<u>Request for Proposals # 2021-0005</u>
Ailey Young House Exterior Painting Project
April 6, 2021

The Town of Wake Forest is soliciting proposals to conserve and paint the exterior of the Ailey Young House.

<u>Project Background:</u> The Ailey Young House was designated as a local historic landmark by the Wake Forest Board of Commissioners in 2012. The house was constructed around 1875 and is an important architectural example of Reconstruction-era workers housing. In addition, it is believed to be the childhood home of Allen Young, son of Ailey and Henry Young. Allen Young founded the first school for African American children in Wake Forest.

The Ailey Young House has been vacant since the 1960s and was severely damaged by fire in the 1980s. The house was overgrown and forgotten until 2008 when it was recorded as part of a local historic resources survey. The house was completely rehabilitated in 2019-2020 to include replacing the roof structure and roof, reconstructing the brick chimney and replacing most fire damaged interior and exterior finish materials, reconstructing windows and shutters. Also in 2020, paint analysis was completed of the exterior of the house to determine the original and subsequent paint colors used on the exterior. That paint analysis report is the basis for this project and is attached as Attachment A.

The house is owned by the Town of Wake Forest. The Wake Forest Historic Preservation Commission is overseeing the rehabilitation of the house and is raising money for the project. The ultimate goal for the rehabilitation is to have a heritage site to celebrate the historical significance of the Northeast Community and its residents. This project is contingent on funding.

<u>Scope of Services – Provide cost for each item and summary of requirements to execute below</u>
(Note – all product applications must follow manufacturers recommendations and all safety precautions). Please provide costs for each item in the RFP, if you are only bidding on a portion of the project please state that in your proposal. Optional products, methods and costs may be provided complete with your rationale for offering it as an option, brand name and specifications so that we can evaluate them against our preferred material and process.

<u>1. Conservation of the Existing Historic Paint – Original Board-and-batten siding, door and window frames, fire-damaged rafter ends only (BEFORE ANY CLEANING and PRIMING)</u>

A. Apply two coats of a conservation-grade, non-yellowing consolidant of 10% Paraloid B-72 (formerly Acryloid B-72 in xylene or ethanol applied with an airbrush and/or low-pressure spray gun to consolidate the flaking and remnant paints and provide a protective coating to only the historic board-and-battens, window frames, door frames in addition to fire-damaged exposed rafters. The fire damaged exposed rafters will not be painted, only consolidated.
B. One section of original board-and-batten with good representation of original paint will be identified for consolidation and will remain unpainted to illustrate the historic paint layers. See Item 4 for the remainder of the exterior. This will likely be next to the chimney under protection of the roof on the rear elevation of the house. See attached photograph detail.

2. Preparation and Painting the Exterior of the House - Traditional Linseed Oil Paint (Please price with and without paint as the paint may be provided for this project.)

Note: Please note the coverage of linseed oil paint vs. acrylic paint, it is not unusual for one quart of linseed oil paint to cover the same amount as a gallon of acrylic or oil paint.

A. After consolidation of the historic painted board and batten. Clean the old (unpainted) and new board and batten, shutters, doors, new window frames, and windows following Linseed Oil Paint manufacturers' instructions with a cleaner to remove any mildew. Allow to dry.
B. Apply a copper-based preservative (carefully following manufacturers' instructions and safety precautions) to the old unpainted and new wood including exposed ends of board-and-batten, shutters, doors, window frames. Allow to dry for at least 24 hours.
C. Apply one coat of a linseed oil pre-primer to all wood surfaces receiving Linseed Oil Pain following Linseed Oil Paint manufacturers' instructions. Allow to dry before step D below.
D. Paint the new board and batten siding (including exposed ends, bottom reveal), window and surrounds, windows, doors, and shutters with two, thin coats following manufacturers' instructions for Linseed Oil Paint in a color to match Benjamin Moore Linen Sand. Allow to dry to touch between coats (usually 1-2 days).
E. Warning: rags drenched in linseed paint or oil can self-combust, after use they must be fully soaked in water and disposed of according to State Standards.

3. Preparation and painting of the exposed wood sheathing (exposed under the roof) and new roof rafters – note different color.

C. Prime the exposed sheathing and new exposed roof rafters with a linseed oil primer following the Linseed Oil Paint manufacturers' instructions.
D. Paint the exposed sheathing and exposed roof rafters with one coat to achieve full coverage using Linseed Oil Paint. Note that it is recommended to apply thin coats of Linseed Oil Paint as its coverage is different than modern paint systems. Color to match Sherwin Williams Peppercorn.
    a. Provide the price for a second coat of linseed oil paint if needed.
E. Option: Modern Paint System for this section only – Prime the exposed sheathing and exposed roof rafters with one coat of alkyd based universal primer. Top-coat with two-coats of acrylic or oil-based paint. Color to Match Sherwin Williams Peppercorn.

4. Additional Services: The project manager shall communicate with the Senior Planner (Historic Preservation) giving a minimum notice of 3 business days to schedule work so that she can be on site during the consolidation portion of the work. The contractor's project manager will communicate immediately if there are any changes required in the project scope. All changes require a multiple approval process that can take up to 2 weeks. Additional activities necessary for satisfactory completion shall include leaving the work site clean and neat at all times. Any debris of construction materials or other items will be removed. The worksite will be maintained in a neat and safe manner ensuring that no hazardous or flammable materials are left unsupervised. Note: flammable materials must be removed from the worksite daily and are not to be left inside, under or around the house. The worksite must be secured daily. If the contractor proposes to bring in a dumpster please include that cost in your estimate. Please note that access to the site is challenging. Only one construction vehicle is permitted on the site at a time. Under no

circumstances are vehicles to enter from the cemetery. Cranes and bucket trucks can ONLY enter using the sewer easement from Spring Street. Any other employee vehicles can be parked in parking lot in the cemetery or on Spring Street and employees walk to the site.

7. Donations: The Town of Wake Forest and the Wake Forest Historic Preservation Commission are currently soliciting donations for the Ailey Young House Rehabilitation Project. If the contractor wishes to make a donation of all or part of this scope of work, please indicate that donation in your proposal.

8. Insurance Requirements: The Town of Wake Forest requires that "eligible contractors" maintain the following insurance requirements: Worker's Compensation, Commercial General Liability, Business Auto Liability, Umbrella/Excess Liability as per the "Eligible Contractors" Memorandum of Understanding. Further, the contractor agrees to protect, defend, indemnify and hold the Town of Wake Forest and its officers, employees, and agents free and harmless from and against any and all losses, penalties, damages, settlements, costs, charges, professional fees or other expenses or liabilities of every kind and character arising out of or relating to any and all claims, liens, demands, obligations, actions, proceedings, or causes of action of every kind and character in connection with or arising directly or indirectly out of this agreement and/or the performance hereof and caused by the negligence of the contractors. The contractor further agrees to investigate, handle, respond to, provide defense for, and defend any such claims, etc. at his sole expense and agrees to bear all other costs and expenses related thereto, even if (claims, etc.) is groundless, false, or fraudulent.

Contractor shall maintain insurance policies at all times with minimum limits as follows:

Coverage	**Minimum Limits**
Workers' Compensation	Statutory Limits
Employers' Liability	$1,000,000
General Liability	$1,000,000
Automobile Liability	$500,000
Professional Liability (E & O)	$1,000,000 (If Required)

Contractor shall provide the Client with a Certificate of Insurance for review prior to the issuance of any contract. All Certificates of Insurance will require thirty (30) days written notice by the insurer or contractor's agent in the event of cancellation, reduction or other modifications of coverage. In addition to the notice requirement above, Contractor shall provide the Town of Wake Forest with immediate written notice of cancellation, reduction, or other modification of coverage of insurance. Upon failure of the Contractor to provide such notice, Contractor assumes sole responsibility for all losses incurred by the Town of Wake Forest for which insurance would have provided coverage. The Town of Wake Forest shall be listed as Certificate Holders on the Certificate of Insurance with an "A" rated insurance company. Both shall be added as an Additional Insured, under General Liability, as evidenced by an endorsement attached to the certificate. Failure to maintain the required insurance in force may be cause for contract termination. In the event that the contractor fails to maintain and keep in force the insurance herein required, the Town of Wake Forest has the right to cancel and terminate the contract without notice. Any subcontractors hired by the Contractor must carry the same insurance amounts.

Contractor shall provide a Drug-Free Workplace and that all drivers meet DOT/CDL licensing requirement.

9. Hold Harmless: To the extent permitted by law, the Consultant/Contractor agrees to defend, pay on behalf of, indemnify, and hold-harmless the Town of Wake Forest, its elected and appointed officials, employees, agents, and volunteers against any and all claims, demands, fault, actual liabilities, assertions of liability, expenses, suits, or losses, including all costs connected therewith, which may be asserted, claimed, or recovered against or from the Town of Wake Forest, its elected or appointed officials, employees, agents, and volunteers by reason of personal injury, including bodily injury or death and/or property damage, including loss of use thereof resulting from the negligence of the Consultant/Contractor.

10. Work Completed: Please provide a timeline including proposed start and finish to complete the work in the proposal.

11. Funding. The Town of Wake Forest is seeking grant funds for the projects associated with the Ailey Young House rehabilitation. Funding for the project may or may not be available immediately.

12. Site Visit: Please contact Michelle Michael, Senior Planner at mmichael@wakeforestnc.gov or 919-435-9516 to schedule a site visit.

13. Proposals Due: The Town of Wake Forest will be accepting proposals for this scope of work until 5:00 pm on Friday, April 30, 2021. Examples of work or references that illustrate experience or knowledge with historic buildings conservation and using traditional painting materials and methods are required. Please send, email or deliver your proposal to the following address:

Town of Wake Forest
301 S. Brooks Street
Wake Forest, NC 27587
Attn: Michelle Michael, Senior Planner (Historic Preservation)
Email: mmichael@wakeforestnc.gov
Please reference **RFP # 2021-0005 – Ailey Young House Exterior Painting Project** on the submittal.

14. Standard Terms and Conditions: The Town of Wake Forest's Standard Terms and Conditions listedat:https://www.wakeforestnc.gov/sites/default/files/uploads/towf_standard_terms_and_conditions.pdf will govern all matters related to the goods and/or services provided by you or your company (the "Vendor") to the Town of Wake Forest (the "Town"). Additional Terms and Conditions stated on the face of a Town purchase order shall take precedence over any conflicting Standard Terms and Conditions stated. Any Terms and Conditions not stated, but incorporated by reference therein, shall be binding only if provided or signed by the Town and attached hereto. In the event that a binding written contract signed by both the Vendor and the Town exists, the Terms and Conditions of that contract shall supersede any conflicting Standard Terms and Conditions

15. Proposal Rejection: The Town of Wake Forest reserves the right to reject any or all proposals and to make the award as deemed in the best interest of the Town of Wake Forest.

16. Additional Information:

Photographs of the Ailey Young House

A section will be identified to consolidate but leave unpainted to illustrate the historic paint finish. An optional location is near the entrance on the front of the house. Approximately two feet in width.

Optical Microscopy Exterior Paint Analysis

Ailey Young House
Wake Forest, North Carolina 27587-2932

For: Michelle A. Michael, MHP
Senior Planner (Historic Preservation)
Town of Wake Forest
301 S. Brooks Street
Wake Forest, NC 27587

By: Susan L. Buck, Ph.D. Conservator and Paint Analyst
303 Griffin Avenue
Williamsburg, VA 23185

Date: April 20, 2020

www.wakeforestnc.gov/planning/historic-preservation/aileyyoung-house

Purpose:

The goal of this project is to identify the weathered, chalky coatings remaining on the front door frame, the siding, and a window frame of the ca.1875 Ailey Young House. If the original paints survive and can be identified through paint analysis, the colors will be matched with a colorimeter/microscope for documentation and possible replication, and recommendations will be made for preservation of the fragmentary evidence.

Procedures:

Four samples from the door frame, siding and window frame were sent to Susan Buck for analysis. Before casting, the samples were examined at 45X magnification under a binocular microscope to screen them for duplicates. The samples that retained the most complete stratigraphies were cast into polyester resin cubes for permanent mounting. The cubes were ground and polished for cross-section microscopy analysis and photography. The sample preparation methods and analytical procedures are described in the reference section of this report.

The cast samples were analyzed with a Nikon Eclipse 80i epi-fluorescence microscope equipped with an EXFO X-Cite 120 Fluorescence Illumination System fiberoptic halogen light source and a polarizing light base using SPOT Advanced software (v. 5.1) for digital image capture and Adobe Photoshop CS for digital image management. Digital images of the best representative cross-sections are included in this report. Please note that the colors in the digital images are affected by the variability of color capture and rendering, and do not accurately represent the actual colors.

Background:

Michelle Michael provided an overview of the house and its history: "The Town owns the Ailey Young House, a Reconstruction-era, African American house that is being rehabilitated to interpret African American history in Wake Forest. The house suffered a fire sometime in the 1970s which caused a lot of damage. The entire attic was mostly destroyed as was the roof structure and the majority of the west pen interior. We have recently replaced the roof structure, standing seam metal roof, and interior finishes that were deteriorated beyond repair. The exterior is board-and-batten and has remnants of a paint or limewash on the boards that remain. Photos of the building are attached from 2009 when its significance was documented, 2020 with the roof 90 % complete and the front and back of one of the boards."[1] It was hoped that paint analysis could document the surviving evidence and offer recommendations for appropriate treatment. The following photographs were provided for context and reference.

Ailey Young House in 2009

South Elevation Roof in 2020

[1] Michelle Michael, email communication, February 4, 2020.

Board with paint remnants

Back of board with paint remnants

Paint Analysis Results:

When the wood fragments were examined at 45X magnification prior to cross-section microscopy analysis, it was apparent that there are at least two generations of deeply cracked, grimy paints remaining in samples 1 and 2 from the east side door frame and the south elevation siding, respectively. The wood surface of sample 3 from the window frame is deeply worn and weathered, with only tiny whitish spots of paint, and almost no paint can be seen on the surface of sample 4, from the south elevation siding.

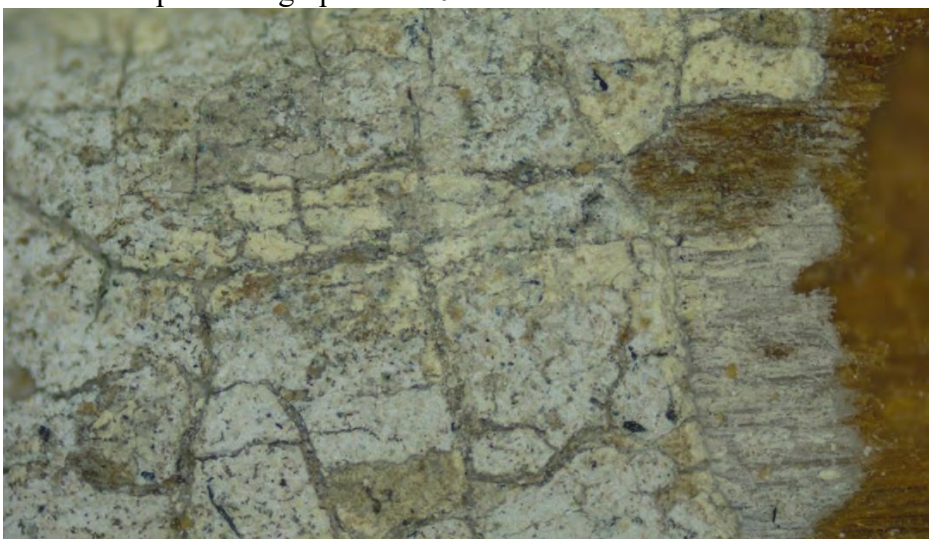
Paint Sample Locations
1. East side door frame.
2. South elevation siding.
3. Window frame north elevation.
4. South elevation siding (board removed from house).

The most intact paint evidence was found in sample 1 from the door frame and sample 2 from the south elevation siding. In cross-section it is apparent that there are gritty accumulations of grime, mold and soot on the surfaces of the wood substrate. This suggests that either these elements were initially left unpainted, or the earliest paints were allowed to completely weather away before repainting. There are two generations of paint on top of the grimy wood substrate. The first generation is an opaque pale yellow paint. This pale yellow paint was allowed to become cracked and grimy before it was painted over with one layer of off-white paint.

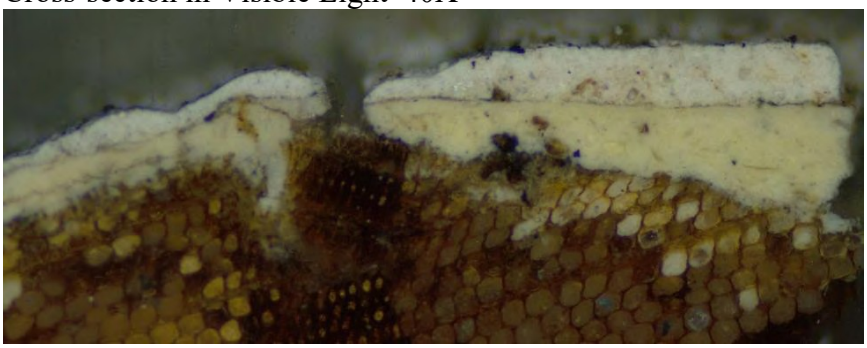
Binding media characterization of the paints in sample 1 shows that both contain strong oil components (with the biological fluorochrome DCF), and there is oil in the wood. This oily material might have been applied separately as a preservative, or it might have soaked into the

wood when the first pale yellow oil paint was applied. There are weak carbohydrate components in the off-white paint (with the fluorochrome TTC) which could be a natural gum additive to the paint. Neither paint layer reacted positively for the presence of proteins. Generation 1 may contain zinc white and white lead, and generation 2 may contain titanium white (a pigment available after about 1920) based on their autofluorescence characteristics.

1. East side door frame. Uncast sample with degraded paints on the wood.
Uncast Sample Photographed at 40X



Cross-section in Visible Light 40X

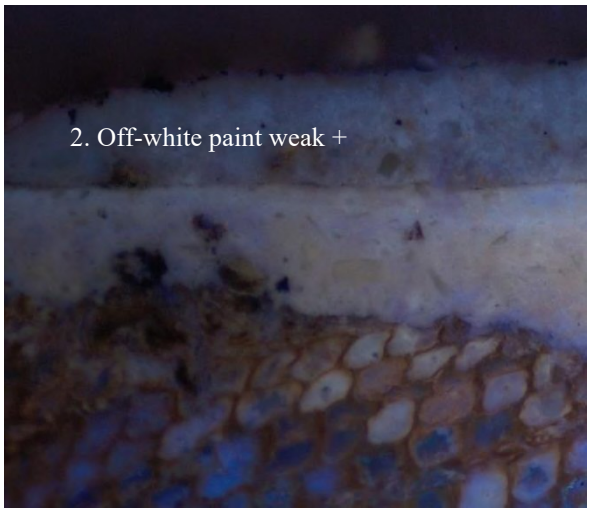


Cross-section in Visible Light 100X

Ultraviolet Light 100X

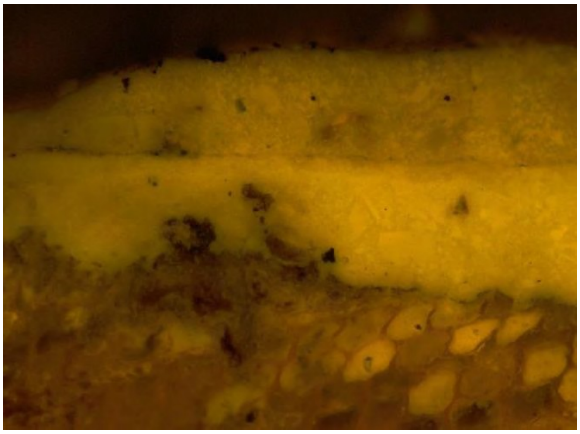
1. East side door frame.

UV Light & TTC for carbohydrates 100X
Weak + reactions for oils in generation 2

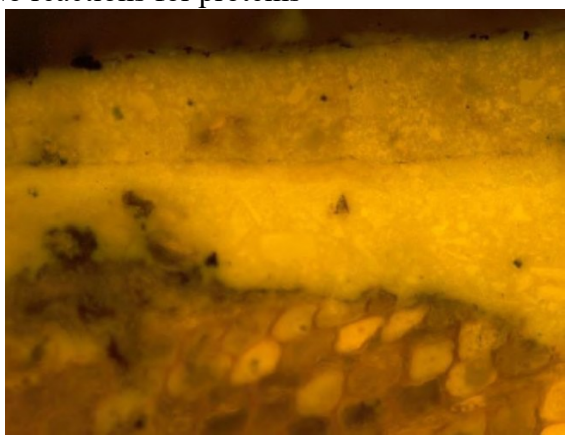


UV & DCF for oils 100X
Strong + reactions for oils in the paints and in the wood

B-2A filter 100X



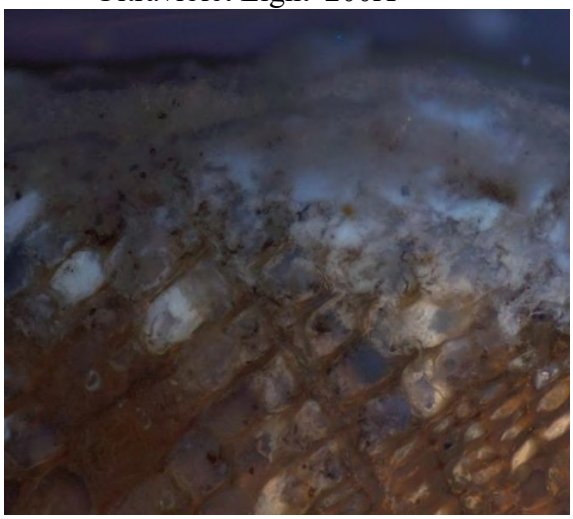
B-2A filter & Alexafluor 488 for proteins 100X
No reactions for proteins



2. South elevation siding. Uncast sample with degraded paints on the wood.
Uncast Sample Photographed at 40X

Cross-section in Visible Light 200X

Ultraviolet Light 200X

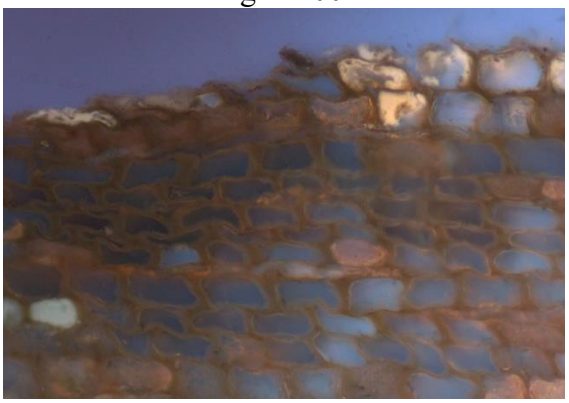


The wood surface of sample 3 is deeply fissured and fibrous, and there are only chalky remnants of off-white paint remaining in the depressions in the wood surface. In cross-section there are small pockets of paint trapped in the wood fibers, but the paints here are particularly fragile and ephemeral.

3. Window frame north elevation. Uncast sample with degraded paints on the wood.
Uncast Sample Photographed at 40X

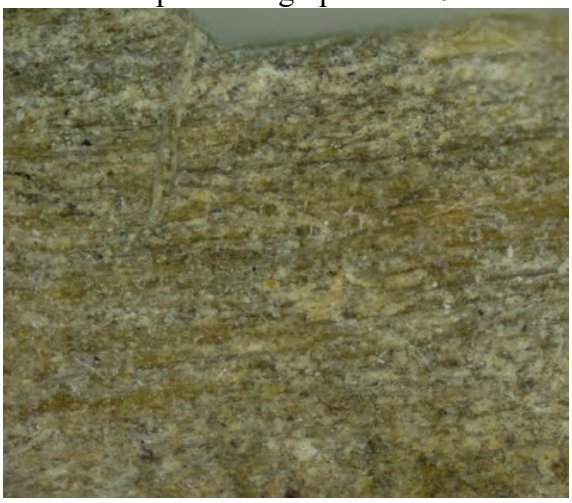
Cross-section in Visible Light 200X

Ultraviolet Light 200X



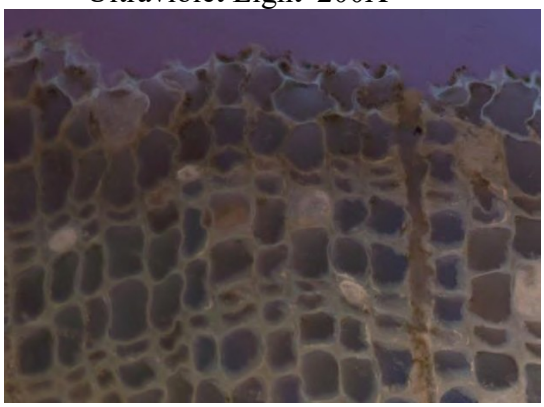
The paints have been almost completely lost in some areas of south elevation siding, based on the evidence in sample 4. The surface of the wood is powdery and fibrous, suggesting decades of exposure with no protective paint covering. In cross-section the wood surface is darkened and oxidized, with soot embedded in the wood fibers.

4. South elevation siding (board removed from house).
Uncast sample with degraded, fibrous wood.
Uncast Sample Photographed at 40X



Cross-section in Visible Light 200X

Ultraviolet Light 200X



Conclusion:

The four paint samples submitted for analysis show the range of conditions of the exterior wood surfaces. The evidence in samples 1 and 2 is compelling as two coherent layers of oil-bound paint survive on top of grimy, gritty wood substrates. It is possible that the exterior was initially left unpainted, or was coated with oil at one point, before the first layer of opaque pale yellow oil paint was applied. This paint was left exposed for many years, and became deeply cracked and grimy, before it was repainted with an off-white oil-bound paint.

There is fragmentary evidence of these paints in sample 3, but the wood is deeply fissured and damaged in this sample from the window frame. There is almost no paint evidence remaining in sample 4 from the south elevation siding, but sample 2 from another area of the siding confirms that the siding was painted in the same manner as the door and window frame.

No evidence of limewash was found in any of the samples. Rather, this modest analysis project confirms that when the building was first painted one layer of a durable oil-bound, pale yellow paint was applied. It was repainted only one more time with a durable oil-bound off-white paint, which now is chalky, discolored and deeply cracked. It is not possible to confidently date the application of either paint layer based on composition and physical characteristics, but the most recent off-white paint must date to after 1920 because of the presence of titanium white.

There are several alternatives for preserving the paint evidence, but none are ideal as consolidated damaged paints on exteriors will continue to be vulnerable to damage from sun, heat, moisture, and mold. Some possible approaches are listed below:

1. Use a conservation-grade, non-yellowing consolidant like 10% Acryloid B-72 in xylene or ethanol applied with an airbrush and/or low-pressure spray gun to consolidate the flaking paints and provide a protective coating. The disadvantage is that this consolidant will slightly saturate and darken the wood and the paint remnants, and leave a sheen on all surfaces.
2. Use a conservation-grade, non-yellowing consolidant like 50:50 Aquazol 50 and Aquazol 500 in ethanol and water applied with an airbrush and/or low-pressure spray gun to consolidate the flaking paints and provide a protective coating. The disadvantage is that this consolidant is not particularly durable for exterior surfaces, but if applied carefully it will not increase the gloss or saturation of the aged surfaces.
3. Spray on a barrier coat of 10% Acryloid B-72 in xylene or ethanol to protect the paint evidence, and then repaint the building with a pale yellow acrylic or oil paint that has been color-matched to the first generation of paint identified in samples 1 and 2.
4. Erect a shed roof over the building to protect the exterior surfaces and leave the exterior untouched.

COLOR MEASUREMENT PROCEDURES

The most intact, representative areas of the earliest pale yellow paint on the siding and door frame were matched using a Minolta Chroma Meter CR-241, a tristimulus color analyzer/microscope with color measurement area of 0.3mm. This instrument has an internal, 360-degree pulsed xenon arc lamp and provides an accurate color measurement in a choice of five different three-coordinate color systems. The color matches were also rechecked at 30X magnification using a color-corrected light source.

The measurements were first generated in the Munsell color system (a color standard used in the architectural preservation field), and after the measurements were taken the closest Munsell color swatches from a standard Munsell Book of Color (gloss paint standards) were compared under 30X magnification to the actual samples. The measurements were also generated in the CIE L*a*b* color space system, which is currently one of the most widely accepted industry color space measuring systems. The most appropriate commercial match is included for reference.

Ailey Young House – Earliest Yellow Paint

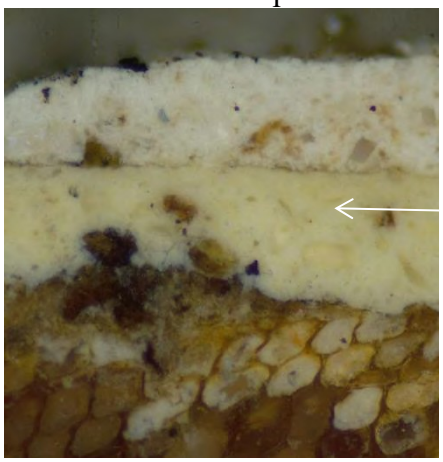
Color Match – April 20, 2020[2]

Samples 1 and 2

Benjamin Moore #2151-60 "Linen sand"

Color System*			Coordinates
Munsell	Hue 0.7GY	Value 9.0	Chroma 2.9
CIE L*a*b*	Black to White L90.83	Green to Red a-6.44	Blue to Yellow b+20.81

Cross-section of sample 1



The Benjamin Moore match #2151-60 is an excellent visual match to the best preserved areas of the earliest pale yellow oil-bound paint when examined in full spectrum light both at 30X magnification and unmagnified. The evidence suggests that that this layer was somewhat glossy and could be replicated in an eggshell or satin gloss level.

[2] Color matching conducted after cross-section microscopy analysis by Susan L. Buck, Ph.D., Conservator and Paint Analyst, with a Minolta Colorimeter CR-241.

* Chroma Meter CR-241 offers five different color systems for measuring absolute chromaticity: CIE Yxy (1931), L*a*b* (1976), and L*C*H* (1976) colorimetric densities DxDyDz; Munsell notation and four systems for measuring color differences.

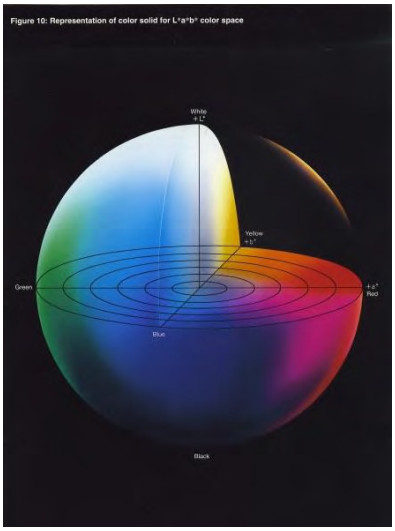
For two colors to match, three quantities defining color must be identical. These three quantities are called tristimulus values X, Y, and Z as determined by CIE (Commission Internationale de l'Eclairage) in 1931.

Color as perceived has three dimensions: hue, chroma and lightness. Chromaticity includes hue and chroma (saturation), specified by two chromaticity coordinates. Since these two coordinates cannot describe a color completely, a lightness factor must also be included to identify a specimen color precisely.

Munsell Color System: The Munsell color system consists of a series of color charts which are intended to be used for visual comparison with the specimen. Colors are defined in terms of the Munsell Hues (H; indicates hue), Munsell Value (V; indicates lightness), and Munsell Chroma (C; indicates saturation) and written as H V/C.

CIE Yxy (CIE 1931): In the Yxy (CIE 1931) color system, Y is a lightness factor expressed as a percentage based on a perfect reflectance of 100%, x and y are the chromaticity coordinates of the CIE x, y Chromaticity Diagram.

CIE L*a*b*: Equal distances in the CIE x,y Chromaticity Diagram do not represent equal differences in color as perceived. The CIE L*a*b* color system, however, more closely represents human sensitivity to color … Equal distances in this system approximately equal perceived color differences. L* is the lightness variable; a* and b* are the chromaticity coordinates.



ΔE (Delta E) is the industry measure used to determine how closely two colors match in the CIE L*a*b*. The symbol Δ means "the change in". It is based on calculating the sum of the differences between each measure. The calculation is: $\Delta E = \sqrt{(L^*)^2 + (a^*)^2 + (b^*)^2}$, or, the color difference equals the square root of the squared sums of the differences between each of

the three L* a* b* tristimulus values. Industry color standards indicate a ΔE of 1 is barely perceptible to the human eye, and ΔE of 6 to 7 is acceptable for color matches in the printing industry.

REFERENCES

Cross-section Preparation Procedures:

The samples were cast into mini-cubes of polyester resin (Excel Technologies, Inc., Enfield, CT). The resin was allowed to cure for 24 hours at room temperature and under ambient light. The cubes were then ground to expose the cross-sections, and dry polished with 400 and 600 grit wet-dry papers and Micro-Mesh polishing cloths, with grits from 1500 to 12,000.

Cross-section microscopy analysis was conducted with a Nikon Eclipse 80i epi-fluorescence microscope equipped with an EXFO X-Cite 120 Fluorescence Illumination System fiberoptic halogen light source and a polarizing light base using SPOT Advanced software (v. 4.6) for digital image capture and Adobe Photoshop CS for digital image management. Photographs and digital images of the best representative cross-sections are included in this report. UV photographs were taken with the UV-2A filter in place (330-380 nanometers excitation with a 400 nm dichroic mirror and a 420 nm. barrier filter). Please note that the colors in the printed photomicrographs may not accurately reflect the actual color of the samples because the colors in the digital images are affected by the variability of color printing.

The following fluorescent stains were used for examination of the samples:

> Triphenyl tetrazolium chloride (TTC) 4.0% in ethanol to identify the presence of carbohydrates (starches, gums, sugars). Positive reaction color is dark red or brown.
>
> Fluorescein isothiocyanate (FITC) 0.2% in anhydrous acetone to identify the presence of proteins. A yellow or yellowish-green colors indicates a positive reaction.
>
> 2, 7 Dichlorofluorescein (DCF) 0.2% in ethanol to identify the presence of saturated and unsaturated lipids (oils). Positive reaction for saturated lipids is pink and unsaturated lipids is yellow.

The best cross-section photographs for each area were mounted and labeled and are included with this report. Photographs were taken at 100X, 200X and 400X magnifications.

Information Provided by Ultraviolet Light Microscopy:

When viewed under visible light, cross-sections which contain ground, paint and varnish may often be difficult to interpret, particularly because clear finish layers look uniformly brown or tan. It may be impossible using only visible light to distinguish between multiple varnish layers. Illumination with ultraviolet light provides considerably more information about the layers present in a sample because different organic, and some inorganic, materials autofluoresce (or glow) with characteristic colors.

There are certain fluorescence colors which indicate the presence of specific types of materials. For example: shellac fluoresces orange (or yellow-orange) when exposed to ultraviolet light, while plant resin varnishes (typically amber, copal, sandarac and mastic) fluoresce bright white. Wax does not usually fluoresce; in fact, in the ultraviolet it tends to appear almost the same color as the polyester casting resin. In visible light wax appears as a somewhat translucent white layer. Paints and glaze layers which contain resins as part of the binding medium will also fluoresce under ultraviolet light at high magnifications. Other materials such as lead white, titanium white and hide glue also have a whitish autofluorescence.

There are other indicators which show that a surface has aged, such as cracks which extend through finish layers, accumulations of dirt between layers, and sometimes diminished fluorescence intensity, especially along the top edge of a surface which has been exposed to light and air for a long period of time.

SAFETY DATA SHEET
THE DOW CHEMICAL COMPANY*

Product name: PARALOID™ B-72 100% Resin

Issue Date: 05/28/2015
Print Date: 05/26/2016

THE DOW CHEMICAL COMPANY* encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. IDENTIFICATION

Product name: PARALOID™ B-72 100% Resin

Recommended use of the chemical and restrictions on use
Identified uses: Coatings product

COMPANY IDENTIFICATION
THE DOW CHEMICAL COMPANY*
Agent for Rohm and Haas Chemicals LLC
100 INDEPENDENCE MALL WEST
PHILADELPHIA PA 19106-2399
UNITED STATES

Customer Information Number: 215-592-3000
SDSQuestion@dow.com

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: 1 800 424 9300
Local Emergency Contact: 800-424-9300

2. HAZARDS IDENTIFICATION

Hazard classification
This material is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29CFR 1910.1200.
Reproductive toxicity - Category 2

Label elements
Hazard pictograms

Signal word: **WARNING!**

Hazards
Suspected of damaging fertility or the unborn child.

Precautionary statements

Prevention
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Use personal protective equipment as required.

Response
IF exposed or concerned: Get medical advice/ attention.

Storage
Store locked up.

Disposal
Dispose of contents/ container to an approved waste disposal plant.

Other hazards
If converted to small particles during further handling, processing, or by other means, may form combustible dust concentrations in air.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature: Acrylic copolymer
This product is a mixture.

Component	CASRN	Concentration
Acrylic polymer(s)	Not hazardous	>= 99.0 - 100.0 %
Individual residual monomers	Not Required	<= 0.1 %
Toluene	108-88-3	<= 0.8 %

4. FIRST AID MEASURES

Description of first aid measures
Inhalation: Move to fresh air.

Skin contact: Wash with water and soap as a precaution. If skin irritation persists, call a physician.

Eye contact: Flush eyes with water as a precaution. If eye irritation persists, consult a specialist.

Ingestion: Drink 1 or 2 glasses of water. Consult a physician if necessary. Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed: Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and

special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Indication of any immediate medical attention and special treatment needed
Notes to physician: Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIREFIGHTING MEASURES

Suitable extinguishing media: Use the following extinguishing media when fighting fires involving this material: Carbon dioxide (CO_2) Dry chemical Water spray

Unsuitable extinguishing media: no data available

Special hazards arising from the substance or mixture
Hazardous combustion products: no data available

Unusual Fire and Explosion Hazards: Material as sold is combustible; burns vigorously with intense heat.

Advice for firefighters
Fire Fighting Procedures: Use water spray to cool unopened containers. Remain upwind. Avoid breathing smoke.

Special protective equipment for firefighters: Wear self-contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Appropriate protective equipment must be worn when handling a spill of this material. See SECTION 8, Exposure Controls/Personal Protection, for recommendations. If exposed to material during clean-up operations, see SECTION 4, First Aid Measures, for actions to follow.

Environmental precautions: CAUTION: Keep spills and cleaning runoff out of municipal sewers and open bodies of water.

Methods and materials for containment and cleaning up: Floor may be slippery; use care to avoid falling. Eliminate all ignition sources. Ventilate the area. Transfer spilled material to suitable containers for recovery or disposal.

7. HANDLING AND STORAGE

Precautions for safe handling: Store in a cool, dry, well ventilated place. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling. Keep container tightly closed. Do not breathe vapours/dust. Static charges can accumulate: use bonding and grounding between transfer equipment and receiving containers and for anyother operations capable of generating static electricity.

Conditions for safe storage: Material can burn; limit indoor storage to approved areas equipped with automatic sprinklers. Ground all metal containers during storage and handling.
Other data: Monomer vapors can be evolved when material is heated during processing operations. See SECTION 8, for types of ventilation required.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
Exposure limits are listed below, if they exist.

Component	Regulation	Type of listing	Value/Notation
Toluene	ACGIH	TWA	20 ppm
	OSHA Z-2	TWA	200 ppm
	ACGIH	TWA	BEI
	OSHA Z-2	CEIL	300 ppm
	OSHA Z-2	Peak	500 ppm

Exposure controls
Engineering controls: Use local exhaust ventilation with a minimum capture velocity of 150 ft/min. (0.75 m/sec.) at the point of dust or mist evolution. Refer to the current edition of "Industrial Ventilation: A Manual of Recommended Practice" published by the American Conference of Governmental Industrial Hygienists for information on the design, installation, use, and maintenance of exhaust systems.

Protective measures: Facilities storing or utilizing this material should be equipped with an eyewash facility.

Individual protection measures

Eye/face protection: Use safety glasses with side shields (ANSI Z87.1or approved equivalent). Eye protection worn must be compatible with respiratory protection system employed.

Skin protection

Hand protection: Cotton or canvas gloves.

Respiratory protection: A respiratory protection program meeting OSHA 1910.134 and ANSI Z88.2 requirements or equivalent must be followed whenever workplace conditions warrant a respirator's use. None required under normal operating conditions. When dusty conditions are encountered, wear a properly fitted NIOSH approved (or equivalent) half-mask, air-purifying respirator. Air-purifying respirators should be equipped with NIOSH approved (or equivalent) organic vapor cartridges and N95 filters. If oil mist is present, use R95 or P95 filters.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	
Physical state	Granular solid
Color	clear
Odor	Acrylic odor
Odor Threshold	no data available
pH	Not Applicable
Melting point/range	no data available
Freezing point	no data available

Boiling point (760 mmHg)	Not applicable
Flash point	Not applicable
Evaporation Rate (Butyl Acetate = 1)	Not Applicable
Flammability (solid, gas)	Not expected to form explosive dust-air mixtures.
Lower explosion limit	Not Applicable
Upper explosion limit	Not Applicable
Vapor Pressure	Not Applicable
Relative Vapor Density (air = 1)	Not Applicable
Relative Density (water = 1)	no data available
Water solubility	practically insoluble
Partition coefficient: n-octanol/water	no data available
Auto-ignition temperature	393.00 °C (739.40 °F) estimated
Decomposition temperature	no data available
Dynamic Viscosity	Not Applicable
Kinematic Viscosity	no data available
Explosive properties	no data available
Oxidizing properties	no data available
Liquid Density	0.66 g/cm3Bulk density
Molecular weight	no data available
Percent volatility	1.00 % maximum

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. STABILITY AND REACTIVITY

Reactivity: no data available

Chemical stability: no data available

Possibility of hazardous reactions: None known.
Product will not undergo polymerization.
This material is considered stable.

Conditions to avoid: no data available

Incompatible materials: There are no known materials which are incompatible with this product.

Hazardous decomposition products: Thermal decomposition may yield acrylic monomers.

11. TOXICOLOGICAL INFORMATION

Toxicological information appears in this section when such data is available.

Acute toxicity

Acute oral toxicity
LD50, Rat, > 5,000 mg/kg

Acute dermal toxicity
LD50, Rabbit, > 3,000 mg/kg

Acute inhalation toxicity
Product test data not available.

Skin corrosion/irritation
slight irritation

Serious eye damage/eye irritation
slight irritation

Sensitization
Product test data not available.

Specific Target Organ Systemic Toxicity (Single Exposure)
Product test data not available.

Specific Target Organ Systemic Toxicity (Repeated Exposure)
Product test data not available.

Carcinogenicity
Product test data not available.

Teratogenicity
Product test data not available.

Reproductive toxicity
Product test data not available.

Mutagenicity
Product test data not available.

Aspiration Hazard
Product test data not available.

COMPONENTS INFLUENCING TOXICOLOGY:

Acrylic polymer(s)

Acute inhalation toxicity
The LC50 has not been determined.

Toluene

Acute inhalation toxicity
LC50, Rat, male and female, 4 Hour, vapour, > 20 mg/l

Sensitization

Did not cause allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:
No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)
May cause drowsiness or dizziness.
Route of Exposure: Inhalation
Target Organs: Central nervous system

Specific Target Organ Systemic Toxicity (Repeated Exposure)
In animals, effects have been reported on the following organs:
central nervous system (CNS) effects
Excessive exposure may cause neurologic signs and symptoms.
Toluene has caused hearing loss in laboratory animals upon exposure to high concentrations.
Intentional misuse by deliberately inhaling toluene may cause nervous system damage, hearing loss, liver and kidney effects and death.

Carcinogenicity
Did not cause cancer in laboratory animals.

Teratogenicity
In laboratory animals, toluene has been toxic to the fetus at doses toxic to the mother; it has caused birth defects in mice when administered orally, but not by inhalation.

Reproductive toxicity
In animal studies, did not interfere with reproduction.

Mutagenicity
The majority and most reliable of the many genetic toxicity studies on toluene, both in vitro and in animals, indicate that it is not genetically toxic.

Aspiration Hazard
May be fatal if swallowed and enters airways.

12. ECOLOGICAL INFORMATION

Ecotoxicological information appears in this section when such data is available.

General Information
There is no data available for this product.

Toxicity

Acrylic polymer(s)

Acute toxicity to fish
No relevant data found.

Toluene

Acute toxicity to fish
Material is moderately toxic to fish on an acute basis (LC50 between 1 and 10 mg/L).

LC50, Rainbow trout (Oncorhynchus mykiss), semi-static test, 96 Hour, 5.8 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates
EC50, Daphnia magna (Water flea), static test, 24 Hour, 7 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants
EbC50, Pseudokirchneriella subcapitata (green algae), 72 Hour, Growth inhibition, 12.5 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria
IC50, Bacteria, 16 Hour, 29 mg/l

Chronic toxicity to fish
NOEC, Fish., flow-through, 40 day, growth, 1.4 mg/l

Chronic toxicity to aquatic invertebrates
NOEC, Daphnia magna (Water flea), 21 day, number of offspring, 2 mg/l
NOEC, Ceriodaphnia dubia (water flea), 7 d, number of offspring, 0.74 mg/l

Toxicity to soil-dwelling organisms
LC50, Eisenia fetida (earthworms), 150 - 280 mg/kg

Persistence and degradability

Acrylic polymer(s)
Biodegradability: No relevant data found.

Toluene
Biodegradability: Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

Biodegradation: 100 %
Exposure time: 14 d
Method: OECD Test Guideline 301C or Equivalent

Theoretical Oxygen Demand: 3.13 mg/mg Calculated.

Bioaccumulative potential

Acrylic polymer(s)
Bioaccumulation: No relevant data found.

Toluene
Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water(log Pow): 2.73 Measured
Bioconcentration factor (BCF): 13.2 - 90 Freshwater fish Measured

Mobility in soil

Toluene
Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient(Koc): 37 - 178 Estimated.

13. DISPOSAL CONSIDERATIONS

Disposal methods: For disposal, incinerate this material at a facility that complies with local, state, and federal regulations.

14. TRANSPORT INFORMATION

DOT

Not regulated for transport

Classification for SEA transport (IMO-IMDG):

Not regulated for transport

Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):

Not regulated for transport

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. REGULATORY INFORMATION

OSHA Hazard Communication Standard
This product is considered hazardous under the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312
Chronic Health Hazard

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning a nd Community Right-to-Know Act of 1986) Section 313
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Section 103
Calculated RQ exceeds reasonably attainable upper limit.

Components	CASRN	RQ
Toluene	108-88-3	1000 lbs RQ

Pennsylvania
Any material listed as "Not Hazardous" in the CAS REG NO. column of SECTION 2, Composition/Information On Ingredients, of this MSDS is a trade secret under the provisions of the Pennsylvania Worker and Community Right-to-Know Act.

California (Proposition 65)
This product contains a component or components known to the state of California to cause birth defects or other reproductive harm:

Components	CASRN
Toluene	108-88-3

United States TSCA Inventory (TSCA)
All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

16. OTHER INFORMATION

Hazard Rating System
HMIS

Health	Flammability	Physical Hazard
1	1	0

Revision
Identification Number: 101083238 / 1001 / Issue Date: 05/28/2015 / Version: 3.0
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

ACGIH	USA. ACGIH Threshold Limit Values (TLV)
BEI	Biological Exposure Indices
CEIL	Acceptable ceiling concentration
OSHA Z-2	USA. Occupational Exposure Limits (OSHA) - Table Z-2
Peak	Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift
TWA	8-hour, time-weighted average

Information Source and References
This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal references within our company.

THE DOW CHEMICAL COMPANY* urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.