooring installation. LEGEND recommends assuming the ACM black mastic to be present below all of room 108/108A/108B until a destructive survey can be conducted to verify the extent of the ACM black mastic.

LEGEND No. 0700048 (NDSU) SOUTH ENGINEERING (BUILDING A013)

| ROOM/ ACM | ASBESTOS TYPE | EST. QUANTITY | ACM TYPE | MATERIAL CONDITION | DAMAGE 다 전 프 POTENTIAL 전 인 보 | ASSESS. CAT. ¹ | NOTES |
|---|----------------|---------------------|------------------------------|-----------------------|---|------------------------------|---|
| Crawlspace | | | | | | | |
| Millboard Pipe Insulation | 80% Chrysotile | 160 ft | Friable TSI | Damaged | PhysicalImage: Image: Imag | 1 | The asbestos millboard pipe insulation is in the crawlspace areas. Refer to section 2.4 "Survey Notes" for further information. |
| Room 108 | | | | | | | |
| Mastic for 12" Gray Floor Tile with White/Brown | 5% Chrysotile | 390 ft ² | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The mastic for 12" floor tile contains asbestos; the floor tile is negative. |
| Room 108A | | | | | | | |
| Mastic for 12" Gray Floor Tile with White/Brown | 5% Chrysotile | 190 ft² | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The mastic for 12" floor tile contains asbestos; the floor tile is negative. |
| Room 108B | l | | | | | | |
| Mastic for 12" Gray Floor Tile with White/Brown | 5% Chrysotile | 175 ft² | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The mastic for 12" floor tile contains asbestos; the floor tile is negative. |
| Room 112 | | | • | | | • | |
| Aircell Pipe Insulation | 80% Chrysotile | 35 ft | Friable TSI | Damaged | PhysicalImage: Image: Imag | 1 | The asbestos aircell pipe insulation runs along the north and south ends of the room. |
| Hard Fittings on Aircell Insulation | Assumed | 2 each | Friable TSI | Damaged | Physical □□■ Air Erosion □■□ | 1 | None |

Hallway 188 Ramp abated May 2016

| Mastic for 12" Cream | 5% Chrysotile | 102 ft ² | Non-Friable | N/A* | N/A* | N/A* | The mastic for 12" floor tile contains asbestos; |
|-----------------------|---------------|---------------------|---------------|------|------|------|--|
| Floor Tile with Black | | | Miscellaneous | | | | the floor tile is negative. It is on the wheel chair |
| Streaks | | | | | | | ramp by room 108. |

Vibration

* = Non-Friable materials were not assessed

LEGEND No. 0700048 (NDSU) SOUTH ENGINEERING (BUILDING A013)

| ROOM/ ACMASBESTOS TYPEEST. QUANTITYACM TYPEMATERIAL CONDITIONDAMAGE POTENTIALS N S N S N S N | ASSESS. CAT. ¹ NOTES |
|---|------------------------------------|
|---|------------------------------------|

Room 210A

| ſ | Aircell Pipe Insulation | 80% Chrysotile | 15 ft | Friable | Damaged | Physical | 1 | The asbestos aircell pipe insulation runs from the |
|---|-------------------------|----------------|-------|---------|---------|-------------|---|--|
| | | | | TSI | | Air Erosion | | floor to the ceiling. |
| | | | | | | Vibration | | |

Room 212

| Joint Compound | 3% Chrysotile | 164 ft ² | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The asbestos joint compound is on the north wall (2 nd layer). |
|----------------|---------------|---------------------|------------------------------|------|------|------|---|
| | | | | | | | |

Room 212 A

| Joint Compound | 3% Chrysotile | 125ft ² | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The asbestos joint compound is on the south wall (2 nd layer). |
|----------------|---------------|--------------------|------------------------------|------|------|------|---|
| | | | | | | | |

Room 212B

| Joint Compound | 3% Chrysotile | 135ft ² | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The asbestos joint compound is on the south wall (2 nd layer). |
|----------------|---------------|--------------------|------------------------------|------|------|------|---|
| | | | | | | | |

Room 214

| Black Sink | 25% Chrysotile | 1 each | Non-Friable | N/A* | N/A* | N/A* | The asbestos undercoating is on a sink along the |
|--------------|----------------|--------|---------------|------|------|------|--|
| Undercoating | | | Miscellaneous | | | | east wall. |
| | | | | | | | |

Room 216B Removed Fall 2008

| Black Sink Undercoating | 8% Chrysotile | 1 each | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The asbestos undercoating is on a sink along the west wall. |
|----------------------------|---------------|--------|------------------------------|------|------|------|---|
| Undercoating | | | Wiscenarieous | | | | west wan. |

LEGEND No. 0700048 (NDSU) SOUTH ENGINEERING (BUILDING A013)

| ROOM/ ACM | ASBESTOS TYPE | EST. QUANTITY | ACM TYPE | MATERIAL CONDITION | DAMAGE 등 록 프 POTENTIAL ^{또 한 한} 한 부 | ASSESS. CAT. ¹ | NOTES |
|-----------------|---------------------|---------------------|---------------|-----------------------|--|------------------------------|--|
| Room 218 Abated | Jan 2015 Assumed | 188 ft ² | Non-Friable | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
| Mastic | | | Miscellaneous | | | | |

Room 220

| 9" Floor Tile and Mastic | Assumed | 142 ft ² | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
|-----------------------------|---------------|---------------------|------------------------------|------|------|------|---|
| Joint Compound | 3% Chrysotile | 289 ft ² | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The asbestos joint compound is located on west wall by room 220A. |

Room 220A

| 9" Floor Tile and Mastic | Assumed | 168 ft ² | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
|-----------------------------|---------------|---------------------|------------------------------|------|------|------|--|
| Joint Compound | 3% Chrysotile | 134 ft ² | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The asbestos joint compound is on the north half of the east wall and the east half of the north wall. |

Room 220B

| 9" Floor Tile and Mastic | Assumed | 192 ft² | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
|-----------------------------|---------------|---------------------|------------------------------|------|------|------|---|
| Joint Compound | 3% Chrysotile | 202 ft ² | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The asbestos joint compound is on the north wall and the north half of the west wall. |

LEGEND No. 0700048 (NDSU) SOUTH ENGINEERING (BUILDING A013)

| ROOM/ ACM | ASBESTOS TYPE | EST. QUANTITY | АСМ ТҮРЕ | MATERIAL CONDITION | DAMAGE 다 전 비율 POTENTIAL ^{또 한 한} 한 바 | ASSESS. CAT. ¹ | NOTES |
|-----------------------------|----------------|---------------------|------------------------------|-----------------------|---|------------------------------|---|
| Room 220C | | | | | | | |
| 9" Floor Tile and Mastic | Assumed | 114 ft ² | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
| Joint Compound | 3% Chrysotile | 189 ft² | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The asbestos joint compound is on the south wall and the south half of the east wall. |
| | Room 221, Abat | |) | | | a. / a.* | |

9" Floor Tile and Mastic Assumed 680 ft² Non-Friable Miscellaneous N/A* N/A* N/A*

Hallway 288

| 9" Floor Tile and | Assumed | 873 ft² | Non-Friable | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
|-------------------|---------|---------|---------------|------|------|------|--|
| Mastic | | | Miscellaneous | | | | |
| | | | | | | | |

Room 305 Abated May 2013

| 9" Floor Tile a | nd Assumed | 57 ft ² | Non-Friable | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
|-----------------|------------|--------------------|---------------|------|------|------|--|
| Mastic | | | Miscellaneous | | | | |
| | | | | | | | |

Room 306 Abated May 2013

| 9" Floor Tile and | Assumed | 50 ft ² | Non-Friable | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
|-------------------|---------|--------------------|---------------|------|------|------|--|
| Mastic | | | Miscellaneous | | | | |
| | | | | | | | |

Room 308

| Glue Puck (on | 10% Chrysotile | 40 ft ² | Non-Friable | N/A* | N/A* | N/A* | The asbestos glue puck is behind the |
|---------------|----------------|--------------------|---------------|------|------|------|--|
| chalkboards) | | | Miscellaneous | | | | chalkboards on the south and east walls. |
| | | | | | | | |
| | | | | | | | |

LEGEND No. 0700048 (NDSU) SOUTH ENGINEERING (BUILDING A013)

| ROOM/ ACM | ASBESTOS TYPE | EST. QUANTITY | ACM TYPE | MATERIAL CONDITION | DAMAGE | ASSESS. CAT. ¹ | NOTES |
|-------------------------------|-----------------|---------------------|------------------------------|-----------------------|--------|------------------------------|---|
| Room 310 | | | | | | | |
| 9" Floor Tile and Mastic | Assumed | 363 ft² | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
| Black Sink Undercoating | 10% Chrysotile | 1 each | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The asbestos undercoating is on a sink along the east wall of the room. |
| Room 312 | | | 1 | | | | |
| Glue Puck (on chalkboards) | 10% Chrysotile | 40 ft ² | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The asbestos glue puck is behind the chalkboards on the south and west walls. |
| Room 314 East Ab | ated May 2013 |] | | | | | |
| 9" Floor Tile and Mastic | Assumed | 750 ft ² | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
| Room 314 West | Room 304) Abate | d May 2013 | 1 | 1 | | | 1 |
| 9" Floor Tile and Mastic | Assumed | 57 ft² | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |

Room 316

| Glue Puck (on | 10% Chrysotile | 40 ft ² | Non-Friable | N/A* | N/A* | N/A* | The asbestos glue pucks are behind the black |
|---------------|----------------|--------------------|---------------|------|------|------|--|
| chalkboards) | | | Miscellaneous | | | | boards on the north and west walls. |
| | | | | | | | |

Room 318 (including the east and west sections of the room) Abated March 2015

| | | the cast and mests | | | | | | |
|---|-------------------|--------------------|---------------------|---------------|------|------|------|--|
| | 9" Floor Tile and | Assumed | 479 ft ² | Non-Friable | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
| | Mastic | | | Miscellaneous | | | | |
| | | | | | | | | |
| L | | | | | | | | |

* = Non-Friable materials were not assessed

LEGEND No. 0700048 (NDSU) SOUTH ENGINEERING (BUILDING A013)

| ROOM/ ACM | ASBESTOS TYPE | EST. QUANTITY | ACM TYPE | MATERIAL CONDITION | DAMAGE 다 정 프 POTENTIAL 영 단 다 | ASSESS. CAT. ¹ | NOTES |
|----------------------------|----------------|------------------|------------------------------|-----------------------|---------------------------------|------------------------------|---|
| Black Sink Undercoating | 12% Chrysotile | 1 each | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The asbestos undercoating is on a sink along the west wall in the west section of the room. |

Room 318A Abated March 2015

| 9" Floor Tile and | Assumed | 133 ft ² | Non-Friable | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
|-------------------|---------|---------------------|---------------|------|------|------|--|
| Mastic | | | Miscellaneous | | | | |
| | | | | | | | |

Room 318B Abated March 2015

| 9" Floor Tile an | t Assumed | 112 ft ² | Non-Friable | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
|------------------|-----------|---------------------|---------------|------|------|------|--|
| Mastic | | | Miscellaneous | | | | |
| | | | | | | | |

Room 318C Abated March 2015

| 9" Floor Tile and | Assumed | 86 ft² | Non-Friable | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
|-------------------|---------|--------|---------------|------|------|------|--|
| Mastic | | | Miscellaneous | | | | |
| | | | | | | | |

Room 318D Abated March 2015

| 9" Floor Tile and | Assumed | 117 ft ² | Non-Friable | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
|-------------------|---------|---------------------|---------------|------|------|------|--|
| Mastic | | | Miscellaneous | | | | |
| | | | | | | | |

Room 318E Abated March 2015

| 9" Floor Tile | and Assumed | 95 ft ² | Non-Friable | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
|---------------|-------------|--------------------|---------------|------|------|------|--|
| Mastic | | | Miscellaneous | | | | |
| | | | | | | | |

LEGEND No. 0700048 (NDSU) SOUTH ENGINEERING (BUILDING A013)

| ROOM/ ACM | ASBESTOS TYPE | EST. QUANTITY | ACM TYPE | MATERIAL CONDITION | DAMAGE 등 종 프 POTENTIAL ^{중 중} 위 | ASSESS. CAT. ¹ | NOTES |
|---|-----------------------|--------------------|------------------------------|-----------------------|--|------------------------------|--|
| Room 318F Abated 9" Floor Tile and Mastic | March 2015 Assumed | 77 ft ² | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |

Room 318G Abated March 2015

| | or Tile and | Assumed | 90 ft ² | Non-Friable | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
|--------|-------------|---------|--------------------|---------------|------|------|------|--|
| Mastic | C | | | Miscellaneous | | | | |
| | | | | | | | | |

Room 318H Abated March 2015

| 9" Floor Tile and | Assumed | 90 ft ² | Non-Friable | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
|-------------------|---------|--------------------|---------------|------|------|------|--|
| Mastic | | | Miscellaneous | | | | |
| | | | | | | | |

Room 322 Abated May 2013

| 9" Floor Tile and | Assumed | 302 ft ² | Non-Friable | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
|-------------------|---------|---------------------|---------------|------|------|------|--|
| Mastic | | | Miscellaneous | | | | |
| | | | | | | | |

Room 388 Abated May 2013

| 9" Floor Tile and | Assumed | 618 ft ² | Non-Friable | N/A* | N/A* | N/A* | The 9" floor tile and mastic are assumed ACMs. |
|-------------------|---------|---------------------|---------------|------|------|------|--|
| Mastic | | | Miscellaneous | | | | |
| | | | | | | | |

Center Stairway (1st-3rd floor)

| 12" Red Floor Tile | 2% Chrysotile | 40 ft ² | Non-Friable | N/A* | N/A* | N/A* | The 12" floor tile contains asbestos; the mastic is |
|--------------------|---------------|--------------------|---------------|------|------|------|---|
| | | | Miscellaneous | | | | negative. The floor tile is on the small landing in |
| | | | | | | | between the floors. |

LEGEND No. 0700048 (NDSU) SOUTH ENGINEERING (BUILDING A013)

| ROOM/ ACM | ASBESTOS TYPE | EST. QUANTITY | ACM TYPE | MATERIAL CONDITION | DAMAGE 등 록 프 POTENTIAL ^{또 한 한} 한 | ASSESS. CAT. ¹ | NOTES |
|---|---------------|------------------|------------------------------|-----------------------|--|------------------------------|--|
| Roof | | | | | | | |
| Penetration Putty (around old chimney) | 2% Chrysotile | 1 ea | Non-Friable Miscellaneous | N/A* | N/A* | N/A* | The asbestos penetration putty is on an old chimney on the north side of the roof. |

¹Assessment Categories:

1) Damaged or Significantly Damaged TSI ACM

2) Damaged Friable Surfacing ACM

3) Significantly Damaged Friable Surfacing ACM

4) Damaged or Significantly Damaged Friable Miscellaneous ACM

End

5) ACM with Potential for Damage

6) ACM with Potential for Significant Damage

7) Any Remaining Friable ACM or Friable Suspected ACM