ARCHITECTS & ENGINEERS for 9/11 TRUTH

September 28, 2020

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**Re: Appeal of the Initial Decision Regarding the Request for Correction to NIST's Final Report on the Collapse of World Trade Center Building 7 (Information Quality #20-01)**

Dear Dr. Olthoff:

This letter is an Appeal of the Initial Decision presumably made by Engineering Laboratory Director Howard Harary on behalf of the National Institute of Standards and Technology ("NIST"), communicated on August 28, 2020, in response to the Request for Correction (the "Request") submitted on April 15, 2020, by 10 family members of people killed on September 11, 2001, by 88 architects and structural engineers, and by the organization Architects & Engineers for 9/11 Truth, Inc. (referred to herein collectively as "Requesters").

The Request was submitted under Section 515 of Public Law 106-554 (commonly known as the Data Quality Act or Information Quality Act; herein referred to as the "DQA"), the Office of Management and Budget's ("OMB's") government-wide Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies (the "OMB Guidelines"), and NIST's "Guidelines, Information Quality Standards, and Administrative Mechanism" (the "NIST IQS"). The information that was the subject of this Request was NIST's *Final Report on the Collapse of the World Trade Center Building 7* (NCSTAR 1A) and NIST's *Fire Response and Probable Collapse Sequence of World Trade Center Building 7* (NCSTAR 1-9), collectively referred to herein as the "NIST WTC 7 Report." Secondarily, NIST's webpage titled *FAQs – NIST WTC 7 Investigation* (referred to herein as the "NIST WTC 7 FAQs") was also the subject of this Request. A copy of the original Request and all correspondence regarding the Initial Decision is enclosed herewith.

This Appeal is being submitted jointly by every Requester who jointly submitted the original Request. As before, the Requesters prefer to be contacted via email through the designated representative of Architects & Engineers for 9/11 Truth. The Requesters also request that NIST not distribute the Requesters' contact information listed below to anyone not officially involved in addressing this Request. If this Appeal is published on NIST's website or elsewhere, a redacted version should be published omitting the Requesters' contact information.

Pursuant to the OMB Guidelines, the NIST IQS provides an administrative appeal process to allow for objective and independent review of the agency's Initial Decision. Under the OMB Guidelines, "An objective process will ensure that the office that originally disseminates the information does not have responsibility for both the initial response and resolution of the disagreement." (*See* OMB Guidelines, Summary of OMB Guidelines.) The NIST IQS thus

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requires that appeals be made in writing to the NIST Associate Director for Laboratory Programs within 30 calendar days of the date of the Initial Decision and that "No individuals who were involved in the initial denial will be involved in the review of or response to the appeal." (*See* NIST IQS, Part III(D)(3). The NIST IQS further requires that appeals "include a statement of the reasons why the requester believes the initial denial was in error." (*See* NIST IQS, Part III(D)(1).)

The Requesters are submitting this Appeal because the Initial Decision is demonstrably in error and fails to provide a response to most of the relevant data quality arguments contained in the Request, instead offering wholly unsubstantive responses or no response at all to each of the central claims and requested corrections contained in the Request. These failures constitute a violation of the NIST IQS, which requires NIST to provide a "point-by-point response to any relevant data quality arguments contained in the request" when NIST denies a request. (*See* NIST IQS, Part III(C)(3).)

The Requesters now pray that you will objectively investigate and analyze the relevant material contained in the appeal record and, based on your findings, require the responsible NIST personnel to take the requested corrective actions. Should you conclude, however, that the arguments contained in the Request and in this Appeal are incorrect, the OMB Guidelines and the NIST IQS oblige you, in your Final Decision, to rectify the unresponsive nature of the Initial Decision by providing a substantive response to each relevant data quality argument, explaining fully why you have concluded that each relevant data quality argument is incorrect.

As described in the Request and further described in this Appeal, the NIST WTC 7 Report and the NIST WTC 7 FAQs contain information that clearly violates the DQA, the OMB Guidelines, and the NIST IQS, and such violations significantly and adversely affect Requesters. The eight items of information described in the Request that fail to comply with the DQA, the OMB Guidelines, and the NIST IQS are listed below in the order they were described in the Request and in which they will be discussed herein.

Part 1: NIST's Computer Simulations

A. Column 79 Side Plate (Request page 8; Appeal page 4)
B. Thermal Expansion of Beam K3004 (Request page 15; Appeal page 11)
C. Girder A2001 Web Stiffeners (Request page 18; Appeal page 17)
D. Reported Cascade of Floor Failures (Request page 22; Appeal page 23)
E. NIST's Global Collapse Analyses (Request page 26; Appeal page 30)

Part 2: NIST's Omission and Distortion of Evidence of Explosions and Incendiaries

F. Seismogram Data (Request page 49; Appeal page 47)
G. Eyewitness and Audio Evidence of Explosions (Request page 55; Appeal page 52)
H. Severely Eroded Steel from WTC 7 (Request page 80; Appeal page 66)

As you will find in your review of this Appeal, each of the eight information quality violations are clear, extreme, and integral to NIST's "Probable Collapse Sequence" for the

collapse of WTC 7 such that correcting them necessarily renders NIST's Probable Collapse Sequence invalid. Analysis of the first four information quality violations, provided in Sections A through D, demonstrates clearly that NIST's Probable Collapse Sequence is physically impossible. Analysis of the fifth information quality violation, provided in Section E, demonstrates clearly that NIST's Probable Collapse Sequence fails to match the observed structural behavior. Analysis of the last three information quality violations, provided in Sections F through H, demonstrates clearly that NIST's Probable Collapse Sequence is inconsistent with demonstrable evidence indicating the use of explosives and incendiaries.

The solution for correcting all of these information quality violations is scientifically straightforward: Discard the Probable Collapse Sequence and develop a new Probable Collapse Sequence that is physically possible, matches the observed behavior well, and is consistent with demonstrable evidence indicating the use of explosives and incendiaries.

NIST, established in 1901, has a long and honorable history of scientific integrity and excellence, including having the distinction of having several of its scientists win the Nobel Prize for their work at NIST. But the NIST WTC 7 Report and NIST's related public statements, as explained in detail herein, do not reflect NIST's long-demonstrated integrity and excellence. This Appeal offers NIST a rapidly closing window of opportunity to re-establish its public reputation as an agency that is committed to performing its scientific mission with both integrity and excellence.

It is the sincere belief of the Requesters that we now stand at a critical moment in history. The actions of persons with integrity at key decision points during this time will determine the fate of future generations in this country, and beyond, for better, or for worse. The Appeal that is now before you as the Agency's appellate decision maker is not just another routine agency decision. Your decision on this Appeal is one of those key decision points at this critical moment in history. We have, via the information in this Appeal, provided you the opportunity and the means to correct NIST's course in a manner that promotes the public interest on this matter of utmost importance.

## A. COLUMN 79 SIDE PLATE

The central claim in Section A of the Request is that NIST's 16-story ANSYS model ignored the effect that Column 79's side plate would have had in preventing the walk-off of Girder A2001 on Floor 13, thus violating the OMB Guidelines and the NIST IQS. The primary requested corrections were for NIST to (1) revise the NIST WTC 7 Report to reflect that the Column 79 side plate would have prevented Girder A2001 from moving westward enough to walk off its support at Column 79, and (2) discard its Probable Collapse Sequence and develop a new Probable Collapse Sequence that is physically possible.

In addition, in the event that NIST maintained that Girder A2001 was able to move past the Column 79 side plate, Section A alternatively requested that NIST "amend the NIST WTC 7 Report to include analysis that satisfies the objectivity, utility, transparency, and reproducibility standards of information quality." (*See* the Request, p. 15.) Specifically, this would mean amending the NIST WTC 7 Report to include analysis, calculations, or figures explaining how Girder A2001 moved westward past the Column 79 side plate in its 16-story ANSYS model — as no such analysis, calculations, or figures are contained in the NIST WTC 7 Report.

As described more fully below, NIST's response to the central claim and the two primary requests in Section A is demonstrably in error and wholly unsubstantive. The question at hand is whether Girder A2001 would become trapped behind the Column 79 side plate when it and the adjoining northeast floor beams are heated to the temperatures at which NIST alleges the initiating failure occurred. The Initial Decision completely avoids discussing the behavior of Girder A2001 at these elevated temperatures, thus failing to respond to the relevant data quality arguments contained in Section A. In addition, the Initial Decision completely avoids responding to the alternative request that NIST amend the NIST WTC 7 Report to include analysis that satisfies the objectivity, utility, transparency, and reproducibility standards of information quality (in the event that NIST maintained that Girder A2001 was able to move past the Column 79 side plate).

### 1. NIST's Erroneous and Unsubstantive Response to Section A

Removing the nonessential opening and closing sentences of NIST's response to Section A, the response reads as follows:

> *NIST disagrees that the 16-story ANSYS model ignored the effect that Column 79's side plate would have on the walk-off of Girder A2001. The full-scale model has detailed connection models that are consistent with the fabrication shop drawings, as shown in Figures 8-21 and 11-15 of the WTC 7 report. The Girder A2001 and Column 79 connection locates the bolts on a seated connection attached to the exterior edges of the Column 79 side plates, with the girder axis at a slight angle to Column 79.*
>
> *The 16-story model was based on architectural and structural drawings of the original building and subsequent building alterations, as well as erection and shop fabrication drawings (NCSTAR 1A, page 36), to ensure that the information*

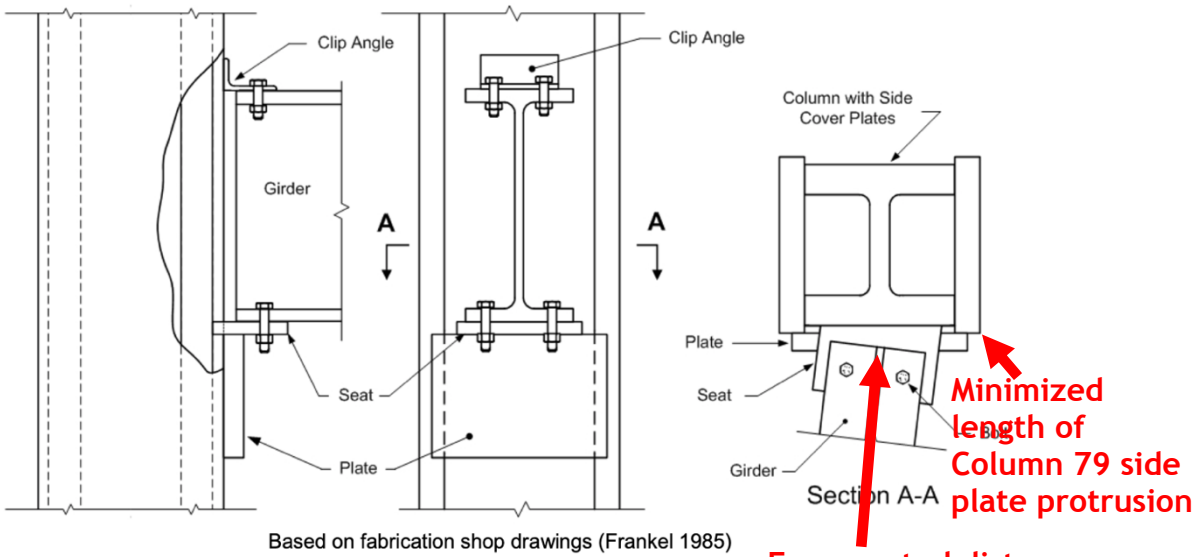
*used to develop the model was accurate, reliable, and unbiased. The model development was further informed by preliminary analyses of structural behavior, with consideration of loads, thermal effects, contact between elements, and potential failure modes. The 16-story model development complies with the OMB Guidelines and NIST IQS.*

In essence, NIST does two things in its response: (1) It makes general assertions about the validity of its 16-story ANSYS model. (2) It describes the spatial relationship between Girder A2001, Column 79, and their connection at room temperature, which it does both by citing Figures 8-21 and 11-5 in NCSTAR 1-9 and by describing it in words.

NIST's general assertions about the validity of its 16-story ANSYS model do not address the central claim nor the underlying relevant data quality arguments contained in Section A.

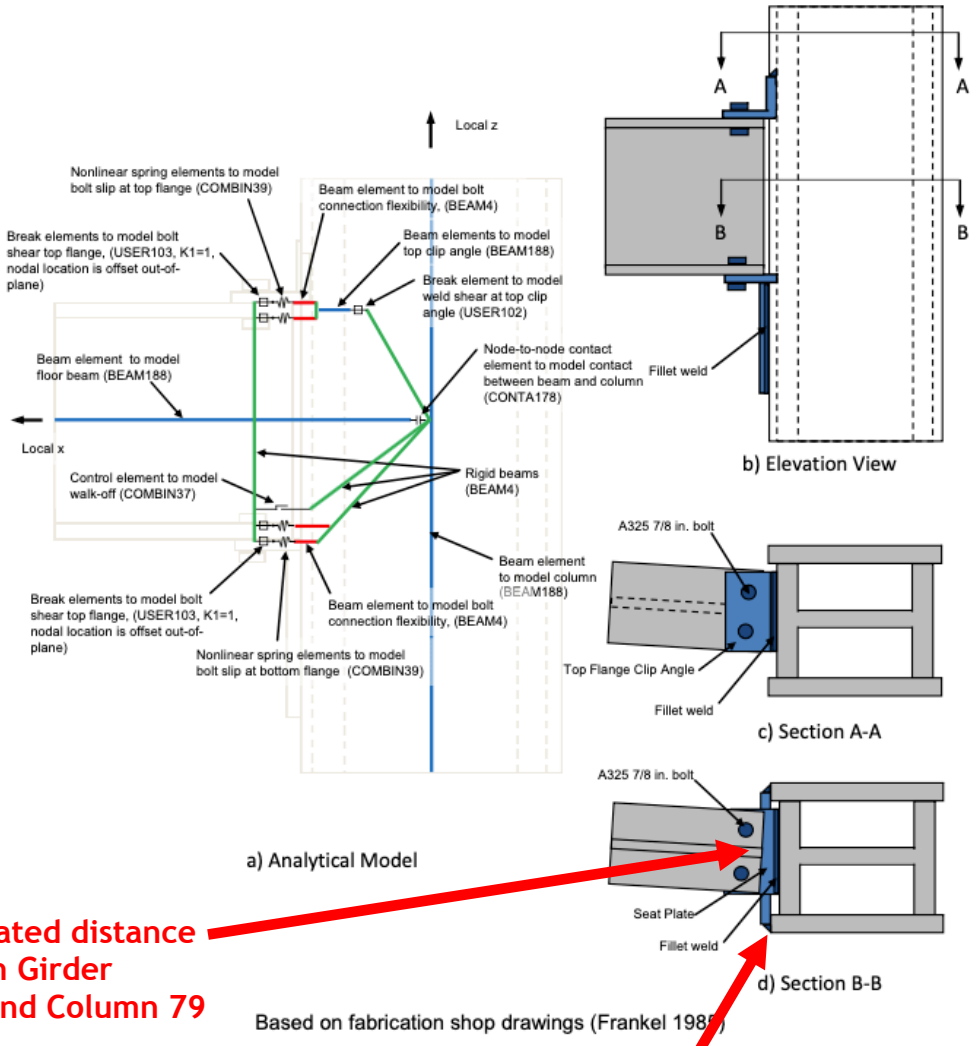
Similarly, NIST's description of the spatial relationship between Girder A2001, Column 79, and their connection at room temperature does not address the central claim nor the underlying relevant data quality arguments contained in Section A, because the question at hand is whether Girder A2001 would become trapped behind the Column 79 side plate when it and the adjoining northeast floor beams are heated to the temperatures at which NIST alleges the initiating failure occurred.

As noted above, Figures 8-21 and 11-5, which are shown below, only show the position of Girder A2001 in relation to Column 79 at room temperature and not at elevated temperatures. Furthermore, Figures 8-21 and 11-5 have the potential to mislead because they are not drawn to scale. As shown below, comparing Figures 8-21 and 11-5 to a figure that is drawn to scale (*see* Brookman 2012, p. 7) demonstrates that Figures 8-21 and 11-5 exaggerate the distance between Girder A2001 and Column 79 and minimize the length of the Column 79 side plate protrusion, and that Figure 8-21 also exaggerates the angle of Girder A2001 in relation to Column 79.




Based on fabrication shop drawings (Frankel 1985)

**Figure 8–21. Seat connection at Column 79.**




Based on fabrication shop drawings (Frankel 1988)

**Figure 11–15 Analytical model for the seated connection at Column 79.**

Exaggerated distance between Girder A2001 and Column 79

Minimized length of Column 79 side plate protrusion

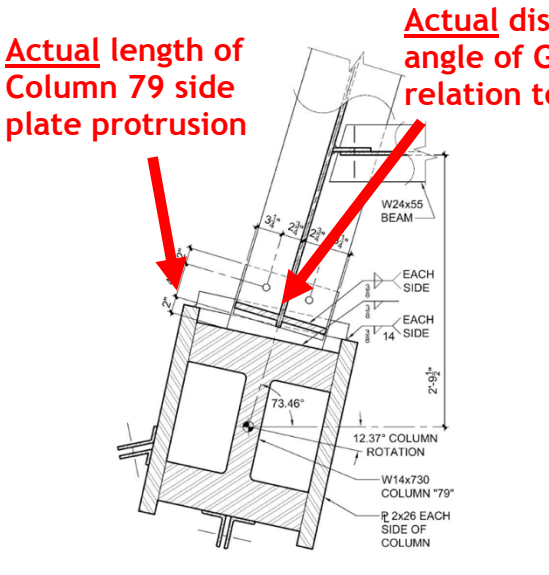
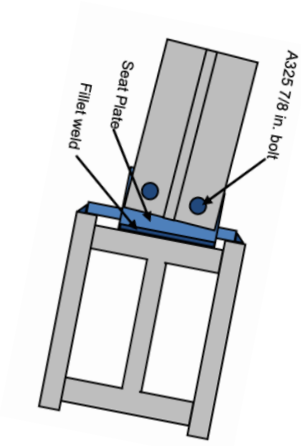


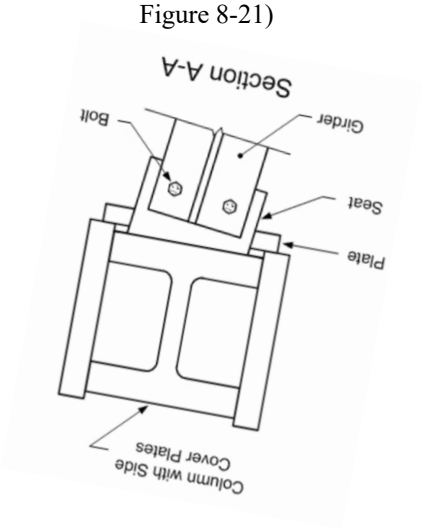

Figure 1: Plan View at Floor 13, Column 79 Seated-Beam Connection

(Data from Frankel Steel Limited, 1985b)




(Zoomed in, rotated view of Figure 11-5)

(Zoomed in, rotated view of Figure 8-21)




By merely making general assertions about the validity of its 16-story ANSYS model and merely describing the position of Girder A2001 in relation to Column 79 at room temperature, the Initial Decision completely avoids discussing the behavior of Girder A2001 when it and the adjoining northeast floor beams are heated to the elevated temperatures at which NIST alleges the initiating failure occurred, thus failing to respond to the relevant data quality arguments contained in Section A.

Specifically, the Initial Decision fails to respond to the following relevant data quality arguments contained in Section A:

1. Preliminary analysis conducted by NIST using LS-DYNA software, presented in Section 8.8 of NCSTAR 1-9, as well as analysis conducted at the University of Alaska Fairbanks (UAF) using ABAQUS software, demonstrates that when Girder A2001 and the adjoining floor beams are heated according to NIST's assumptions (to 500 °C and 600 °C, respectively), Girder A2001 expands and becomes trapped behind the side plate on the western side of Column 79 as it is pushed to the west by the thermally expanding floor beams. The trapping of Girder A2001 behind the Column 79 side plate in NIST's preliminary LS-DYNA analysis is illustrated graphically in Figure 8-26 of Section 8.8 shown below. The trapping of Girder A2001 behind the Column 79 side plate in the UAF analysis is illustrated graphically in Figure 3.4 of the UAF Report shown below.

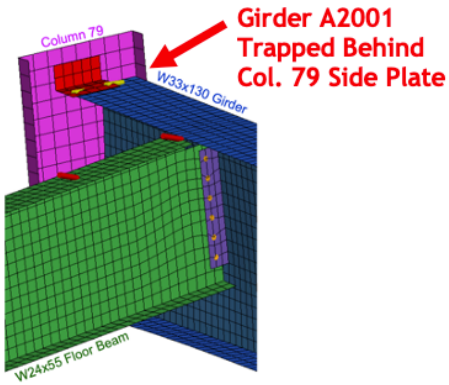



**Figure 8–26. Lateral displacement of girder due to thermal expansion of floor beam.**
Note: failed bolts and shear studs

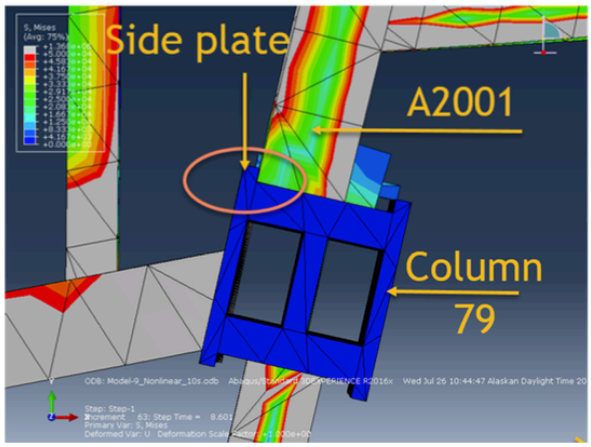



Figure 3.4 Plan view showing girder A2001 trapped by the Column 79 side plate.

2. Contradicting the finding of its preliminary LS-DYNA analysis that Girder A2001 would become trapped behind the side plate on the western side of Column 79 — a finding corroborated by the UAF analysis — NIST somehow ultimately concludes that "the floor beams on the east side of the building expanded enough that they pushed the girder spanning between Columns 79 and 44 **to the west on the 13th floor. . . . This movement was enough for the girder to walk off of its support at Column 79.**" (*See* NCSTAR 1A, p. 22. Emphasis added.) Yet the NIST WTC 7 Report provides no analysis, calculations, or figures explaining how Girder A2001 moved westward past the Column 79 side plate enough for it to walk off of its support at Column 79 in its 16-story ANSYS model.

3. The only place where NIST addresses the discrepancies between its preliminary LS-DYNA analysis and its 16-story ANSYS model is in FAQ #35 of the NIST WTC 7 FAQs. However, the reasons given in FAQ #35 for discrepancies between the results of the preliminary LS-DYNA analysis and the 16-story ANSYS model fall well short of explaining to an acceptable degree of scientific precision why Girder A2001 became trapped behind the Column 79 side plate in the preliminary LS-DYNA analysis but not in the 16-story ANSYS model.

    a. Regarding the first reason stated in NIST WTC 7 FAQ #35, since NIST does not specify how the computed temperatures produced different results from the simplified thermal loading scenario, we are left to assume that the computed temperatures may have heated the floor beams first and caused Girder A2001 to be pushed at least 3.678 inches to the west (the distance between the edge of Girder A2001 and the Column 79 side plate) *before* it expanded enough to become trapped behind the Column 79 side plate. However, calculations regarding the thermal expansion potential of Girder A2001 (*see* the Request, p. 12) demonstrate that it needed to be heated only to 70 °C to move within the envelope of the Column 79 side plate if unrestrained. Reinforcing these calculations, NIST's own preliminary LS-DYNA analysis results (*see* NCSTAR 1-9, p. 352-353; the Request, p. 13) demonstrate that at 131 °C, there was sufficient expansion of Girder A2001 to cause the seat bolts at Column 79 to fail. At 164 °C, there was sufficient expansion of Girder A2001 to cause both top clip bolts at Column 79 to fail. Once unrestrained due to these connection failures and exceeding 160 °C,

Girder A2001 would move at least 0.367 inches within the envelope of the Column 79 side plate. (*See* the Request, p. 12.)

The Case B floor temperatures used in NIST's 16-story ANSYS model are somewhat difficult to decipher in Figure 10-39. (*See* NCSTAR 1-9, p. 432; the Request, p. 14.) (The Case B floor temperatures are the computed worst-case scenario temperatures, which NIST then used in its global collapse analyses.) Nevertheless, careful review indicates that the temperatures of Girder A2001 and the floor beams to its east were approximately the same until at least 3:30 PM (3 hours into the thermal analysis), and that Girder A2001 reached temperatures around 164 °C (enough for the Column 79 connection to fail and for Girder A2001 to move within the envelope of the Column 79 side plate) long before the floor beams to its east were heated sufficiently to push Girder A2001 to the west at least 3.678 inches. Focusing on beam K3004, which was the closest beam to Column 79 framing into Girder A2001, and thus dictated the extent of westward displacement of Girder A2001 at Column 79, the thermal expansion from room temperature length would be only 2.527 inches at 300 °C and would not reach 3.700 inches until 430 °C (based on NIST's Coefficient of Thermal Expansion (CTE) value for steel of $1.4 \times 10^{-5}$ in/in-°C, and the room temperature (20 °C) length of beam K3004 of 644-11/16 inches).

b. Regarding the second reason stated in NIST WTC 7 FAQ #35 for discrepancies between the preliminary LS-DYNA analysis and the 16-story ANSYS model, neither the NIST WTC 7 Report nor the NIST WTC 7 FAQs provide any narrative description, let alone supporting analysis, indicating that Column 79 experienced any displacement that would have facilitated the walk-off of Girder A2001. While NIST offers only a vague mention of the possibility of column displacement, the UAF analysis finds that Column 79 would have been pushed to the east 1.8 to 1.915 inches and to the north 0.73 to 0.94 inches when heated according to NIST's assumptions, but that the westward displacement of Girder A2001 relative to Column 79 would be less than 1 inch. (*See* UAF Report, p. 66, p. 71.)

c. Meanwhile, the third reason stated in NIST WTC 7 FAQ #35 for discrepancies between the preliminary LS-DYNA analysis and the 16-story ANSYS model does not apply to the question of whether Girder A2001 would become trapped behind the Column 79 side plate.

4. In summary, NIST's preliminary LS-DYNA analysis and the UAF analysis demonstrate that Girder A2001 would have become trapped behind the Column 79 side plate when heated according to NIST's assumptions. Thus, the first major step leading to the initiating local failure in NIST's Probable Collapse Sequence — the walk-off of Girder A2001 — was physically impossible. Furthermore, the NIST WTC 7 Report does not provide any analyses, calculations, or figures sufficient to demonstrate that Girder A2001 could have moved past the Column 79 side plate enough to walk off its support at Column 79. Thus, we deduce that NIST's 16-story ANSYS model ignored the effect that Column 79's side plate would have had in preventing the walk-off of Girder A2001.

5. As a result, NIST's claim that Girder A2001 moved past the Column 79 side plate fails to comply with the OMB Guidelines and NIST IQS because it lacks objectivity, utility, transparency, and reproducibility. First, NIST's claim is inaccurate, unreliable, and apparently biased because it contradicts the valid findings of its own analysis and those of the UAF analysis, thus violating the objectivity element of information quality under the OMB Guidelines and NIST IQS, which requires information disseminated by NIST to be "accurate, reliable, and unbiased." (*See* NIST IQS, Part II.) NIST's claim also violates the objectivity element of information quality because it is not presented in a complete manner. Second, NIST's claim violates the utility element of information quality because care was not taken to make sufficient background and detail available regarding its claim, even though greater transparency would have enhanced the usefulness of the information disseminated. NIST merely provides a brief summary of its analysis results and a superficial FAQ that falls well short of explaining the discrepancies in its analyses to an acceptable degree of scientific precision. Third, NIST's claim violates the transparency standard imposed upon influential information because NIST did not practice a degree of transparency sufficient to facilitate reproducibility. Finally, NIST's claim violates the reproducibility standard imposed upon influential information because — to the extent that independent analysis of the original data using identical methods could be performed — contradictory analytic results were generated by the UAF researchers.

In summary, NIST's response to Section A is demonstrably in error and wholly unsubstantive because it fails to rebut or even address the valid argument — corroborated by its own preliminary LS-DYNA analysis — that when Girder A2001 and the adjoining floor beams are heated according to NIST's assumptions, Girder A2001 expands and becomes trapped behind the side plate on the western side of Column 79 as it is pushed to the west by the thermally expanding floor beams.

### 2. Actions NIST Must Take to Comply with the DQA, OMB Guidelines, and NIST IQS

To comply with the DQA, the OMB Guidelines, and the NIST IQS, NIST must take one of the following three actions. In the Requesters' view, only the first action is analytically sound.

1. Revise the NIST WTC 7 Report to reflect that the Column 79 side plate would have prevented Girder A2001 from moving westward enough to walk off its support at Column 79. NIST must then discard its Probable Collapse Sequence and develop a new Probable Collapse Sequence that is physically possible; or

2. Amend the NIST WTC 7 Report to include analysis that satisfies the objectivity, utility, transparency, and reproducibility standards of information quality — i.e., analysis, calculations, or figures explaining how Girder A2001 moved westward past the Column 79 side plate in its 16-story ANSYS model when, in the preliminary LS-DYNA analysis, it became trapped behind the Column 79 side plate. In particular, NIST must identify both the temperature of Girder A2001, the amount of thermal expansion of Girder A2001, and the distance of Girder A2001 from the Column 79 side plate at the moment Girder A2001 moved past the Column 79 side plate. Also, your Final Decision must include a substantive response

to each of the relevant data quality arguments listed above, which would essentially be the same analysis that would be added to the NIST WTC 7 Report explaining how Girder A2001 moved westward past the Column 79 side plate in its 16-story ANSYS model but not in its preliminary LS-DYNA analysis; or

3. Provide a substantive response in your Final Decision to each of the relevant data quality arguments listed above. Your Final Decision must include analysis, calculations, or figures explaining how Girder A2001 moved westward past the Column 79 side plate in the 16-story ANSYS model when, in the preliminary LS-DYNA analysis, it became trapped behind the Column 79 side plate. In particular, this analysis must identify both the temperature of Girder A2001, the amount of thermal expansion of Girder A2001, and the distance of Girder A2001 from the Column 79 side plate at the moment Girder A2001 moved past the Column 79 side plate. In addition, your Final Decision must identify where these analyses, calculations, or figures are already contained in the NIST WTC 7 Report, thus precluding the need to amend the report.

## B. THERMAL EXPANSION OF BEAM K3004

The central claim in Section B of the Request is that NIST ignored the limit of how far beam K3004 could thermally expand and its resulting inability to cause the walk-off of Girder A2001, thus violating the OMB Guidelines and NIST IQS. The primary requested corrections were for NIST to (1) revise the NIST WTC 7 Report to reflect that beam K3004 could not thermally expand enough to cause the walk-off of Girder A2001, and (2) discard its Probable Collapse Sequence and develop a new Probable Collapse Sequence that is physically possible.

In addition, in the event that NIST maintained that beam K3004 was able to thermally expand enough to cause the walk-off of Girder A2001, Section B alternatively requested that NIST "amend the NIST WTC 7 Report to include analysis that satisfies the objectivity, utility, transparency, and reproducibility standards of information quality." (*See* the Request, p. 18.) Specifically, this would mean amending the NIST WTC 7 Report to include analysis, calculations, or figures explaining how beam K3004 expanded sufficiently to make Girder A2001 walk off of its support at Column 79 in its 16-story ANSYS model — including, most importantly, a value for the westward thermal expansion of beam K3004 — as no such analysis, calculations, or figures are contained in the NIST WTC 7 Report.

As described more fully below, NIST's response to the central claim and the two primary requests in Section B is demonstrably in error and wholly unsubstantive. The question at hand is whether the thermal expansion of beam K3004 did indeed dictate the extent of westward displacement of Girder A2001 at Column 79 and whether beam K3004 could expand westward the 6.25 inches needed to cause the walk-off of Girder A2001. The Initial Decision completely avoids discussing whether the thermal expansion of beam K3004 dictated the extent of westward displacement of Girder A2001 at Column 79 and also completely avoids discussing the actual amount of thermal expansion of beam K3004, thus failing to respond to the relevant data quality arguments contained in Section B. In addition, the Initial Decision completely avoids responding to the alternative request that NIST amend the NIST WTC 7 Report to include analysis that

satisfies the objectivity, utility, transparency, and reproducibility standards of information quality (in the event that NIST maintained that beam K3004 was able to thermally expand enough to cause the walk-off of Girder A2001).

### 1. NIST's Erroneous and Unsubstantive Response to Section B

Removing the nonessential opening and closing sentences of NIST's response to Section B, the response reads as follows:

> *NIST disagrees that NIST ignored the limit of how far Beam K3004 could thermally expand or its contribution to the walk-off of Girder A2001. The full-scale 16-story ANSYS model was based on architectural and structural drawings of the original building and subsequent building alterations, as well as erection and shop fabrication drawings (NCSTAR 1A, page 36), with detailed connection models between structural steel members and concrete floor slabs (NCSTAR 1-9, Section 11.2.5) and thermal data from simulations of the fire growth and spread in WTC 7 (NCSTAR 1-9, Section 9.3 and Section 10.3) that were validated against numerous photograph and video records (NCSTAR 1-9, Section 5.6 and Section 9.5).*
>
> *The 16-story model was developed so that all floor beams and girders could fully respond to the loads and temperature effects, including thermal expansion, deflections, and failure modes within the load paths of the structural system (NCSTAR 1-9, Section 11.2). As the northeast floor beams thermally expanded, all the floor beams had connections to the Girder and expanded against Girder A2001 until the connection at Col 79 failed, as shown in Figure 11-48.*
>
> *The 16-story ANSYS model was based on architectural and structural drawings of the original building and subsequent building alterations, as well as erection and shop fabrication drawings (NCSTAR 1A, page 36), to ensure that the information used to develop the model was accurate, reliable, and unbiased. The model development was further informed by preliminary analyses of structural behavior, with consideration of loads, thermal effects, contact between elements, and potential failure modes (NCSTAR 1A, Section 8.8). The 16-story model development complies with the OMB Guidelines and NIST IQS.*

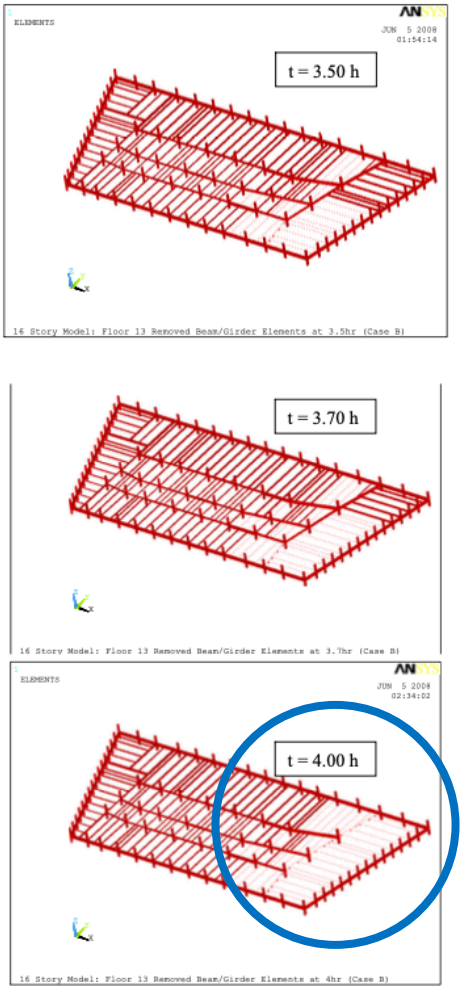
In essence, NIST does two things in its response: (1) It makes general assertions about the validity of its 16-story ANSYS model. (2) In the last sentence of the second paragraph cited above, it restates a key step in its Probable Collapse Sequence — namely, that the northeast floor beams thermally expanded against Girder A2001 until the connection at Column 79 failed.

NIST's general assertions about the validity of its 16-story ANSYS model, which comprise most of NIST's response to Section B, do not address the central claim nor the underlying relevant data quality arguments contained in Section B.

Similarly, NIST's restatement of a key step in its Probable Collapse Sequence — that the northeast floor beams thermally expanded against Girder A2001 until the connection at Column

79 failed — does not address the central claim nor the underlying relevant data quality arguments contained in Section B, because the question at hand is whether the thermal expansion of beam K3004 alone dictated the extent of westward displacement of Girder A2001 at Column 79 and whether beam K3004 could expand westward the 6.25 inches needed to cause the walk-off of Girder A2001. In particular, NIST's statement that the northeast floor beams thermally expanded against Girder A2001 "until the connection at Column 79 failed" is unresponsive because it does not address at all how far beam K3004 thermally expanded after the connection at Column 79 had failed, and thus how far Girder A2001 was pushed westward. In other words, NIST's response does not address the walk-off of Girder A2001 but only the failure of the Girder A2001 connection at Column 79.

In addition, NIST's reference to Figure 11-48 (shown below) does not address the central claim nor the underlying relevant data quality arguments contained in Section B, because Figure 11-48 merely identifies which beams and girders buckled or had connection end damage in NIST's analysis. It does not actually explain or illustrate how beam K3004 expanded sufficiently to make Girder A2001 walk off of its support at Column 79.




Beams and girders that buckled or had end connection damage are indicated with dotted lines.

**Figure 11–48. Floor 13 Case B temperatures at 3.5h to 4.0 h.**

**Figure 11-48 merely identifies that Girder A2001's connection at Column 79 failed in NIST's 16-story ANSYS model. It does not explain how beam K3004 expanded sufficiently to make Girder A2001 walk off its support at Column 79.**

By merely making general assertions about the validity of its 16-story ANSYS model and merely restating that the northeast floor beams thermally expanded against Girder A2001 until the connection at Column 79 failed, the Initial Decision completely avoids discussing whether the thermal expansion of beam K3004 did indeed dictate the extent of westward displacement of Girder A2001 at Column 79 and also completely avoids discussing the actual amount of thermal expansion of beam K3004, thus failing to respond to the relevant data quality arguments contained in Section B.

Specifically, the Initial Decision fails to respond to the following relevant data quality arguments contained in Section B:

1. Beam K3004 was the closest beam to Column 79 framing into Girder A2001 from the east. Therefore, the thermal expansion of beam K3004 dictated the extent of westward displacement of Girder A2001 at Column 79. Beam K3004 (along with Girder A2001 and Column 79) is indicated in Figure 1-5 of NCSTAR 1-9 below.

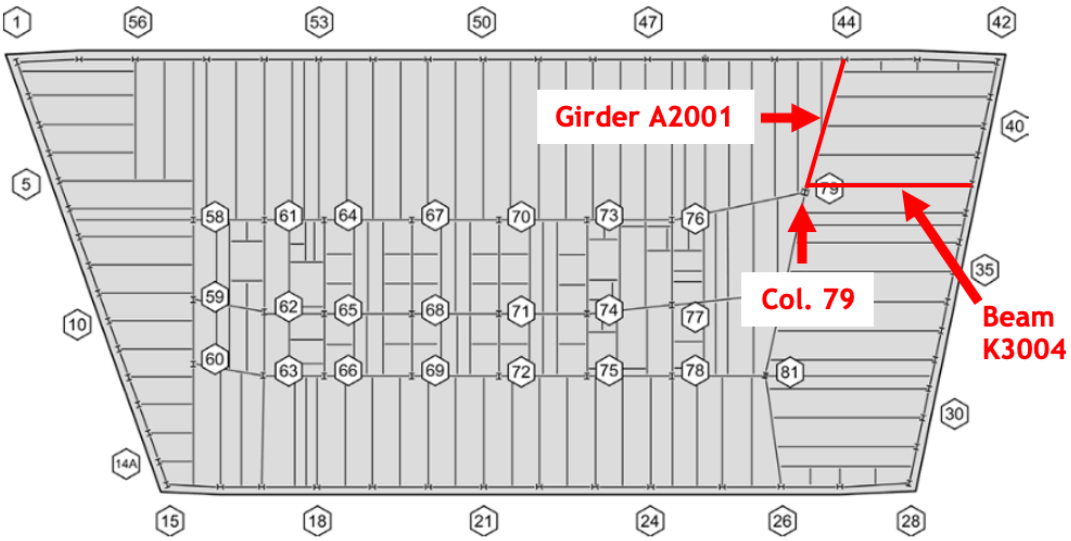



**Figure 1–5. Typical WTC 7 floor showing locations of the columns, girders, and beams.**

   a. As an addendum to this point, it should be noted that — when NIST states in its Initial Decision that "all the floor beams had connections to the Girder and expanded against Girder A2001 until the connection at Col 79 failed" — NIST effectively confirms that the connection between beam K3004 and Girder A2001 did not break in its 16-story ANSYS model. NIST's confirmation that this connection did not break is relevant because had the connection broken, the thermal expansion of beam K3004 would no longer dictate the extent of westward displacement of Girder A2001 at Column 79. But as long as that connection was intact, beam K3004 would continue to dictate the extent of westward displacement of Girder A2001 at Column 79. The expansion of the other northeast beams could cause Girder A2001 to bend, but the end of Girder A2001 could move only as far as beam K3004 expanded.

2. Initially, the NIST WTC 7 Report stated that the amount of westward displacement required to make Girder A2001 walk off its support at Column 79 was 5.5 inches, based on the bearing seat having a width of 11 inches. Subsequently, independent researchers discovered that the bearing seat at Column 79 was actually 12 inches wide and informed NIST of the error. In response, NIST issued an erratum in June 2012 that adjusted the bearing seat width to 12 inches and the distance needed for walk-off to 6.25 inches. In its erratum, NIST claimed that the errors were merely typographical and that "[t]he dimensions and lateral displacements used in the analyses were correct. (*See* Errata for NIST NCSTAR 1A, NIST NCSTAR 1-9, and NIST NCSTAR 1-9A, p. 2.)

3. However, the correction from 5.5 inches to 6.25 inches in fact made the walk-off of Girder A2001 under NIST's Probable Collapse Sequence physically impossible for a second reason. As shown in the Exhibit D spreadsheet of the Request, which calculates the thermal expansion of beam K3004 at different temperatures, the maximum net thermal expansion of beam K3004 is 5.728 inches, which occurs at 654 °C. It is at this temperature that the marginal increase in shortening due to heat-induced sagging begins to exceed the marginal increase in heat-induced expansion. Beam K3004 thus becomes progressively shorter as it is heated to higher temperatures. Therefore, it was physically impossible for beam K3004 to push Girder A2001 westward at least 6.25 inches, because the furthest beam K3004 could expand was 5.728 inches.

4. The NIST WTC 7 Report provides no analysis, calculations, or figures explaining how beam K3004 expanded sufficiently to make Girder A2001 walk off of its support at Column 79 in its 16-story ANSYS model.

5. In summary, straightforward analysis of how far beam K3004 could thermally expand demonstrates that the first major step leading to the initiating local failure in NIST's Probable Collapse Sequence is physically impossible for a second reason. Even if Girder A2001 had *not* become trapped behind the Column 79 side plate, it would not have walked off its support at Column 79, because the maximum thermal expansion of beam K3004 was less than the 6.25 inches needed to push the web of Girder A2001 past the edge of its bearing seat.

6. As a result, NIST's claim that beam K3004 expanded enough that it caused Girder A2001 to walk off of its support at Column 79 fails to comply with the OMB Guidelines and NIST IQS because it lacks objectivity, utility, transparency, and reproducibility. First, NIST's claim is inaccurate, unreliable, and apparently biased because it is inconsistent with the limit of how far beam K3004 could thermally expand. Second, NIST's failure to show how far beam K3004 expanded in its 16-story ANSYS model violates the objectivity element of information quality because NIST's claim is not presented in a complete manner. If the analyses indicated that Girder A2001 was pushed laterally at least 6.25 inches, as NIST claimed in its June 2012 erratum, NIST should specify how far beam K3004 expanded. NIST's failure to show how far beam K3004 expanded also violates the utility element of information quality because care was not taken to make sufficient background and detail available regarding its claim, even though greater

transparency would have enhanced the usefulness of the information disseminated. Third, NIST's claim violates the transparency standard imposed upon influential information because NIST did not practice a degree of transparency sufficient to facilitate reproducibility. Finally, NIST's claim violates the reproducibility standard imposed upon influential information because — to the extent that independent analysis of the original data could be performed — contradictory analytic results were generated.

In summary, NIST's response to Section B is demonstrably in error and wholly unsubstantive because it fails to rebut or even address the valid argument that the thermal expansion of beam K3004 dictated the extent of westward displacement of Girder A2001 at Column 79, and the valid argument that it was physically impossible for beam K3004 to push Girder A2001 westward at least 6.25 inches because the furthest that beam K3004 could expand was 5.728 inches.

### 2. Actions NIST Must Take to Comply with the DQA, OMB Guidelines, and NIST IQS

To comply with the DQA, the OMB Guidelines, and the NIST IQS, NIST must take one of the following three actions. In the Requesters' view, only the first action is analytically sound.

1. Revise the NIST WTC 7 Report to reflect that beam K3004 could not thermally expand enough to cause the walk-off of Girder A2001. NIST must then discard its Probable Collapse Sequence and develop a new Probable Collapse Sequence that is physically possible; or

2. Amend the NIST WTC 7 Report to include analysis that satisfies the objectivity, utility, transparency, and reproducibility standards of information quality — i.e., analysis, calculations, or figures explaining how beam K3004 expanded sufficiently to make Girder A2001 walk off of its support at Column 79 in its 16-story ANSYS model. In particular, NIST must provide a value for **exactly** how far beam K3004 expanded westward. Also, your Final Decision must include a substantive response to each of the relevant data quality arguments listed above, which would essentially be the same analysis that would be added to the NIST WTC 7 Report explaining how beam K3004 expanded sufficiently to make Girder A2001 walk off of its support at Column 79. In particular, your Final Decision must include a substantive response explaining why the thermal expansion analysis contained in the Exhibit D spreadsheet of the Request is incorrect; or

3. Provide a substantive response in your Final Decision to each of the relevant data quality arguments listed above. Your Final Decision must include analysis, calculations, or figures explaining how beam K3004 expanded sufficiently to make Girder A2001 walk off of its support at Column 79 in its 16-story ANSYS model. In particular, this analysis must include a value for **exactly** how far beam K3004 expanded westward, and it must include a substantive response explaining why the thermal expansion analysis contained in the Exhibit D spreadsheet of the Request is incorrect. In addition, your Final Decision must identify where these analyses, calculations, or figures are already contained in the NIST WTC 7 Report, thus precluding the need to amend the report.

## C. GIRDER A2001 WEB STIFFENERS

The central claim in Section C of the Request is that NIST omitted the presence of web stiffeners on Girder A2001 that would have prevented the flange failure and walk-off of Girder A2001, thus violating the OMB Guidelines and NIST IQS. The primary requested corrections were for NIST to (1) perform new analyses that include the partial height web stiffeners on Girder A2001 and revise the NIST WTC 7 Report to reflect that Girder A2001 would not have walked off its support at Column 79, and (2) discard its Probable Collapse Sequence and develop a new Probable Collapse Sequence that is physically possible.

In addition, in the event that NIST maintained that Girder A2001 was able to walk off its support at Column 79 despite the presence of the web stiffeners, Section C alternatively requested that NIST "amend the NIST WTC 7 Report to include analysis that satisfies the objectivity, utility, transparency, and reproducibility standards of information quality." (*See* the Request, p. 21.) Specifically, this would mean amending the NIST WTC 7 Report to include analysis, calculations, or figures explaining how Girder A2001 could actually walk off of its support at Column 79 despite the presence of the web stiffeners — as no such analysis, calculations, or figures are contained in the NIST WTC 7 Report.

As described more fully below, NIST's response to the central claim and the two primary requests in Section C is demonstrably in error and wholly unsubstantive. The Initial Decision justifies NIST's omission of the web stiffeners from its 16-story ANSYS model by making the irrational claim that because flange bending did not occur in the preliminary LS-DYNA analysis with the web stiffener omitted, the web stiffener was "not needed" to prevent flange bending in the 16-story ANSYS model, even though flange bending **must occur** for Girder A2001 to walk off its support at Column 79 when pushed westward at least 6.25 inches. The Initial Decision avoids discussing whether flange bending must occur for Girder A2001 to walk off its support at Column 79 and whether the web stiffener would prevent such flange bending. In addition, the Initial Decision completely avoids responding to the alternative request that NIST amend the NIST WTC 7 Report to include analysis that satisfies the objectivity, utility, transparency, and reproducibility standards of information quality (in the event that NIST maintained that Girder A2001 was able to walk off its support at Column 79 despite the presence of the web stiffeners).

### 1. NIST's Erroneous and Unsubstantive Response to Section C

Removing the nonessential opening and closing sentences of NIST's response to Section C, the response reads as follows:

> *NIST disagrees that the presence of web stiffeners on Girder A2001 was needed in the 16-story model to prevent flange failure and walk-off of Girder A2001. The preliminary analysis of the northeast corner floor system in Chapter 8 of the WTC 7 report used a modeling approach (shell elements) that could simulate a range of failure modes, including local deformations or buckling/crippling of steel beam flange and web elements. The partial height web stiffener for Girder A2001 in Frankel shop drawing #9114 was not included in the preliminary analyses. Web stiffeners increase the buckling resistance of the web element, such*

> *as when a floor area is subject to its full design live load. However, as the building had been evacuated, the floor live loads were minimal. A conservative approach was to evaluate Girder A2001 for the potential occurrence of deformation and buckling failure modes without the web stiffener in the preliminary analyses (NCSTAR 1-9 Section 8.8). Even though the applied floor load and temperatures in the preliminary analyses (NCSTAR 1-9 Section 8.8) exceeded those in the 16-story ANSYS model (NCSTAR 1-9 Section 11.2) by a factor of 2 or more, Girder A2001 did not experience any deformation of its web or flange elements at the seated connection to Column 79 in the absence of the web stiffeners. Therefore, the web stiffener was not needed to prevent web or flange buckling or bending in the 16-story ANSYS model.*
>
> *The 16-story model was based on architectural and structural drawings of the original building and subsequent building alterations, as well as erection and shop fabrication drawings (NCSTAR 1A, page 36), to ensure that the information used to develop the model was accurate, reliable, and unbiased. The model development was further informed by preliminary analyses of structural behavior, with consideration of loads, thermal effects, contact between elements, and potential failure modes (NCSTAR 1A, Section 8.8). The 16-story model development complies with the OMB Guidelines and NIST IQS.*

In essence, NIST does two things in its response: (1) In the second paragraph cited above, it makes general assertions about the validity of its 16-story ANSYS model. (2) In the first paragraph cited above, it provides a justification for the omission of the web stiffeners from its 16-story ANSYS model.

NIST's general assertions about the validity of its 16-story ANSYS model do not address the central claim nor the underlying relevant data quality arguments contained in Section C.

NIST's justification for the omission of the web stiffeners from its 16-story ANSYS model might be construed as partially addressing the central claim in Section C. However, as discussed further below, NIST's justification for the omission of the web stiffeners is so irrational that it fails to actually address the central claim. Furthermore, by focusing on a process-based justification for omitting the web stiffeners, the Initial Decision avoids discussing whether flange bending must occur for Girder A2001 to walk off its support at Column 79 and whether the web stiffener would prevent such flange bending.

NIST's stated reason for omitting the web stiffeners from the preliminary LS-DYNA analysis is not being challenged. Rather, it is NIST's use of the results of that analysis as justification for omitting the web stiffeners from the 16-story ANSYS model that is irrational and being challenged.

A primary reason that flange bending does not occur in the preliminary LS-DYNA analysis is that — as discussed in Section A — Girder A2001 becomes trapped behind the Column 79 side plate and therefore is not pushed westward at least 6.25 inches to where the web of Girder A2001 is no longer supported by the bearing seat. In other words, in the preliminary

LS-DYNA analysis, Girder A2001 was not pushed into a position where bending of the girder flange followed by walk-off could occur. The trapping of Girder A2001 behind the Column 79 side plate is illustrated in Figure 8-26 shown below (the same figure cited in Section A).

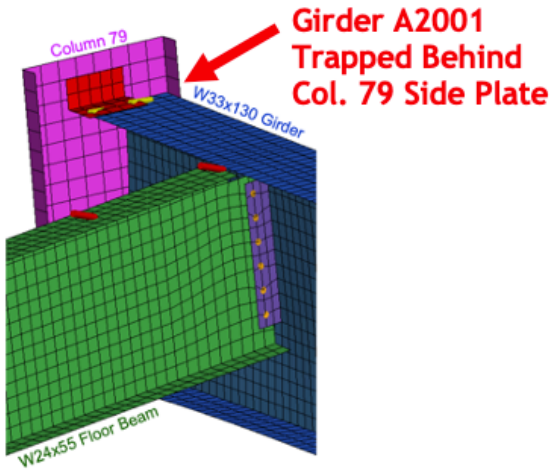



**Figure 8–26. Lateral displacement of girder due to thermal expansion of floor beam.**
Note: failed bolts and shear studs

However, in the 16-story ANSYS model, Girder A2001 was pushed into a position where bending not only could occur (if the girder were pushed far enough and had no web stiffeners), but where it would need to occur in order for Girder A2001 to walk off its support at Column 79. The fact that flange bending did not occur in the preliminary LS-DYNA analysis is totally irrelevant, because Girder A2001 was not pushed into the same position it was pushed into in the 16-story ANSYS model.

By focusing on this process-based justification for omitting the web stiffeners, the Initial Decision avoids discussing whether flange bending must occur for Girder A2001 to walk off its support at Column 79 and whether the web stiffener would prevent such flange bending, thus failing to respond to the relevant data quality arguments contained in Section C.

Specifically, the Initial Decision fails to respond to the following relevant data quality arguments contained in Section C:

1. The omission of these web stiffeners was confirmed via email on October 25, 2013, by NIST public affairs officer Michael Newman, who wrote (*see* Exhibit C of the Request): "The web stiffeners shown at the end of the girder in Frankel drawing #9114 prevent web crippling. The structural analyses of WTC 7 did not show any web crippling failures. Therefore, the web crippling plates did not need to be included in the models/analyses."

   Note that the justification for the omission of the web stiffeners given by Mr. Newman in 2013 is different from the justification given in the Initial Decision. In 2013, NIST justified the omission on the grounds that web crippling did not occur in the "structural analyses" (this may mean the preliminary LS-DYNA analysis and the 16-story ANSYS model). Therefore, NIST claimed, the web stiffeners — which are primarily intended to prevent web crippling,

though they also prevent flange bending — were not needed. NIST's new justification in the Initial Decision is that neither web crippling (buckling) nor flange bending occurred in the preliminary LS-DYNA analysis. Therefore, NIST claims, the web stiffeners were "not needed" in the 16-story ANSYS model. As discussed below, NIST does not address whether flange bending must occur in the 16-story ANSYS model in order for walk-off to occur.

2. NIST's stated reason for omitting the web stiffeners from its analyses is fundamentally unsound. As noted in the UAF Report, "In addition to stiffening the web, these stiffeners significantly increase the bending resistance of the flange and would have prevented it from failing due to flexure (assuming the girder were somehow able to bypass the column side plate)." (*See* UAF Report, p. 81.) As illustrated in Figure 3.8 of the UAF Report, shown below, the stresses in the girder flange and stiffener are not sufficient to cause the flange to fail, and thus Girder A2001 would not have walked off its support at Column 79 when pushed westward 6.25 inches. (*See* UAF Report, p. 82.)

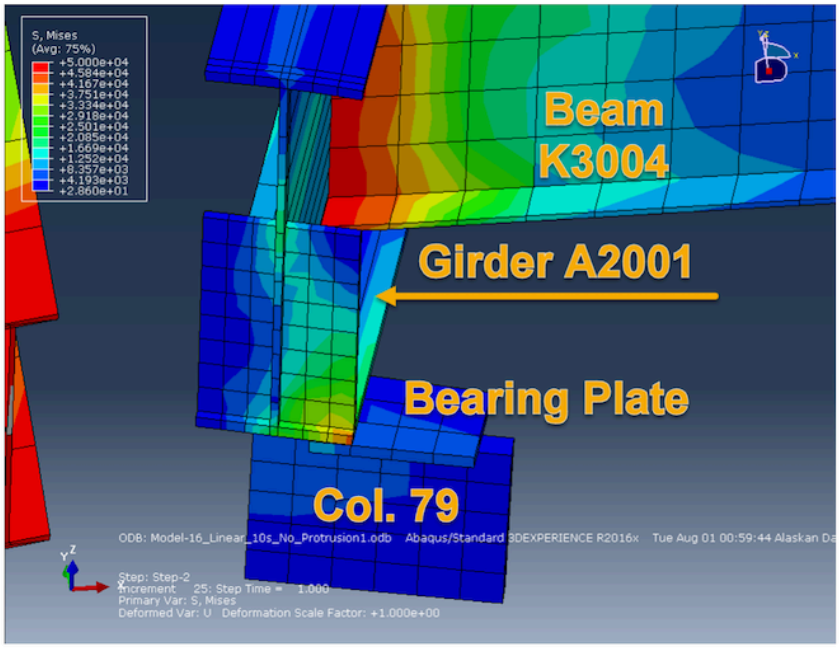



Figure 3.8 Analysis showing girder web A2001 pushed laterally past the bearing seat at Column 79. The column is removed for clarity.

3. The NIST WTC 7 Report provides no analysis, calculations, or figures explaining how Girder A2001 actually walked off of its support at Column 79 in its 16-story ANSYS model. As noted in the previous section, the NIST WTC 7 Report merely states in general terms (*see* NCSTAR 1-9, p. 527): "A girder was considered to have lost vertical support when its web was no longer supported by the bearing seat. The bearing seat at Column 79 was 11 in. wide. Thus, when the girder end at Column 79 had been pushed laterally at least 5.5 in., it was no longer supported by the bearing seat."[1] Moreover, NIST does not address the omission of the Girder A2001 web stiffeners either in the NIST WTC 7 Report or in the NIST WTC 7 FAQs.

[1] Independent researchers later discovered that the bearing seat at Column 79 was actually 12 inches wide. In response, NIST issued an erratum in June 2012 that adjusted the distance needed for walk-off to 6.25 inches.

4. In summary, NIST omitted from its structural analyses the presence of web stiffeners that significantly increased the bending resistance of the Girder A2001 flange and would have prevented Girder A2001 from failing due to flexure, thus preventing it from walking off its support at Column 79. When the web stiffeners that NIST omitted from its analyses are included, the first major step leading to the initiating local failure in NIST's Probable Collapse Sequence is shown, for a third reason, to be physically impossible. Even if Girder A2001 had *not* become trapped behind the Column 79 side plate and beam K3004 *could* thermally expand at least 6.25 inches, Girder A2001 would not have walked off its support at Column 79 due to the presence of the web stiffeners.

5. As a result, NIST's claim that Girder A2001 walked off its support at Column 79 fails to comply with the OMB Guidelines and NIST IQS because it lacks objectivity, utility, transparency, and reproducibility. First, NIST's claim is inaccurate, unreliable, and apparently biased because it is based on the intentional omission of a known structural feature that materially affects the result of the analysis, thus violating the objectivity element of information quality under the OMB Guidelines and NIST IQS. NIST's claim also violates the objectivity element of information quality because it is not presented in a complete manner. Second, NIST's claim violates the utility element of information quality because care was not taken to make sufficient background and detail available regarding its claim, even though greater transparency would have enhanced the usefulness of the information disseminated. NIST merely provides a brief summary of its analysis results and provides no statement regarding the omission of a known structural feature. Third, NIST's claim violates the transparency standard imposed upon influential information because NIST did not practice a degree of transparency sufficient to facilitate reproducibility. Finally, NIST's claim violates the reproducibility standard imposed upon influential information because — to the extent that independent analysis of the original data using identical methods could be performed — contradictory analytic results were generated by the UAF researchers.

Finally, it must be noted that by avoiding direct discussion of whether flange bending must occur for Girder A2001 to walk off its support at Column 79 — and claiming that "The web stiffener was not needed to prevent web or flange buckling or bending" — NIST may be attempting to imply, at least ambiguously, that flange bending was not necessary in order for Girder A2001 to walk off its support at Column 79. However, the NIST WTC 7 Report makes clear that flange bending was an essential aspect of girder walk-off (*see* NCSTAR 1-9, p. 488, emphasis added):

> *Walk-off failure of beams and girders was defined to occur when (1) the end of the beam or girder moved along the axis of the beam until it was no longer supported by the bearing seat, or (2) the beam or girder was pushed laterally until its web was no longer supported by the bearing seat. Gravity shear loads in a beam were transferred to the bearing seat primarily in the proximity of the web on the bottom flange. Therefore, when the web was no longer supported by the bearing seat, the beam was assumed to have lost support,* ***as the flexural stiffness of the bottom flange was assumed to be insufficient for transferring the gravity loads.***

Thus, NIST's response to Section C amounts to the following: The web stiffener was not needed to prevent flange bending in the 16-story ANSYS model, but flange bending occurred in the 16-story ANSYS model and was instrumental to the walk-off of Girder A2001. As the UAF Report shows — and which NIST fails to address and rebut — the web stiffener would prevent such flange bending and walk-off.

### 2. Actions NIST Must Take to Comply with the DQA, OMB Guidelines, and NIST IQS

To comply with the DQA, the OMB Guidelines, and the NIST IQS, NIST must take one of the following three actions. In the Requesters' view, only the first action is analytically sound.

1. Perform new analyses that include the partial height web stiffeners on Girder A2001 and revise the NIST WTC 7 Report to reflect that Girder A2001 would not have walked off its support at Column 79. As noted in the Request, there is no reasonable basis for not performing these new analyses since NIST has acknowledged it omitted the web stiffeners from its analyses, NIST's justification for omitting the web stiffeners is irrational, and this omission has been shown to have materially affected the results of NIST's analyses. NIST must then discard its Probable Collapse Sequence and develop a new Probable Collapse Sequence that is physically possible; or

2. Amend the NIST WTC 7 Report to include analysis that satisfies the objectivity, utility, transparency, and reproducibility standards of information quality — i.e., analysis, calculations, or figures explaining how Girder A2001 could actually walk off of its support at Column 79 despite the presence of the web stiffeners. In particular, NIST must acknowledge whether flange bending was necessary for Girder A2001 to walk off its support at Column 79. Also, your Final Decision must include a substantive response to each of the relevant data quality arguments listed above, which would essentially be the same analysis that would be added to the NIST WTC 7 Report explaining how Girder A2001 could actually walk off of its support at Column 79 despite the presence of the web stiffener. In particular, your Final Decision must include a substantive response explaining why the UAF Report finding that the web stiffener would prevent the Girder A2001 flange bending and walk-off is incorrect; or

3. Provide a substantive response in your Final Decision to each of the relevant data quality arguments listed above. Your Final Decision must include analysis, calculations, or figures explaining how Girder A2001 could actually walk off of its support at Column 79 despite the presence of the web stiffeners. In particular, this analysis must acknowledge whether flange bending was necessary for Girder A2001 to walk off its support at Column 79. Your Final Decision must also include a substantive response explaining why the UAF Report finding that the web stiffener would prevent the Girder A2001 flange bending and walk-off is incorrect. In addition, your Final Decision must identify where these analyses, calculations, or figures are already contained in the NIST WTC 7 Report, thus precluding the need to amend the report.

## D. REPORTED CASCADE OF FLOOR FAILURES

The central claim in Section D of the Request is that NIST erroneously concluded that the impact load of Floor 13 falling onto Floor 12 would be sufficient to cause Floor 12 to fail and initiate a cascade of floor failures down to Floor 5, thus violating the OMB Guidelines and NIST IQS. The primary requested corrections were for NIST to (1) revise the NIST WTC 7 Report to include calculations that demonstrate that the impact load of Floor 13 falling onto Floor 12 would be insufficient to cause Floor 12 to fail, and (2) discard its Probable Collapse Sequence and develop a new Probable Collapse Sequence that is physically possible.

In addition, in the event that NIST maintained that the impact load of Floor 13 falling onto Floor 12 was sufficient to cause Floor 12 to fail, Section D alternatively requested that NIST "amend the NIST WTC 7 Report to include analysis that satisfies the objectivity, utility, transparency, and reproducibility standards of information quality." (*See* the Request, p. 26.) Specifically, this would mean amending the NIST WTC 7 Report to include analysis, calculations, or figures showing that the impact load of Floor 13 falling onto Floor 12 would be sufficient to cause Floor 12 to fail and initiate a cascade of floor failures down to Floor 5 — starting with a description of which girder connections on Floor 12 were broken by the collapse of Floor 13 — as no such analysis, calculations, or figures are contained in the NIST WTC 7 Report.

As described more fully below, NIST's response to the central claim and the two primary requests in Section D is demonstrably in error and wholly unsubstantive. The Initial Decision avoids discussing in any degree of detail whether the impact load of Floor 13 falling onto Floor 12 would be sufficient to cause Floor 12 to fail and initiate a cascade of floor failures down to Floor 5 — even failing to identify which connections on Floor 12 were broken by the collapse of Floor 13 — thus failing to respond to the relevant data quality arguments contained in Section D. In addition, the Initial Decision completely avoids responding to the alternative request that NIST amend the NIST WTC 7 Report to include analysis that satisfies the objectivity, utility, transparency, and reproducibility standards of information quality (in the event that NIST maintained that the impact load of Floor 13 falling onto Floor 12 was sufficient to cause Floor 12 to fail).

### 1. NIST's Erroneous and Unsubstantive Response to Section D

Removing the nonessential opening and closing sentences of NIST's response to Section D, the response reads as follows:

> *NIST disagrees that the analyses of the WTC 7 collapse erroneously concluded that the impact load of Floor 13 onto Floor 12 was sufficient to initiate a cascade of floor failures to Floor 5. The WTC 7 report has considered the proposed hypothesis.*
>
> *The LS-DYNA model included the ability to simulate nonlinear responses, falling debris, and dynamic impact effects on other structural members (NCSTAR 1A, page 38). Initial conditions for the LS-DYNA model were obtained from the 16-*

*story ANSYS model for damage to steel beams and girders and connections, steel and concrete temperatures, and the redistribution of structural member loads following failures.*

*LS-DYNA simulations were conducted to examine the sensitivity of the collapse initiation and progression results to the initial state of fire-induced damage (NCSTAR 1A, page 38). The simulations showed that the structural damage at 4 h from the multiple floor fires was the primary cause of the collapse and that debris damage from WTC 1 contributed to the rate of the collapse progression. The simulation with lesser structural damage at 3.5 h had several girders in Floors 12 to 14 that were connected to Columns 79, 80, and 81, and fell to the floors below. However, the damage was not sufficient to initiate a global collapse (NCSTAR 1-9, page 603-604).*

*The LS-DYNA model was based on architectural and structural drawings of the original building and subsequent building alterations, as well as erection and shop fabrication drawings (NCSTAR 1A, page 38), to ensure that the information used to develop the model was accurate, reliable, and unbiased. The model development was further informed by other analyses of structural behavior, with consideration of loads, thermal effects, contact between elements, and potential failure modes (NCSTAR 1A, page 38). Several analyses were conducted to determine the sensitivity of the global collapse initiation to the impact of falling floors relative to the damage sustained from the fires (NCSTAR 1-9, Section 12.4). The LS-DYNA model development and analyses for determining the Probable Collapse Sequence for WTC 7 complies with the OMB Guidelines and NIST IQS.*

In essence, NIST does three things in its response: (1) It makes general assertions about the validity of its LS-DYNA model. (2) It describes the capabilities and methodology related to its LS-DYNA model. (3) In the third paragraph cited above, it restates the findings of its LS-DYNA simulations.

NIST's general assertions about the validity of its LS-DYNA model do not address the central claim nor the underlying relevant data quality arguments contained in Section D. In addition, NIST's description of the capabilities and methodology related to its LS-DYNA model are contextually relevant but do not on their own directly address the central claim nor the underlying relevant data quality arguments contained in Section D.

Similarly, although relevant, NIST's restatement of the findings of its LS-DYNA simulations do not address in any degree of detail the central claim nor the underlying relevant data quality arguments contained in Section D. Specifically, the Initial Decision fails to respond to the following relevant data quality arguments contained in Section D:

1. Chapter 12 of NCSTAR 1-9, which presents the results of NIST's 47-story LS-DYNA analysis, states the following (*see* NCSTAR 1-9, p. 572-573):

> *The LS-DYNA analysis calculated the dynamic response of the structure to the floor failures and resulting debris impact loads on the surrounding structure.* ***The thermally weakened floors below Floors 13 and 14 could not withstand the impact from the collapsing floors, resulting in sequential floor collapses.*** *The floor systems progressively failed down to Floor 5, where the debris accumulated, as shown in Figure 12–43.*
>
> *. . . Column 79 was laterally unsupported in the east-west and south directions between Floors 5 and 14. There was still some lateral support in the north direction at Floors 8 to 12 and Floor 14, as the erection bolts in the seated connections had all failed at these girder ends, but the girders had not walked off the bearing seats.* (Emphasis added.)

Aside from the brief summary of the 47-story LS-DYNA analysis results cited above, the NIST WTC 7 Report provides no other description, analysis, or calculations showing how the collapse of Floor 13 began a cascade of floor failures down to Floor 5, thus making NIST's claim difficult to independently scrutinize.

2. In fact, the NIST WTC 7 Report even neglects to specify which girder connections on Floor 12 were broken by the collapse of Floor 13. One might assume that the girder directly beneath Floor 13's Girder A2001 (i.e., Floor 12's Girder A2001) would be impacted and have its connections broken. But that assumption is contradicted by NIST's claim that "[t]here was still some lateral support in the north direction at Floors 8 to 12 and Floor 14, as the erection bolts in the seated connections had all failed at these girder ends, but the girders had not walked off the bearing seats." (*See* NCSTAR 1-9, p. 573.)

3. Thus, instead, we are left to assume that the walk-off of Floor 13's Girder A2001, which framed into Column 79 from the north, somehow broke the girder connections of Floor 12's Girder A2015, which framed into Column 79 from the west, or of Floor 12's Girder A2002, which framed into Column 79 from the south. Adding to the difficulty of independently scrutinizing NIST's claim, NIST has declined to disclose the results files of its LS-DYNA analysis on the grounds that releasing this data "might jeopardize public safety." (*See* Finding Regarding Public Safety Information, NIST Director Patrick Gallagher, July 2009.)

   The Requesters now note that NIST claims that Girder A2015 had already lost vertical support (i.e., fallen) due to a tensile weld failure in the knife connection on the west side of Column 79, primarily caused by the thermal expansion of Girder A2015 on Floor 13. (*See* NCSTAR 1-9, p. 504.) Thus, we are left to assume that the walk-off of Floor 13's Girder A2001 on the north side of Column 79 somehow broke the girder connections of Floor 12's Girder A2002 on the south side of Column 79.

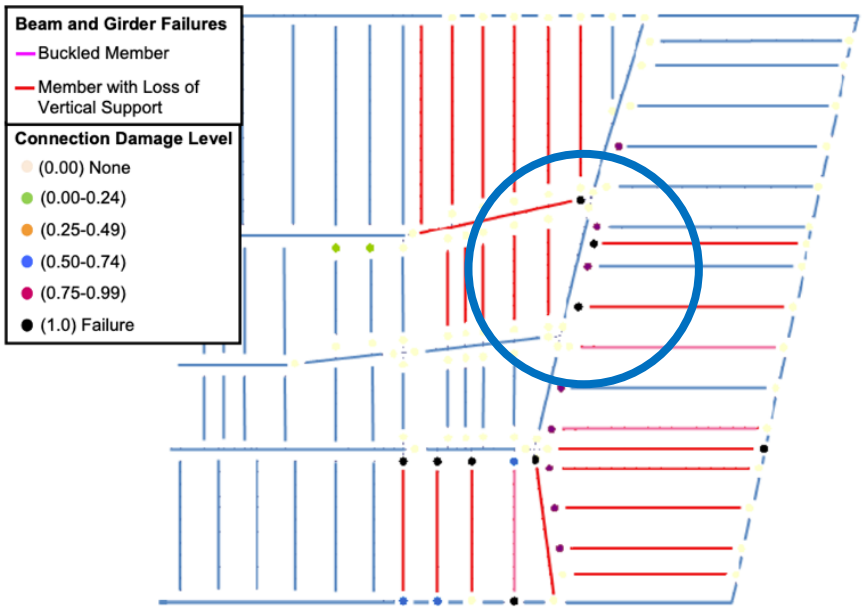
4. Calculations demonstrate unequivocally that the impact of Floor 13 falling onto Floor 12 would be greatly insufficient to shear the girder connections of any of the girders framing into Column 79 on Floor 12. Critiquing a similar hypothesis for the collapse of WTC 7 put forward by Guy Nordenson and Associates in a lawsuit between Con Edison and Silverstein Properties, the UAF Report provides the analysis shown on pages 23 to 25 of the Request.

This analysis focuses on the force required to shear the girder connection for Girder A2001, but it is also applicable to calculating the force required to shear the girder connections for Girder A2002. The impact force of Floor 13's Girder A2001 at room temperature falling onto Floor 12 is calculated to be 61,950 lb., and the impact force would be less at higher temperatures as the stiffness of Girder A2001 is reduced. This analysis can be applied to Girder A2002 by calculating the force required to shear its connection to Column 79. The 3/8" thick knife brackets used to mount Girder A2002 to Column 79 were 15.5" long. They were welded to Column 79 with 5/16" fillet welds on one side of each bracket. The weld area of the brackets is 6.84 $in^2$. Per Frankel drawing 1091, the weld metal was E70, which is the same as that used for 3/8" x 14" long fillet welds used for the support plate and the 3/8" x 12" long fillet weld of the bearing seat under Girder A2001 at Column 79. The weld area there was 10.61 $in^2$, and the shear load was determined to be 632,000 lbs. Thus, for the 6.84 $in^2$ weld area of the knife brackets of Girder A2002 the shear load would be 407,000 lbs. Therefore, the impact force of Floor 13 falling onto Floor 12 is insufficient to shear the girder connection of Girder A2002 by a factor of more than 6.

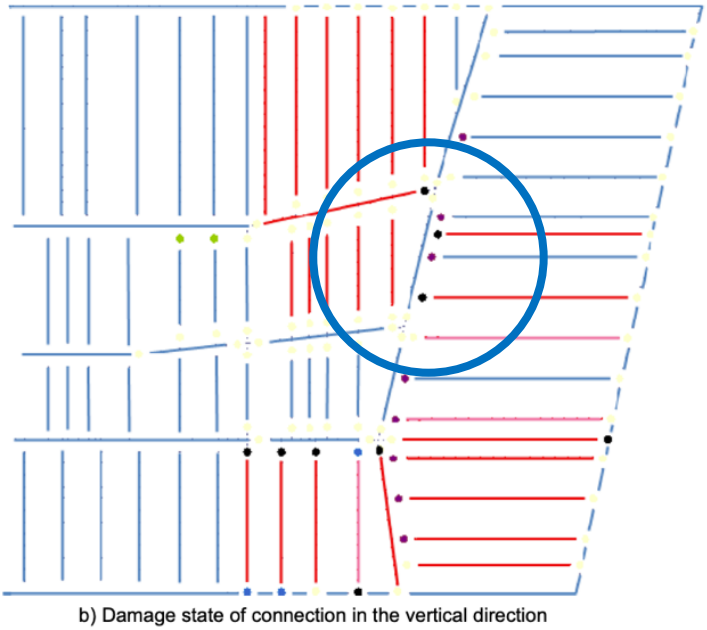
5. In summary, the analysis presented above and on pages 23 to 25 of the Request demonstrates that the second major step leading to the initiating local failure in NIST's Probable Collapse Sequence — the cascade of floor failures from Floor 13 down to Floor 5 — was physically impossible. Furthermore, aside from briefly summarizing the results of its 47-story LS-DYNA analysis, the NIST WTC 7 Report provides no other description, analysis, or calculations to support this claim, even neglecting to specify which girder connections on Floor 12 were broken by the collapse of Floor 13. Thus, we deduce that NIST had no valid basis for its conclusion that the impact load of Floor 13 falling onto Floor 12 would be sufficient to cause Floor 12 to fail and initiate a cascade of floor failures down to Floor 5.

6. As a result, NIST's claim that the collapse of Floor 13 would have initiated a cascade of floor failures down to Floor 5 fails to comply with the OMB Guidelines and NIST IQS because it lacks objectivity, utility, transparency, and reproducibility. First, NIST's claim is inaccurate, unreliable, and apparently biased because it severely overestimates the ability of Floor 13 falling onto Floor 12 to cause Floor 12 to fail, thus violating the objectivity element of information quality under the OMB Guidelines and NIST IQS. NIST's claim also violates the objectivity element of information quality because it is not presented in a complete manner, failing to even specify which girder connections on Floor 12 were broken by the collapse of Floor 13. Second, NIST's claim violates the utility element of information quality because care was not taken to make sufficient background and detail available regarding its claim, even though greater transparency would have enhanced the usefulness of the information disseminated. NIST merely provides a brief summary of its analysis results and has declined to disclose the results files of its LS-DYNA analysis on the grounds that releasing this data "might jeopardize public safety." Third, NIST's claim violates the transparency standard imposed upon influential information because NIST did not practice a degree of transparency sufficient to facilitate reproducibility. Finally, NIST's claim violates the reproducibility standard imposed upon influential information because — to the extent that independent analysis of the original data could be performed — contradictory analytic results were generated by the UAF researchers.

As an addendum to the relevant data quality arguments from the Request listed above, it must also be noted that the fire-induced damage at 4 hours of heating in NIST's 16-story ANSYS model, which NIST cites in the Initial Decision, does not help explain how the impact load of Floor 13 falling onto Floor 12 would be sufficient to cause Floor 12 to fail (presumably by breaking the girder connection of Floor 12's Girder A2002 on the south side of Column 79). As shown in Figure 11-34 of NCSTAR 1-9 below, Floor 12's Girder A2002 and its connections to both Column 79 and Column 80 were undamaged. Therefore, the calculation presented above of the force required to shear the undamaged Girder A2002 connection at Column 79 applies fully.




a) Damage state of connection in the horizontal direction



b) Damage state of connection in the vertical direction

**Figure 11–34. Damage state of connections, beams, and girders in Floor 12 at 4.0 h for Case B temperatures.**

Furthermore, the NIST WTC 7 Report provides no explanation for how Girder A2002 on Floors 13 lost vertical support (which NIST claims when it writes that "Column 79 was laterally unsupported in the east-west and south directions between Floors 5 and 14") and thus possibly contributed to breaking Floor 12's Girder A2002 (in addition to reducing lateral support of Column 79 at Floor 13). NIST WTC 7 Report vaguely states the following, without describing how Girder A2002 on Floor 13 failed and lost vertical support (*see* NCSTAR 1-9, p. 504-505):

> *On Floor 13 (Figure 11–35), all four of the north-south girders attached to Columns 79, 80, and 81 had failed, due to either buckling or girder walk off of the bearing seat at Columns 79 and 81. . . .*
>
> *Summary. After 4.0 h of heating, Columns 79, 80, and 81 had lost lateral support in the north-south direction at Floor 13, due to failure of the girders between the columns. The girders between Columns 80 and 81 had buckled and the girders between Columns 79 and 44 and Columns 26 and 81 had walked off the bearing seat at Column 79 and 81, respectively.*

Again, the NIST WTC 7 Report does not specifically state what happened to Girder A2002 (i.e., the girder between Columns 79 and 80). In its description of the Case C temperature analysis results, the NIST WTC 7 Report actually makes the outright false statement that "On Floor 13 . . . [t]he girder between Columns 79 and 80 had walked off of the bearing seat at Column 79 due to the effects of thermal expansion." (*See* NCSTAR 1-9, p. 514.) As noted above, the Girder A2002 connection at Column 79 was a knife connection, not a seated connection, thus precluding lateral walk-off. NIST's outright false statement regarding the impossible walk-off of Girder A2002 in the less severe Case C temperature analysis casts even more doubt on NIST's claim that Girder A2002 lost vertical support and left Column 79 laterally unsupported from the south on Floor 13.

Contradicting the above claims, as shown in Figures 11-35 of NCSTAR 1-9 below, NIST's 16-story ANSYS model shows that Girder A2002 on Floor 13 had buckled but did not have connection damage. It must be noted that the buckled Girder A2002 on Floor 13 would still provide sufficient lateral support to Column 79. Girder A2002's buckling load was 242,000 lbs. Assuming Girder A2002's axial strength was reduced by 50% once buckled, it would still withstand 122,000 lbs. in compression. The lateral support requirement for a column is approximately 0.6% of the column's axial load. Column 79 was ASTM A572 GR 50 steel with a 50 ksi yield strength. It had a cross section of 319 $in^2$ at Floor 13 and a factor of safety of about 3. Therefore, it would have had about 50,000/3 x 319 = 5.32 x $10^6$ lbs. on it at Floor 13, and 0.6% of that is about 32,000 lbs. — which is substantially less than the axial strength of the buckled Girder A2002.

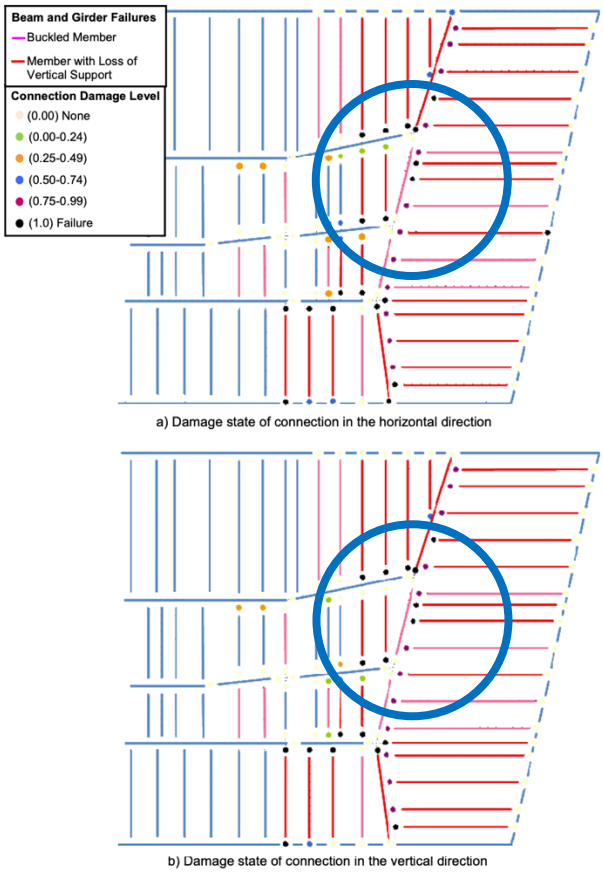



**Figure 11–35. Damage state of connections, beams, and girders in Floor 13 at 4.0 h for Case B temperatures.**

In short, based on the fire-induced damage estimates in NIST's 16-story ANSYS model, there is no apparent basis for concluding that Girder A2002 lost vertical support on Floors 12 and 13. Moreover, as the NIST WTC 7 Report notes, the east floor beams provided lateral support in the east-west direction as long as the girders were intact (*see* NCSTAR 1-9, p. 531):

> *The east floor beams could only provide lateral support to Columns 79, 80, and 81 as long as the girders were intact. The floor beams with fin connections provided indirect lateral bracing to Columns 79 and 80, as the beams framed into the girders at locations close to the columns.*

Therefore, as long as Girder A2002 did not lose vertical support, beam D3004 (the northern most east floor beam south of Column 79) would provide lateral support in the east-west direction. Together, these observations preclude the reported cascade of floor failures and loss of lateral support in the east-west and south directions between Floors 5 and 14.

In summary, NIST's response to Section D is demonstrably in error and wholly unsubstantive because it avoids discussing in any degree of detail whether the impact load of Floor 13 falling onto Floor 12 would be sufficient to cause Floor 12 to fail and initiate a cascade of floor failures down to Floor 5 — even failing to identify which connections on Floor 12 were

broken by the collapse of Floor 13. Furthermore, further scrutiny of the fire-induced damage estimates cited in the Initial Decision demonstrates that there is no apparent basis for concluding that Girder A2002 could lose vertical support on Floors 12 and 13 and leave Column 79 laterally unsupported in the east-west and south directions between Floors 5 and 14.

### 2. Actions NIST Must Take to Comply with the DQA, OMB Guidelines, and NIST IQS

To comply with the DQA, the OMB Guidelines, and the NIST IQS, NIST must take one of the following three actions. In the Requesters' view, only the first action is analytically sound.

1. Revise the NIST WTC 7 Report to include calculations that demonstrate that the impact load of Floor 13 falling onto Floor 12 would be insufficient to cause Floor 12 to fail. NIST must then discard its Probable Collapse Sequence and develop a new Probable Collapse Sequence that is physically possible; or

2. Amend the NIST WTC 7 Report to include analysis that satisfies the objectivity, utility, transparency, and reproducibility standards of information quality — i.e., analysis, calculations, or figures showing that the impact load of Floor 13 falling onto Floor 12 would be sufficient to cause Floor 12 to fail and initiate a cascade of floor failures down to the 5th floor — starting with a description of which girder connections on Floor 12 were broken by the collapse of Floor 13, which the NIST WTC 7 Report neglects to specify, and an explanation for how Girder A2002 framing into Column 79 from the south could lose vertical support on Floors 12 or 13. Also, your Final Decision must include a substantive response to each of the relevant data quality arguments listed above, which would essentially be the same analysis that would be added to the NIST WTC 7 Report explaining how the impact load of Floor 13 falling onto Floor 12 would be sufficient to cause Floor 12 to fail and initiate a cascade of floor failures down to Floor 5; or

3. Provide a substantive response in your Final Decision to each of the relevant data quality arguments listed above. Your Final Decision must include analysis, calculations, or figures showing that the impact load of Floor 13 falling onto Floor 12 would be sufficient to cause Floor 12 to fail and initiate a cascade of floor failures down to Floor 5 — starting with a description of which girder connections on Floor 12 were broken by the collapse of Floor 13 and an explanation for how Girder A2002 framing into Column 79 from the south could lose vertical support on Floors 12 or 13. In addition, your Final Decision must identify where these analyses, calculations, or figures are already contained in the NIST WTC 7 Report, thus precluding the need to amend the report.

## E. NIST'S GLOBAL COLLAPSE ANALYSES

The central claim in Section E of the Request is that, contrary to NIST's assertion, NIST's global collapse analyses do not match the observed behavior reasonably well and do not confirm NIST's leading collapse hypothesis, thus violating the OMB Guidelines and NIST IQS. The requested corrections were for NIST to (1) revise the NIST WTC 7 Report to reflect that the

north face roofline underwent a sudden transition to free fall, (2) perform a new global collapse analysis that both is physically possible (i.e., does not involve the walk-off of Girder A2001 at its Column 79 support nor a cascade of floor failure from Floor 13 to Floor 5) and matches the observed behavior well (e.g., the scenario simulated in the UAF analysis), and (3) discard its Probable Collapse Sequence and adopt a new probable collapse sequence that both is physically possible and better matches the observed behavior.

Unlike most other sections of the Request, Section E did not include an alternative request in the event that NIST maintained that its global collapse analyses matched the observed behavior reasonably well and confirmed its leading collapse hypothesis.

As described more fully below, NIST's response to the central claim and the three requests in Section E is demonstrably in error and wholly unsubstantive. Section E methodically demonstrates in detail that NIST's global collapse analyses fail to match most of the observed behavior — predicting fundamentally different structural behavior from what was observed — while the global collapse analysis performed by researchers at UAF predicted all of the observed structural behavior. The Initial Decision completely avoids discussing this analysis, instead merely re-stating claims from the NIST WTC 7 Report and NIST WTC 7 FAQs without addressing the criticisms of those claims made in the Request, thus failing to respond to the relevant data quality arguments contained in Section E.

### 1. NIST's Erroneous and Unsubstantive Response to Section E

Removing the nonessential opening and closing sentences of NIST's response to Section E, the response reads as follows:

> *NIST disagrees that NIST's global collapse analyses do not match the observed behavior reasonably well and do not confirm NIST's Leading Collapse Hypothesis. The critical observations and corresponding failures identified from the structural analysis include: (1) east-west motion of the building beginning at approximately the same time as failure of floors 6 through 14 around Column 79; (2) the formation of the "kink" in the roofline of the east penthouse approximately one second after Column 79 was found to buckle; (3) window breakage on the east side of the north face as the buckling of Column 79 precipitated the failure of upper floors; and (4) the beginning of global collapse (vertical drop of the building exterior) within approximately one-half second of the time predicted by analysis.*
>
> *The measured time and analytically predicted time from the start of failures of floors surrounding Column 79 to the initial downward motion of the north face roofline was 12.9 seconds (see NIST NCSTAR Report 1A, Table 3-1). The collapse observations from video analysis of the CBS News Archive video are included in NIST NCSTAR Report 1A Section 3.5 and NIST NCSTAR Report 1-9, Section 8.3.*
>
> *The NIST analysis and animation of the upper exterior wall deformations differ from the video images only in the later stages of the animation, and only after the initiation of global collapse.*

> *Uncertainties associated with the NIST approach are addressed in NIST NCSTAR Report 1A, Section 3.5, where it is noted, "Once simulation of the global collapse of WTC 7 was underway, there was a great increase in the uncertainty in the progression of the collapse sequence, due to the random nature of the interaction, break up, disintegration, and falling debris." The contributions due to stiffness and strength of nonstructural materials and components, such as exterior cladding, interior walls and partitions, were not considered in the analyses conducted by NIST. It is well known that such non-structural components can increase the stiffness and strength of a structural system, but their contributions are difficult to quantify. Given these factors, disparities between the video and the animation in the later stages of collapse would be expected.*
>
> *The global collapse analysis and Probable Collapse Hypothesis are based on a series of models and analyses informed by shop fabrication drawings to ensure that the information used to develop the model was accurate, reliable, and unbiased. The model development was further informed by other analyses of structural behavior, with consideration loads, thermal effects, contact between elements, and potential failure modes. Several analyses were conducted to determine the sensitivity of the global collapse initiation to the impact of falling floors relative to the damage sustained from the fires. The results of these analysis were compared to observed data from photographs and video records, where the simulations with and without WTC 1 damage bracketed the event times. Further consideration was given to the quality of the analysis results as the collapse progressed and an accuracy appraisal is included in Section 3.5.3 of the WTC 7 report. The methods, data, and information used for determining the Probable Collapse Sequence for WTC 7 complies with the OMB Guidelines and NIST IQS.*

In essence, NIST does four things in its response: (1) In the last paragraph cited above, it makes general assertions about the validity of its global collapse analyses and methodology. (2) In the first and second paragraphs cited above, it restates its claim that its global collapse analyses matched the observed behavior reasonably well because the global collapse analyses matched closely or were consistent with certain critical observations. (3) In the third paragraph cited above, it restates its claim attempting to minimize the extent to which the global collapse analyses fail to match the observed behavior. (4) In the fourth paragraph cited above, it restates two claims attempting to justify why the global collapse analyses do not match the observed behavior better. Each of these four points will be addressed sequentially below.

*Response to the Points in NIST's Response to Section E*

In regards to point #1, NIST's general assertions about the validity of its global collapse analyses and methodology do not address the central claim nor the underlying relevant data quality arguments contained in Section E. In support of its assertions, the Initial Decision references Section 3.5.3 of the NCSTAR 1A, titled "Accuracy Appraisal," which is a single paragraph that makes essentially the same assertions made in NIST's response to Section E (*see* NCSTAR 1A, p. 44):

> *Given the complexity of the modeled behavior, the global collapse analyses matched the observed behavior reasonably well. The close similarity of the timing and the nature of the events up to the initiation of global collapse is strong confirmation of the extent and nature of the structural failures in the interior of the building and the accuracy of the four-step simulation process. The overall simulation of the collapsing building with damage better matched the video observations of the global collapse. The global collapse analysis confirmed the leading collapse hypothesis, which was based on the available evidence.*

Section 3.5.3 is clearly not sufficient to address and rebut the methodical, detailed analysis contained in Section E.

In regards to point #2, as discussed in the Request, in a subsection titled "Matching Certain Observables Does Not Amount to Matching the Observed Behavior" (*see* the Request, p. 41), NIST's claim that its global collapse analysis "matched the observed behavior reasonably well" and therefore "confirmed the leading collapse hypothesis" rests on the notion that reproducing certain observed events was sufficient to match the observed behavior and confirm the leading collapse hypothesis, even though fundamental aspects of the structural behavior were not predicted in the model. As the Request notes, NCSTAR 1A, NCSTAR 1-9, and the NIST WTC 7 FAQs offer six observables that NIST claims either were accurately predicted in the global collapse analysis or that corresponded temporally to a simulated failure in the global collapse analysis (*see* the Request, p. 42). These include:

1. An east-west vibration of the building ± 2 inches about 6 seconds before the initiation of the east penthouse collapse, which NIST claims started at nearly the same time as the alleged cascade of floor failures.

2. A seismic signal approximately 10 seconds prior to the initiation of global collapse, which NIST claims was likely due to the falling of debris from the cascade of floor failures.

3. The formation of a kink in the roofline of the east penthouse approximately one second after Column 79 was found to buckle.

4. Window breakage on the east side of the north face as the buckling of Column 79 precipitated the failure of upper floors.

5. The collapse of the east penthouse (both the time of its initiation and the time at which the penthouse descended below the roofline).

6. The initiation of global collapse, which NIST claims occurred within approximately one-half second of the time predicted in the global collapse analysis.

In its response to Section E cited above, NIST lists four "critical observations and corresponding failures identified from the structural analysis," which are the same four it lists in

FAQ #29 of the NIST WTC 7 FAQs. This list of four critical observations does not include the seismic signal approximately 10 seconds prior to the initiation of global collapse nor the initiation of the east penthouse collapse.

By merely restating the four "critical observations and corresponding failures identified from the structural analysis," NIST completely avoids addressing the relevant data quality argument contained in Section E regarding the unsoundness of using these four observations as a basis for asserting that its global collapse analyses matched the observed behavior reasonably well. Specifically, the Request makes the following relevant data quality arguments, which the Initial Decision completely avoids addressing (*see* the Request, p. 42, 46):

> *The fundamental flaw in NIST's claim that its global collapse analysis "matched the observed behavior reasonably well" and therefore "confirmed the leading collapse hypothesis" is as follows: All of the observables listed above are also consistent with the hypothesis of controlled demolition, if not more consistent. Furthermore, as discussed further below, the hypothesis of controlled demolition readily explains the other fundamental aspects of WTC 7's structural behavior that NIST's global collapse analysis fails to predict (lack of deformation, vertical descent, and free fall). Therefore, it is scientifically unsound for NIST to conclude that its global collapse analysis confirmed its leading collapse hypothesis. . . .*
>
> *Furthermore, as mentioned above, all of the observables that NIST claims were accurately predicted in its global collapse analysis, or corresponded temporally to a simulated failure in its global collapse analysis, are also consistent with the hypothesis of controlled demolition, if not more consistent. The east-west vibration of the building ± 2 inches about 6 seconds before the initiation of the east penthouse collapse could have been caused by explosive and/or incendiary devices that were used to bring down the east penthouse or destroy other parts of the building. The seismic signal approximately 10 seconds prior to the initiation of global collapse is much better explained by a subaerial explosion that occurred in the process of bringing down the east penthouse, as discussed further in Part 2. The formation of a kink in the roofline of the east penthouse could have been caused by the removal of Columns 79, 80, and 81 high up in the building. Window breakage on the east side of the north face is better explained by the failure of Columns 79, 80, and 81 high up in the building and a shockwave propagating downward from the collapse of the east penthouse into the building. This is especially apparent because the window breakage propagated from the roof down and was limited to approximately the upper 15 floors. Any window breakage caused by the failure of Column 79 low in the building would be expected to occur from the bottom up along much of the height of the building, not just the upper 15 floors. Finally, the collapse of the east penthouse and the global collapse of the building are the intended result of a controlled demolition scenario.*

It must also be emphasized that NIST's global collapse analyses do not explicitly show the east-west vibration of the building ± 2 inches about 6 seconds before the initiation of the east penthouse collapse nor the window breakage on the east side of the north face. These are merely

observables that NIST claims correspond temporally with the failures that it alleges led to the collapse of the building.

In the second paragraph of NIST's response to Section E cited above — where NIST states "The measured time and analytically predicted time from the start of failures of floors surrounding Column 79 to the initial downward motion of the north face roofline was 12.9 seconds (see NIST NCSTAR Report 1A, Table 3-1) — NIST merely condenses its claim about the accuracy of global collapse analyses by noting that the model accurately predicted (down to the to the tenth of a second) the time elapsed between the first critical observation and the fourth critical observation. Again, NIST's response ignores the relevant data quality argument that these observations (including the timing of them) can also be explained by the hypothesis of controlled demolition. Furthermore, NIST commits the fallacy of claiming that there is a measured time for the start of floor failures surrounding Column 79. The measured time is for the east-west vibration of the building ± 2 inches, which NIST asserts was caused by the floor failures surrounding Column 79.

In regards to point #3, NIST attempts minimize the extent to which the global collapse analyses fail to match the observed behavior by repeating its false claim that "The NIST analysis and animation of the upper exterior wall deformations differ from the video images only in the later stages of the animation, and only after the initiation of global collapse." (Emphasis added.)

This claim is patently false. As illustrated very clearly in the Request, substantial deformation of the upper exterior walls occurred **prior** to the initiation of global collapse in NIST's global collapse analysis while none whatsoever is seen in the video images. Figure 2 from the Request, shown below, presents the animation of the global collapse analysis at 6.3 seconds after the initiation of the east penthouse collapse, laid over the animation at .1 seconds before the initiation of the east penthouse collapse. 6.3 seconds is the time that NIST identifies as the initiation of global collapse in its model. Thus, the two stills from the animation illustrate the change that occurred between the initiation of the east penthouse collapse and the initiation of global collapse. As is readily apparent in Figure 2, substantial deformation of the upper exterior walls occurred prior to the initiation of global collapse in NIST's global collapse analysis. The NIST WTC 7 Report acknowledges that "In both analyses, the eastern exterior wall deflected inward at the roof level as the structure became unsupported after the vertical collapse event [i.e., global collapse]." (*See* NCSTAR 1-9, p. 600.) In fact, the inward deflection of the eastern exterior wall in NIST's global collapse analysis commences well before the initiation of global collapse.

However, per NIST's own observations, there is no observed deformation or displacement of the upper exterior corners as late as 7.5 seconds after the initiation of the east penthouse collapse, which is .6 seconds after NIST claims that global collapse initiated. As shown in the Request and below, Figures 5-199, 5-200, and 5-201 from NCSTAR 1-9, which compare the position of WTC 7's exterior at 5.0 seconds and 7.5 seconds after the initiation of the east penthouse collapse, demonstrate the total absence of deformation or displacement in the upper exterior corners at least .6 seconds after NIST claims global collapse initiated, with NIST actually commenting: "Interestingly, little movement of the northeast and northwest corners of the building is indicated." (*See* NCSTAR 1-9, p. 274.)

The Initial Decision completely ignores this analysis from Section E and simply restates the claim in NIST WTC 7 FAQ #35, which this analysis unambiguously refutes.

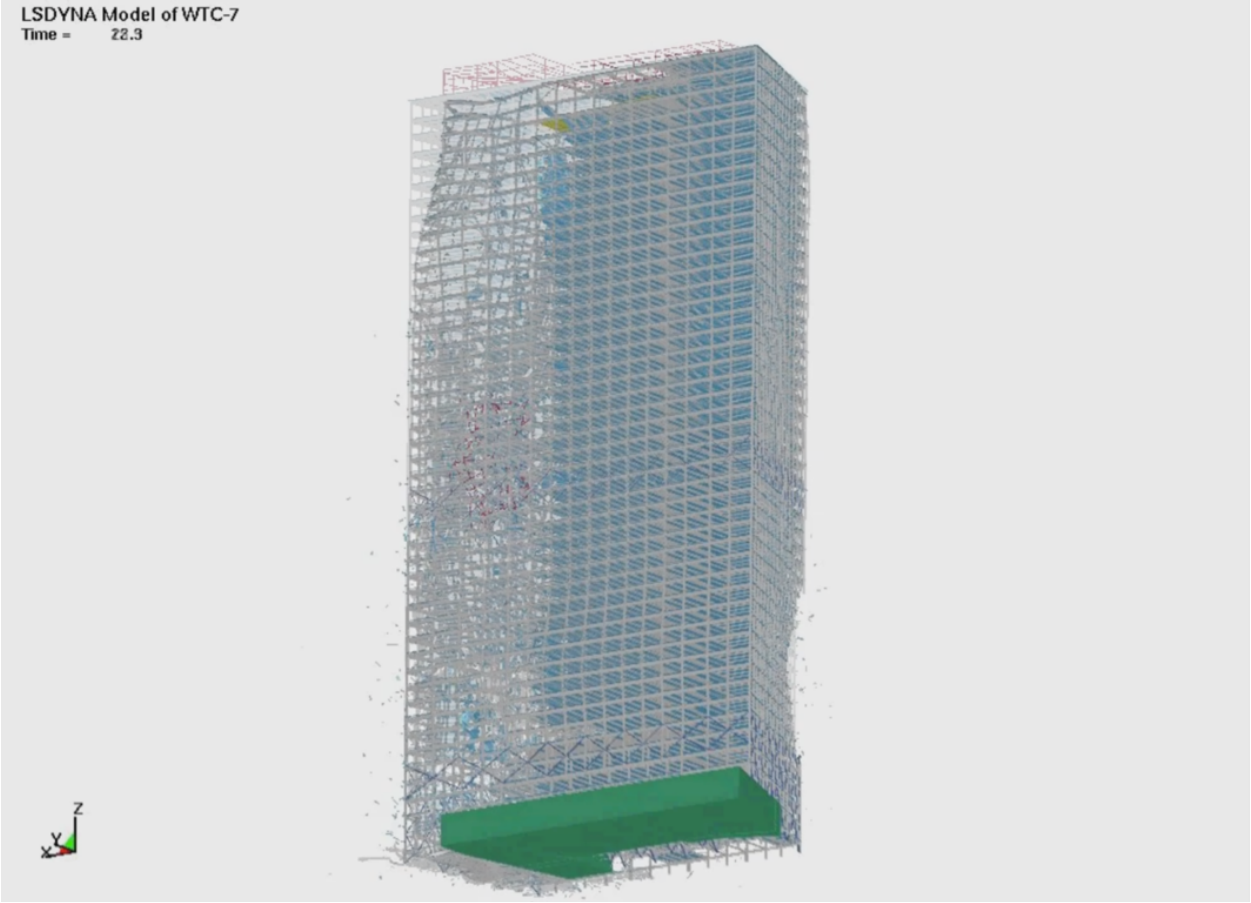



Figure 2: NIST's global collapse analysis at 6.3 seconds after the initiation of the east penthouse collapse laid over .1 seconds before the east penthouse collapse initiation. 6.3 seconds is the time that NIST identifies as the initiation of global collapse in its model. Therefore, substantial deformation of the upper exterior walls occurred **prior** to the initiation of global collapse in NIST's global collapse analysis.


**Figure 5–199. Cropped frames from the Camera 2 video clip in Figure 5–185 and the Camera 3 video clip in Figure 5–186, showing the north face of WTC 7 5.0 s ± 0.1 s after the east penthouse began to move downward.**
The intensities have been adjusted.


**Figure 5–200. Cropped frames from the Camera 2 video clip in Figure 5–185 and the Camera 3 video clip in Figure 5–186, showing the north face of WTC 7 7.5 s ± 0.1 s after the east penthouse began to move downward.**
The intensities have been adjusted.


**Figure 5–201. Cropped difference frame at 7.5 s ± 0.1 s after the east penthouse began to move, created by subtracting the frame reproduced in Figure 5–199 from the Camera 3 video clip shown in Figure 5–200.**
The intensity levels were adjusted.

In regards to point #4, NIST attempts to justify why the global collapse analyses do not match the observed behavior better by repeating one unsubstantiated claim already addressed in the Request and one false claim from the NIST WTC 7 FAQs that is not addressed in the Request.

The unsubstantiated claim already addressed in the Request and partially repeated in the Initial Decision is stated in a section of the NIST WTC 7 Report titled "Aspects following the Global Collapse Initiation" (*see* NCSTAR 1A, p. 44):

> *Once simulation of the global collapse of WTC 7 was underway, there was a great increase in the uncertainty in the progression of the collapse sequence, due to the random nature of the interaction, break up, disintegration, and falling debris. The uncertainties deriving from these random processes increasingly influenced the deterministic physics-based collapse process, and the details of the progression of the horizontal failure and final global collapse were increasingly less precise.*

As noted in the Request, NIST terminated the animation of the global collapse analysis 1.8 seconds after the initiation of global collapse, which .05 seconds into the period where the model might have been expected to show the observed period of free fall, based on NIST's claim that there was 1.75 seconds of slow descent before free fall began. (*See* the Request, p. 40-41). But because free fall means that there is no interaction between the falling top section of the building and the structure below it, it should have been easier for NIST's global collapse analysis to simulate the observed period of free fall, not more difficult. NIST should not have needed to terminate the global collapse analysis due to increasing uncertainty and less precision just as the model might have been expected to show the observed period of free fall. (*See* the Request, p. 41.) The Initial Decision completely avoids addressing this relevant data quality argument, simply restating NIST's original claim.

The false claim from the NIST WTC 7 FAQs that is not addressed in the Request is as follows (*see* NIST WTC 7 FAQ #29):

> *The contribution to stiffness and strength of nonstructural materials and components, such as exterior cladding, interior walls and partitions, was not considered in the analyses conducted by NIST. It is well known that such non-structural components can increase the stiffness and strength of a structural system, but their contribution is difficult to quantify. Given these factors, disparities between the video and the animation in the later stages of collapse would be expected.*

The letter enclosed herewith by Dr. J. Leroy Hulsey, a professor emeritus of civil engineering at the University of Alaska Fairbanks (UAF), who conducted the extensive computer modeling study of the collapse of WTC 7 cited in the Request and in this Appeal, indicates that the contribution to stiffness and strength of non-structural materials and components, such as exterior cladding, interior walls, and partitions, would be insignificant. (*See* Exhibit A of this Appeal.) Dr. Hulsey states that he and his team examined the effects of including non-structural sheathing stiffness in the UAF global collapse analysis and compared the analytical results with the analytical results of excluding the stiffness of the non-structural sheathing. Dr. Hulsey states with a high degree of confidence that the additional stiffness introduced by non-structural elements will result in an insignificant effect on the analytical results and, further, will not alter the collapse mechanism findings in the case of WTC 7's collapse or the way the structure will fail.

Also, as noted in the Request and below, the UAF global collapse analysis predicted all of the structural behavior — including the lack of exterior deformation — that NIST's global collapse analysis failed to predict. Specifically, the UAF global collapse analysis predicted the lack of exterior deformation without including non-structural materials and components such as sheathing. Thus, the disparities between the video and NIST's global collapse analysis animation are not accounted for by the exclusion of non-structural materials and components.

*Relevant Data Quality Arguments in Section E to Which NIST Failed to Respond*

The following is a point-by-point list of the relevant data quality arguments contained in Section E to which NIST failed respond substantively or at all in its Initial Decision. Some of these arguments are addressed above but are also listed here in order to provide a complete list of the relevant data quality arguments to which NIST must respond in its Final Decision if it does not revise the NIST WTC 7 Report as requested.

1. First and most apparent, NIST's global collapse analysis predicts significant deformation of the upper exterior walls both before and after the initiation of global collapse. Yet, per NIST's own observations, there is no observed deformation or displacement of the upper exterior corners as late as 7.5 seconds after the initiation of the east penthouse collapse (which is .6 seconds *after* NIST claims that global collapse initiated). Figures 5-199, 5-200, and 5-201 from NCSTAR 1-9, which compare the position of WTC 7's exterior at 5.0 seconds and 7.5 seconds after the initiation of the east penthouse collapse, demonstrate the

total absence of deformation or displacement in the upper exterior corners, with NIST actually commenting: "Interestingly, little movement of the northeast and northwest corners of the building is indicated." (*See* NCSTAR 1-9, p. 274.) Meanwhile, the NIST global collapse analysis predicts significant deformation of the upper exterior walls both before and after the initiation of global collapse. The four figures shown on pages 30 and 31 of the Request (including Figure 2 shown above) illustrate the increasing deformation of the upper exterior walls predicted in NIST's global collapse analysis at four different points in time by overlaying each animation frame on top of the animation frame just before the initiation of the east penthouse collapse (which is at 16 seconds in NIST's global collapse analysis animation). The next three figures, shown on page 32 of the Request, juxtapose video of the collapse with NIST's global collapse analysis at 5 seconds, 7.5 seconds, and 8.1 seconds after the initiation of the east penthouse collapse. In addition, Figure 12-62 from NCSTAR 1-9, shown on page 33 of the Request and below, illustrates the significant deformation of the exterior predicted in NIST's global collapse analysis, with the upper eastern exterior folding inward to the south dramatically, as acknowledged by NIST: "In both analyses, the eastern exterior wall deflected inward at the roof level as the structure became unsupported after the vertical collapse event." (*See* NCSTAR 1A, p. 44.) However, this behavior was not observed in any videos of the collapse.

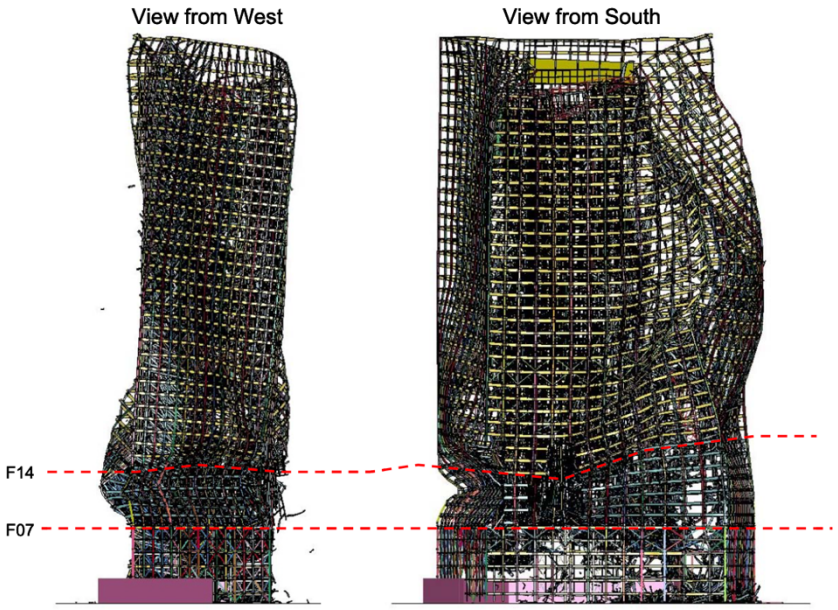



**Figure 12–62. Exterior column buckling after initiation of global collapse with debris impact and fire-induced damage (slabs removed from view).**

2. The second way that NIST's global collapse analysis fails to match most of the observed behavior is in the direction of the collapse. As illustrated in Figure 5-205 of NCSTAR 1-9, shown on page 34 of the Request, the northwest edge of WTC 7 descended nearly symmetrically during the first 4 seconds of the global collapse. Analyzing Figure 5-205, NIST states (*see* NCSTAR 1-9, p. 277):

> *In this sequence of images, both the northeast and northwest edges began to tilt toward the north shortly after the building began to move downward. The*

*northeast edge tilt continued to increase until the edge was obscured by dust and smoke. The northwest edge initially tilted in a similar manner, but then settled back to its original line and fell nearly vertically (or directly toward or away from the camera).*

In contrast, NIST's global collapse analysis predicts both the northeast and northwest edges of WTC 7 tipping to the south — not to the north — in a manner that appears they would not have tilted back to the north and, in the case of the northwest edge, that it would not have settled back to its original line. The southward tipping predicted in NIST's global collapse analysis is shown on page 35 of the Request and below in the western view from Figure 12-62 of NCSTAR 1-9 (left) and in the overlay of the final frame from NIST's global collapse analysis animation on top of the frame just before the initiation of the east penthouse collapse (right).

It should be noted that the illustration and animation of NIST's global collapse analysis shown in Figure 8 below correspond approximately to the position of WTC 7 at 8.3 seconds in the video, at which point there is no tipping or tilting of the building (see "8.3 s"). It is apparent that at the rate of tipping shown in the global collapse analysis, approximately 3 seconds later the model would have shown the building tipping southward dramatically far from its original position.

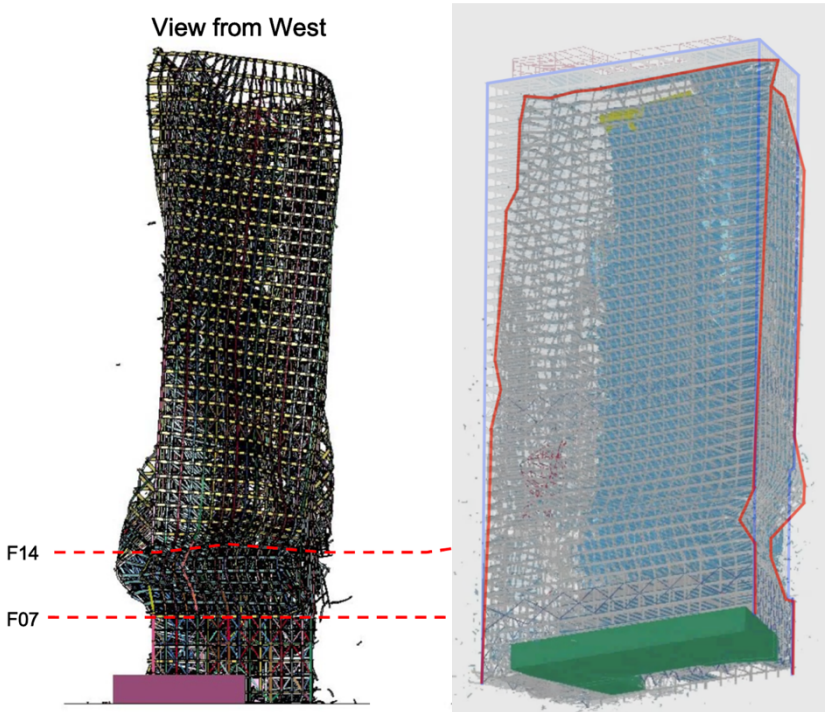



Figure 8: NCSTAR 1-9 Figure 12-62 View from West (left); NIST's global collapse analysis at 8.1 seconds after east penthouse collapse initiation laid over .1 seconds before the east penthouse collapse initiation (right).

3. The third way that NIST's global collapse analysis fails to match most of the observed behavior is by its failure to a predict the observed rate of downward motion from the initiation of global collapse through to the end of free fall. This downward motion is

characterized by a sudden transition from stasis to free fall followed by a period of free fall lasting approximately 2.5 seconds, during which WTC 7 fell downward approximately 8 stories without encountering any resistance. (*See* NCSTAR 1A, p. 45; Chandler, *NIST Finally Admits Free Fall*.)

As shown in detail from page 35 to 39 of the Request, the NIST WTC 7 Report mischaracterizes WTC 7's transition to free fall by tracking the vertical position of a single point "near the center of the roofline." Careful measurement by physicist and researcher David Chandler using the video that NIST labeled as Camera 2, which has a line of sight approximately level with the roofline, shows that a point near the center of the roofline did indeed begin to move downward at about 6.9 seconds after the east penthouse collapse initiation, but that the northeast and northwest corners of the roofline did not begin to move downward until about 8.2 seconds after the east penthouse collapse initiation. Chandler's measurement is corroborated by Figure 5-201 of NCSTAR 1-9 above, which shows a slight displacement at the middle of the roofline and zero displacement of the upper exterior corners 7.5 seconds after the east penthouse collapse initiation. According to Chandler's measurements, between 6.9 seconds and 8.2 seconds, the point near the center of the roofline dropped approximately half a meter, then stopped, and then dropped approximately 1 meter further, while the northeast and northwest corners remained stationary. Then, at 8.2 seconds, within a tenth of a second, all three points along the roofline suddenly began descending uniformly in free fall. While the northeast corner became difficult to track partway into the descent because of smoke, the measurements indicate that the middle of the roofline and the northwest corner stayed in free fall for approximately 2.5 seconds. Therefore, NIST mischaracterizes the downward motion in three important ways: (1) It overstates by approximately half a second the period of time that the middle of the roofline experienced a "slow descent" before entering free fall, claiming that this period lasted 1.75 seconds when it was closer to 1.3 seconds; (2) It wrongly portrays the displacement of the middle of roofline during this 1.3 seconds as a smooth transition to free fall, when in fact it dropped approximately half a meter, stopped, and then dropped approximately 1 meter, before suddenly entering free fall; (3) Most importantly, it generalizes the downward motion of the middle of the roofline to represent the downward motion of the entire roofline, when in fact the northeast and northwest corners did not descend at all from 6.9 seconds to 8.2 seconds, and their transition from stasis to free fall was instantaneous and simultaneous. NIST's mischaracterization of the sudden transition to free fall is significant not only because it misrepresents the nature of the observed behavior so as to make it seem more consistent with a natural, progressive collapse, but also because it helped NIST claim that its global collapse analysis "matched the observed behavior reasonably well."

In fact, the animation of NIST's global collapse analysis shows neither a 1.75-second period in which the north face descended approximately 2.2 meters (NIST's inaccurate observation), nor a 1.2-second period in which the middle of the roofline descended approximately 1.5 meters (Chandler's observation), nor the sudden transition to free fall of the entire roofline (Chandler's observation). Rather, as shown in Figure 10 on page 40 of the Request, NIST's model shows a highly deformed roofline descending approximately one and a half stories (approximately 6 meters) during the 1.8 seconds from the initiation of global collapse (6.3 seconds after the east penthouse collapse initiation in NIST's global collapse analysis) to the

termination of the model (8.1 seconds after the east penthouse collapse initiation). This amount of displacement is significantly greater than the initial displacement observed by both NIST and Chandler just prior to the onset of free fall.

In addition to failing to predict the sudden transition to free fall, NIST's global collapse analysis fails to predict the observed period of free fall itself. Because NIST terminates the animation of the global collapse analysis 8.1 seconds after the initiation of the east penthouse collapse, the model effectively cuts off just as it might have been expected to show the observed period of free fall. This is derived by noting the time of global collapse initiation in NIST's global collapse analysis, which is 6.3 seconds after the initiation of the east penthouse collapse, and adding the period of 1.75 seconds of slow descent alleged by NIST, which places the theoretical start of free fall at 8.05 seconds after the east penthouse collapse initiation. This is .05 seconds before NIST terminated the animation of the global collapse analysis. As a result, NIST's global collapse analysis ends before showing the observed period of free fall.

The NIST WTC 7 Report states the following about the global collapse analysis in a subsection titled "Aspects following the Global Collapse Initiation" (*see* NCSTAR 1A, p. 44):

> *Once simulation of the global collapse of WTC 7 was underway,* ***there was a great increase in the uncertainty in the progression of the collapse sequence****, due to the random nature of the interaction, break up, disintegration, and falling debris. The uncertainties deriving from these random processes increasingly influenced the deterministic physics-based collapse process, and* ***the details of the progression of the horizontal failure and final global collapse were increasingly less precise.*** *(Emphasis added.)*

But because free fall means that there is no interaction between the falling top section of the building and the structure below it, it should have been easier for NIST's global collapse analysis to simulate the observed period of free fall, not more difficult. NIST should not have needed to terminate the global collapse analysis due to increasing uncertainty and less precision just as the model might have been expected to show the observed period of free fall.

It is reasonable to deduce that NIST may have terminated its global collapse analysis 8.1 seconds after the east penthouse collapse initiation because the model had failed to match most of the observed behavior up until that point, and the model's ability to match the observed behavior only worsened after that point, as noted by NIST. Significant deformation and tipping were underway and likely to increase, and there was no indication that the building was about to enter vertical free fall.

In any case, NIST's claim that "the three stages of collapse progression . . . are consistent with the results of the global collapse analyses discussed in Chapter 12 of NIST NCSTAR 1-9" is unambiguously false for a second reason: The second stage, which NIST characterizes as 2.25 seconds of free fall, is not shown in NIST's global collapse analysis.

Furthermore, NIST's admission that there was increasing uncertainty and less precision in the model following global collapse initiation suggests that it would not have shown the observed period of free fall if it had continued.

4. In summary of the three data quality arguments above, because NIST's global collapse analysis fails to match most of the observed behavior — predicting fundamentally different structural behavior from what was observed — NIST should have interpreted its global collapse analysis as disconfirming its leading collapse hypothesis.

5. As discussed in more detail above, NIST's claim that its global collapse analysis "matched the observed behavior reasonably well" and therefore "confirmed the leading collapse hypothesis" rests on the notion that reproducing certain observed events was sufficient to match the observed behavior and confirm the leading collapse hypothesis, even though fundamental aspects of the structural behavior — lack of deformation, vertical descent, and free fall — were not predicted in the model. The fundamental flaw in NIST's claim that its global collapse analysis "matched the observed behavior reasonably well" and therefore "confirmed the leading collapse hypothesis" is as follows: All of the observables listed above are also consistent with the hypothesis of controlled demolition, if not more consistent. Furthermore, as discussed further below, the hypothesis of controlled demolition readily explains the other fundamental aspects of WTC 7's structural behavior that NIST's global collapse analysis fails to predict (lack of deformation, vertical descent, and free fall). Therefore, it is scientifically unsound for NIST to conclude that its global collapse analysis confirmed its leading collapse hypothesis.

6. The UAF study cited above performed a number of simulations using SAP2000 software to determine what types of local failures and their locations may have caused the total collapse of WTC 7 to occur as observed.

   First, the UAF team found that the collapse of the east penthouse was most accurately predicted by simulating the failure of Columns 79, 80, and 81 from the 45$^{th}$ floor up to the penthouse. This failure mechanism caused the east penthouse to collapse into the building while also causing minimal movement of the exterior. In contrast, the UAF team found that as the failure of Columns 79, 80, and 81 was simulated progressively lower in the building, the east penthouse was *less likely* to collapse into the building, because the intact portions of Columns 79, 80, and 81 above where the columns failed would still support the penthouse. At the same time, there would be greater movement of the exterior the further down the column failures were simulated. Figures 4.2 and 4.7 of the UAF Report, shown on page 43 of the Request, illustrate these phenomena. Specifically, Figure 4.2 shows the results of removing Columns 79, 80, 81 from Floor 6 to Floor 13, which is approximately where these columns buckled in NIST's Probable Collapse Sequence. (*See* UAF Report, p. 96, p. 99.)

   Second, the UAF team found that the failure of Columns 79, 80, and 81 would not have initiated an east-to-west progression of core column failures, as claimed by NIST (see the latter stages of NIST's Probable Collapse Sequence on page 23 above). Therefore, the UAF team considered the possibility that the local failures that caused the global collapse were not actually a result of the earlier local failures that caused the collapse of the east penthouse.

Thus, the UAF team simulated the simultaneous failure of all core columns over 8 stories followed 1.3 seconds later by the simultaneous failure of all exterior columns over 8 stories. The UAF team found that "the simultaneous failure of all core columns followed by the simultaneous failure of all exterior columns produces almost exactly the behavior observed in videos of the collapse." (*See* UAF Report, p. 106.) Figure 4.17 of the UAF Report, shown on page 44 of the Request, shows the UAF team's global collapse analysis from two separate angles alongside corresponding video of the collapse. Figure 11 on page 45 of the Request illustrates how the collapse progressed in the UAF global collapse analysis by overlaying the last frame of the animation on the first frame the animation. As is apparent, the UAF global collapse analysis predicts minimal deformation of the exterior and a clean vertical descent, as observed in videos of the collapse. The UAF team also found that the simultaneous failure of all core columns over 8 stories followed 1.3 seconds later by the simultaneous failure of all exterior columns over 8 stories resulted in a downward velocity and acceleration that matched almost exactly with the observed 2.5 seconds of free fall, as illustrated in Figure 4.20 from the UAF Report, shown on page 46 of the Request.

7. Furthermore, as mentioned above, all of the observables that NIST claims were accurately predicted in its global collapse analysis, or corresponded temporally to a simulated failure in its global collapse analysis, are also consistent with the hypothesis of controlled demolition, if not more consistent. The east-west vibration of the building ± 2 inches about 6 seconds before the initiation of the east penthouse collapse could have been caused by explosive and/or incendiary devices that were used to bring down the east penthouse or destroy other parts of the building. The seismic signal approximately 10 seconds prior to the initiation of global collapse is much better explained by a subaerial explosion that occurred in the process of bringing down the east penthouse, as discussed further in Part 2. The formation of a kink in the roofline of the east penthouse could have been caused by the removal of Columns 79, 80, and 81 high up in the building. Window breakage on the east side of the north face is better explained by the failure of Columns 79, 80, and 81 high up in the building and a shockwave propagating downward from the collapse of the east penthouse into the building. This is especially apparent because the window breakage propagated from the roof down and was limited to approximately the upper 15 floors. Any window breakage caused by the failure of Column 79 low in the building would be expected to occur from the bottom up along much of the height of the building, not just the upper 15 floors. Finally, the collapse of the east penthouse and the global collapse of the building are the intended result of a controlled demolition scenario.

8. Based on all of the information presented above, NIST's claim that its global collapse analysis matched the observed behavior reasonably well and confirmed its leading collapse hypothesis fails to comply with the OMB Guidelines and NIST IQS because it lacks objectivity, utility, transparency, and reproducibility. First, NIST's claim that its global collapse analysis matched the observed behavior reasonably well is inaccurate, unreliable, and apparently biased because NIST's global collapse analysis fails to match most of the observed behavior, actually predicting fundamentally different structural behavior from what was observed, thus violating the objectivity element of information quality under the OMB Guidelines and NIST IQS. In addition, NIST's claim that there was 1.75-second period of slow descent prior to free fall, which helped NIST claim that its global collapse analysis

matched the observed behavior reasonably well, is inaccurate, unreliable, and apparently biased because careful measurement shows a sudden transition to free fall. Second, NIST's claim that its global collapse analysis confirmed its leading collapse hypothesis is inaccurate, unreliable, and apparently biased because it matched only *some* of the observables, while the hypothesis of controlled demolition also explains those observables in addition to explaining the fundamental aspects of WTC 7's structural behavior that NIST's global collapse analysis failed to predict (lack of deformation, vertical descent, and free fall). Third, NIST's termination of its global collapse analysis 8.1 seconds after the east penthouse collapse initiation violates the utility element of information quality because care was not taken to make sufficient background and detail available regarding its claim. Similarly, NIST's termination of its global collapse analysis 8.1 seconds after the east penthouse collapse initiation also violates the transparency standard imposed upon influential information because NIST did not practice a degree of transparency sufficient to facilitate reproducibility. Specifically, even despite the increase in uncertainty and decrease in precision — or precisely because of it — NIST should have terminated its global collapse analysis later in order to increase the usefulness of the information and to better allow members of the public to evaluate whether the global collapse analysis matched the observed behavior well. Fourth, NIST's claim that its global collapse analysis matched the observed behavior reasonably well violates the reproducibility standard imposed upon influential information because — to the extent that independent analysis of the original data using identical methods could be performed — contradictory analytic results were generated by the UAF researchers. Namely, the UAF analysis found that simulating the failure of Columns 79, 80, and 81 from the Floor 6 to Floor 13 did not cause the east penthouse to collapse into the building. Fifth, NIST's claim that its global collapse analysis confirmed its leading collapse hypothesis violates the reproducibility standard imposed upon influential information because the UAF analysis found that simulating what is effectively a controlled demolition scenario matches the observed behavior far better than NIST's global collapse analysis does.

### 2. Actions NIST Must Take to Comply with the DQA, OMB Guidelines, and NIST IQS

To comply with the DQA, the OMB Guidelines, and the NIST IQS, NIST must take one of the following two actions. In the Requesters' view, only the first action is analytically sound.

1. Revise the NIST WTC 7 Report to reflect that the north face roofline underwent a sudden transition to free fall, as shown in detail from page 35 to 39 of the Request. Then perform a new global collapse analysis that both is physically possible (i.e., does not involve the walk-off of Girder A2001 at its Column 79 support nor a cascade of floor failure from Floor 13 to Floor 5) and matches the observed behavior well (e.g., the scenario simulated in the UAF analysis). Then discard the Probable Collapse Sequence and adopt a new probable collapse sequence that both is physically possible and better matches the observed behavior; or

2. Provide a substantive response in your Final Decision to each of the relevant data quality arguments listed above. In particular, your Final Decision must provide a detailed explanation for why the NIST WTC 7 Report should not be revised to reflect that the north face roofline underwent a sudden transition to free fall when the NIST WTC 7 Report

currently states that the north face roofline underwent a 1.75-second period of slow descent prior to free fall. Your Final Decision must also provide a detailed explanation for why NIST should not perform a new global collapse analysis simulating the scenario simulated in the UAF analysis (the failure of Columns 79, 80, and 81 high in the building followed by the near-simultaneous failure of all columns lower in the building over 8 stories).

## F. SEISMOGRAM DATA

The central claim in Section F is that NIST erroneously attributed the two seismic signals generated during the collapse of WTC 7 to the alleged cascade of floor failures and to the initiation of global collapse instead of to the occurrence of two subaerial explosions, thus violating the OMB Guidelines and NIST IQS. The requested corrections were for NIST to (1) revise the NIST WTC 7 Report to reflect that subaerial explosions, as opposed to the alleged cascade of floor failures and the initiation of global collapse, were the actual source of the seismic signals generated during the collapse of WTC 7, and (2) discard its Probable Collapse Sequence and develop a new Probable Collapse Sequence that is consistent with the occurrence of a subaerial explosion at the onset of the east penthouse collapse and a subaerial explosion at the onset of global collapse.

Unlike most other sections of the Request, given the straightforward nature of the information quality violation, Section F did not include alternative requests in the event that NIST maintained that the two seismic signals generated during the collapse of WTC 7 were caused by the alleged cascade of floor failures and the initiation of global collapse.

As described more fully below, NIST's response to the central claim and the two requests in Section F is demonstrably in error and wholly unsubstantive. Section F provides clear, compelling, and straightforward reasons that the two seismic signals could not possibly have been generated by the alleged cascade of floor failures and the initiation of global collapse. The Initial Decision completely avoids addressing all of the relevant data quality arguments contained in Section F — with the exception of briefly addressing whether the seismogram data indicate two separate seismic events — and merely restates in basic terms its methodology for analyzing the seismogram data.

### 1. NIST's Erroneous and Unsubstantive Response to Section F

Removing the nonessential opening and closing sentences of NIST's response to Section F, the response reads as follows:

> *NIST disagrees that the analysis of seismic signals in WTC 7 report, in particular two seismic signals associated with the cascade of floor failures and the initiation of global collapse, fail to comply with the OMB Guidelines or NIST IQS. As referenced in the WTC 7 report, the seismic signals for the WTC 7 event were recorded and evaluated by Lamont-Doherty Earth Observatory (LDEO) for accuracy and reliability. NCSTAR 1-9, Appendix B lists criteria for characterizing seismic signals recorded from the WTC site, provides uncertainty bounds on WTC*

> *event times based on the seismic signals, and clearly indicates the various types of seismic signals (pressure, shear, and Rayleigh waves) from the collapse of WTC 7.*
>
> *While the report notes that the "qualitative sequence of events is consistent with what might be construed as two arrivals," it acknowledges that "caution is required when interpreting signals that are small." NIST evaluated other seismic events recorded on September 11, 2001, including earthquakes, local quarry blasts, and unidentified weak signals, to distinguish the main events from such signals. In addition to the seismic records provided by LDEO, NIST also considered seismic records from other sources such as photographs, video recordings, and television broadcasts. The seismic records from these additional sources were also evaluated for completeness and included in the analysis of the WTC 7 probable collapse sequence. Further, the seismic signals from these additional records were also evaluated for all possible sources, including subaerial explosions, with consideration of seismic signal characteristics, quality, and associated uncertainties. Accordingly, the use of underlying data for the seismic signals and the methodologies for analysis of the seismic signals complies with the OMB Guidelines and NIST IQS.*

In essence, NIST does two things in its response: (1) It restates in basic terms its methodology for analyzing the seismogram data and asserts that its analyses comply with the OMB Guidelines and NIST IQS. (2) As it did in NCSTAR 1-9 Appendix B, it cautions against interpreting the seismic data as necessarily indicating two separate seismic events.

NIST's basic description of its methodology for analyzing the seismogram data and its assertions that its analyses comply with the OMB Guidelines and NIST IQS do not address the central claim nor the underlying relevant data quality arguments contained in Section F.

NIST's caution against interpreting the seismic data as necessarily indicating two separate seismic events is not incorrect but also does not negate the analysis of the seismic data contained in Section F.

André Rousseau, a retired geophysicist who previously worked at the National Center of Scientific Research in Bordeaux, France, and who provided a declaration as part of the original Request (*see* the Request, Exhibit B), states in a new declaration enclosed herewith that he agrees caution is required when interpreting signals that are small. Indeed, in Rousseau's professional opinion, it cannot be concluded with absolute confidence that the second signal shown in the seismograms is from a second seismic event. However, as Rousseau attests, he concludes that the second signal is most likely an arrival from a separate seismic event. Rousseau attests that if this signal were the result of geological configuration, there would have been the same effect for the four other seismic signals emitted from WTC 1 and WTC 2. According to Rousseau, in the case of WTC 2, a second signal occurred 5.85 seconds after the first signal, while the second signal in the case of WTC 7 occurred 8 seconds after the first signal. Moreover, as shown in the Request and presented below, NIST listed two separate seismic events in Table B-4 of NCSTAR 1-9 Appendix B — though, as stated above, NIST cautioned against interpreting the seismogram data as necessarily indicating two separate seismic events.

**Table B-4. Summary of seismic events recorded 8:46 to 17:21 on Sept. 11, 2001.**

| Origin Time, EDT (hh:mm:sec) | Event ID | Latitude (°N) | Longitude (°E) | Depth (km) | Magnitude ($M_L$) | Event Type |
|---|---|---|---|---|---|---|
| 17:20:42 | 5 | 40.71 | -74.01 | 0 | 0.6 | WTC 7 collapse initiation |
| 17:20:50 | 5' | 40.71 | -74.01 | 0 | 0.6 | WTC 7 perimeter wall collapse |

In any case, the Initial Decision completely avoids addressing the many relevant data quality arguments contained in Section F — all of which still hold regardless of whether one or two seismic events occurred. The following are the relevant data quality arguments to which NIST provided no response whatsoever:

1. Putting aside whether the observed seismic activity can be accurately characterized as two separate seismic events, the fundamental flaw in NIST's interpretation of the seismogram data is that debris impact, whether inside the building or directly against the ground, simply does not produce a force sufficient to create seismic waves that will travel further than several hundred meters. This fact is attested to in the declaration by André Rousseau, a retired geophysicist who previously worked at the National Center of Scientific Research in Bordeaux, France, for 35 years and published 50 papers on the relationship between the characteristics of progressive mechanical waves and geology. Rousseau states in the original declaration (*see* the Request, Exhibit B):

   > *Seismic waves can only propagate in the ground when they are produced from a fracture (earthquake, explosion) or from a percussion on a solid ground by a solid mass (great lumps of solid rocks falling from a mountain, meteorites) or from the technique used in applied geophysics of "weight dropping," which consists of letting a heavy mass such as a three-ton weight fall to earth, or by using vibrators attached to the ground. But the energy of the waves developed in the ground by the latter three methods is too low for the waves to go further than several hundred meters. As a result, only explosions can explain the seismic waves that correspond to the collapse of WTC 7.*

   Rousseau further attests in the original declaration:

   > *The recording of Rayleigh waves in the LDEO seismogram [shown below] unaccompanied by a pressure (P) wave and a shear (S) wave indicates the occurrence of subaerial explosions taking place close to the ground, where the emitted energy splits into sound waves, mostly in the air, and surface waves in the ground.*

   In the declaration, Rousseau cites the controlled demolition of the remaining portion of the bomb-ravaged Alfred P. Murrah Federal Building in Oklahoma City on May 23, 1995, as a

real-world experiment showing the inability of falling debris to create seismic waves that travel further than several hundred meters.

> *The example of the Alfred P. Murrah Federal Building demolition involved a powerful subaerial explosion and the emission of Rayleigh waves. While Rayleigh waves were recorded on seismometers approximately 7 km and 26 km from the Federal Building, the falling of debris had no seismic consequences, even at distances much less than the 34 km distance between Lower Manhattan and Palisades, NY. Only the seismic equipment situated close to the source during the Federal Building demolition was able to record the seismic energy created by the collapse of the building.*

The seismogram data generated during the demolition of the Alfred P. Murrah Federal Building is shown on page 52 of the Request.

2. Furthermore, as Rousseau states in the original declaration, "the recorded frequency of about 1 Hertz (1 Hz, or one cycle per second) is consistent with the frequency of waves generated by explosions, whereas the frequencies of waves generated by percussion are above 10 Hz and often around 100 Hz."

   In support of this claim, in the new declaration enclosed herewith, Rousseau cites the findings of two studies regarding the frequencies generated by different types of percussive events. In the paper titled "Seismic Characteristics of the Weigh-Dropping Source," the experiments conducted find that the frequencies generated by weight dropping are 10 Hz and higher. In the paper titled, "Analysis of Rock-Fall and Rock-Fall Avalanche Seismograms in the French Alps," the authors find that the seismogram data generated by the impact of enormous rocks falling in the French Alps generate frequencies around 10 Hz. As Rousseau attests in the enclosed declaration, these rocks are many times heavier than the floor sections in WTC 7. Furthermore, they impact the ground directly, and all of the energy from their fall is conveyed in a single impact. In contrast, the falling floor sections inside WTC 7 obviously would not have impacted the ground directly, and the force of their impact would not be imparted all at once.

3. Rousseau also attests in the original declaration, "the bell-like form in the LDEO seismogram points to an impulsive source of energy, not percussion on the ground due to the fall of debris." In the new declaration, Rousseau emphasizes that, based on that the bell-like form in the LDEO seismogram, this was an impulsive source of energy imparted within a split second, not a percussive source of energy distributed over several seconds. The waveforms are simply incompatible with a sustained seismic event.

4. NIST's claim that the first seismic signal was generated by "interior debris falling onto the lower floors of WTC 7" is especially implausible. As Rousseau attests in the original declaration, "even if there were tremendous percussion caused by the impact of several floors [Floor 14 to Floor 6] in the northeastern corner of the building falling onto a lower, stronger floor [Floor 5], any seismic wave created in the adjoining steel columns would hit the ground only in the form of seismic noise. Further, because the passage from metal to rock is a

refraction that absorbs energy, there would be insufficient energy left to propagate in the ground."

5. NIST's overall Probable Collapse Sequence is also totally incompatible with the observed seismic activity. As Rousseau states in the original declaration, firstly, "[t]here is no reason that the initial cascade of floor failures in NIST's Probable Collapse Sequence would be expected to create a larger seismic signal than the subsequent sustained, widespread debris impact occurring inside the building." Second, "[t]here is no reason why the initiation of global collapse under NIST's Probable Collapse Sequence would be expected to generate a second seismic signal. The major mechanism for the initiation of global collapse was the buckling of exterior columns, which does not involve debris impact." (Emphasis added.) Third, "[t]he initiation of global collapse was quickly followed by the observed period of free fall, during which the top section of the building descended downward approximately 8 stories for 2.25 to 2.5 seconds without encountering any resistance. By definition, the top section of the building was exerting no force whatsoever on the lower section during this period." (Emphasis added.)

6. Finally, Rousseau states in the original declaration, "[t]he part of the collapse that would be most expected to generate seismic energy — the top section falling onto the lower section after free-falling for 8 stories, and then directly impacting the ground — did not generate a unique seismic signal." In other words, NIST's claim implies that the collapse of several floor sections onto one floor in one corner of the building somehow generated a stronger seismic signal than the impact load caused by the entire top section free-falling for 105 feet.

7. In contrast, as attested to by Rousseau in the original declaration, "[t]he hypothesis of controlled demolition involving two subaerial explosions is perfectly consistent with the recorded seismic activity." First, Rousseau attests, "[e]xplosions caused by demolition charges can create seismic waves that will travel further than several hundred meters." Second, "explosions caused by demolition charges create seismic waves with frequencies around 1 Hz." Third, "[t]he bell-like form in the LDEO seismogram is consistent with an impulsive source of energy such as that generated by an explosion." Fourth, "[t]he occurrence of two seismic signals approximately 7 seconds apart, occurring just before the initiation of the east penthouse collapse initiation and just before the initiation of global collapse, is readily explained by the detonation of demolition charges."

8. In summary, the NIST WTC 7 Report erroneously attributes the first seismic signal during the collapse of WTC 7 to the alleged cascade of floor failures in its Probable Collapse Sequence, and it erroneously attributes the second seismic signal to the initiation of global collapse. Debris impact simply does not produce a force sufficient to create seismic waves that will travel further than several hundred meters, while explosions caused by demolition charges do. The two seismic signals recorded during the collapse of WTC 7 were clearly caused by explosions and are readily explained by the detonation of demolition charges just before the initiation of the east penthouse collapse and just before the initiation of global collapse. As a result, NIST's claim that the two seismic signals were created by a cascade of floor failures and the initiation of global collapse, respectively, fails to comply with the OMB Guidelines and NIST IQS because it lacks objectivity. NIST's claim is inaccurate, unreliable,

and biased because it contradicts the straightforward and indisputable interpretation of the seismogram data indicating that the seismic signals were created by explosions.

### 2. Actions NIST Must Take to Comply with the DQA, OMB Guidelines, and NIST IQS

To comply with the DQA, the OMB Guidelines, and the NIST IQS, NIST must take one of the following two actions. In the Requesters' view, only the first action is analytically sound.

1. Revise the NIST WTC 7 Report to reflect that subaerial explosions, as opposed to the alleged cascade of floor failures and the initiation of global collapse, were the actual source of the seismic signals generated during the collapse of WTC 7. NIST must then discard its Probable Collapse Sequence and develop a new Probable Collapse Sequence that is consistent with the occurrence of a subaerial explosion at the onset of the east penthouse collapse and a subaerial explosion at the onset of global collapse; or

2. Provide a substantive response in your Final Decision to each of the relevant data quality arguments listed above. In particular, your Final Decision must provide an explanation and supporting theoretical evidence demonstrating that the impact of falling floor sections inside WTC 7 could have (1) generated sufficient force to create seismic waves that will travel 34 kilometers, (2) generated a seismic signal with a frequency of 1 Hz, (3) generated a seismic signal that produced a bell-like form, indicating an impulsive source of energy, and (4) generated force that would not merely hit the ground in the form of seismic noise and, despite the passage from metal to rock, leave sufficient energy to propagate in the ground. Furthermore, your Initial Decision must explain why the alleged cascade of floor failures from Floor 14 down to Floor 5 in one corner of the building would serve as a greater impulsive source of energy than the building-wide structural failures, debris impact, 105-foot free fall of the upper structure onto the lower structure.

## G. EYEWITNESS AND AUDIO EVIDENCE OF EXPLOSIONS

The two central claims in Section G of the Request are that NIST (1) ignored and distorted eyewitness reports and audio recording indicative of explosions at the onset of and during the collapse of WTC 7 and (2) distorted eyewitness reports of an explosion occurring inside WTC 7 on the morning of 9/11, thus violating OMB Guideline and NIST IQS.

The primary requested corrections were for NIST to (1) revise the NIST WTC 7 Report to reflect that there are eyewitness report and audio recordings indicative of explosions at the onset of and during the collapse of WTC 7, (2) revise Section 6.5.2 of NCSTAR 1-9 to faithfully reflect the account of Barry Jennings, according to which there was a big explosion inside WTC 7 before 10:28 AM that caused the 6$^{th}$ floor landing he and Michael Hess were standing on to give way, (3) discard its Probable Collapse Sequence and develop a new Probable Collapse Sequence that is consistent with the occurrence of an explosion at the onset of the east penthouse collapse as well as explosions later in the collapse sequence and explosions earlier in the day. Section G noted that this would be accomplished by simulating the failure of Columns 79, 80,

and 81 high in the building, followed by the near-simultaneous failure of all columns lower in the building over 8 stories, as requested in Section E of the Request.

As part of the first requested correction, Section G urged that NIST should attempt to interview the witnesses discussed in Section G and that NIST should commission a more in-depth audio analysis of the three videos cited in Section G. As part of the second requested correction, Section G noted that NIST must revise its account of the EOC evacuation orders, or, alternatively, must amend the NIST WTC 7 Report to include evidence supporting NIST's account of the evacuation orders.

In addition, in the event that NIST maintained that the overall body of eyewitness and audio evidence does not indicate the occurrence of explosions at the onset of and during the collapse of WTC 7, in order to satisfy the objectivity, utility, and transparency standards of information quality, Section G alternatively requested that NIST publish a new appendix to the NIST WTC 7 Report containing all interviews that indicate explosions did not occur at that time. Further, in the event that NIST maintained that the event Hess and Jennings witnessed was caused by the collapse of WTC 1 at 10:28 AM, in order to satisfy the objectivity, utility, and transparency standards of information quality, Section G alternatively requested that NIST publish its interviews with Hess and Jennings in a new appendix to the NIST WTC 7 Report and that NIST explain how, based on documented or experimental evidence, it took Hess and Jennings approximately 29 minutes to descend 17 floors (an average of 1 minute and 42 seconds per floor).

As described more fully below, NIST's response to the two central claims and the three requests in Section G is demonstrably in error and wholly unsubstantive. In regards to the first central claim, the Initial Decision completely avoids responding to the relevant data quality arguments, merely restating portions of its analysis that were criticized in the Request, but without responding to those criticisms. In regards to the second central claim, the Initial Decision completely avoids responding to the relevant data quality arguments, merely stating that NIST's account of the rescue events in WTC 7 is based on eight independent interviews (interviews that NIST will not release). In addition, the Initial Decision completely avoids responding to the alternative requests that NIST amend the NIST WTC 7 Report to include interviews and analysis that would satisfy the objectivity, utility, and transparency standards of information quality (namely, interviews that indicate explosions did not occur at the onset of and during the collapse of WTC 7, the interviews with Hess and Jennings, and analysis explaining how it took Hess and Jennings approximately 29 minutes to descend 17 floors).

### 1. NIST's Erroneous and Unsubstantive Response to Section G

Removing the nonessential opening and closing sentences of NIST's response to Section G, the response reads as follows:

> *NIST disagrees that eyewitness reports and audio recordings indicative of explosions at the onset of and during the collapse of WTC 7 were ignored or distorted. NIST collected numerous photographs, video/audio recordings, news broadcasts, and interviews related to the WTC events on September 11, 2001, and*

*performed concurrent analyses of these records to determine the most likely sequence of events (NCSTAR 1-9, Chapter 5).*

*NIST conducted several types of independent analyses of video and audio recordings to obtain additional quantitative data and information. For example, NCSTAR 1-9, Section 5.7.5, includes an audio analysis of two audio/video recordings on West Street and one audio/video recording on West Broadway that were approximately 640 m from WTC 7. The analysis found that the recordings did not include voice comments regarding any noise associated with the WTC 7 collapse until the east penthouse started to descend into the interior of WTC 7 building, which began 6.9 s prior to the global collapse. The analysis of the recordings found that the sound level increased during the global collapse but there were no loud, explosive sounds when the collapse began. Further, none of the camera operators, interviewers, or interviewees heard any sound that attracted their attention before the east penthouse started to descend.*

*NIST disagrees with the assertion that it distorted eyewitness reports of an explosion occurring inside WTC 7. The rescue events documented in NCSTAR 1-9, Section 6.5.2, are based on eight independent interviews. NIST also conducted an independent analysis of hypothetical blast scenarios, as documented in Appendix D. The analysis included examining pressure waves from two simulated blast charges of different sizes inside the building, and corresponding window damage and sound propagation outside of the building. For locations where sound propagation was unobstructed (e.g., down West Street or West Broadway), the analysis shows that the sound level would have been 130 dB to 140 dB at 1 km, which is about twice the distance from the recording locations (approximately 640 m from WTC 7).*

*NIST has objectively investigated and analyzed numerous photographs, video/audio recordings, news broadcasts, and interviews related to the WTC events on September 11, 2001, and concurrently analyzed recorded and reported events and quantitative analyses of acoustic signals and transmission characteristics to arrive at the conclusions in the WTC 7 report. NIST determination of the probable collapse sequence of WTC 7 complies with OMB Guidelines and NIST IQS for quality.*

In essence, NIST does four things in its response: (1) It describes in basic terms its methodology for Chapter 5 of NCSTAR 1-9 and in particular Section 5.7.5 of that chapter, titled "Audio Characteristics Based on Video Soundtracks" — and asserts that these analyses were conducted objectively and that NIST's determination of the probable collapse sequence complies with the OMB Guidelines and NIST IQS. (2) It describes in basic terms the methodology and results of its analysis of "Hypothetical Blast Scenarios" contained in NCSTAR 1-9 Appendix D. (3) It restates the findings of its analysis of videos recorded on West Street and West Broadway during the collapse of WTC 7. (4) It merely states, without any further elaboration, that NIST's account of the rescue events in WTC 7 (which includes the experience of Barry Jennings and Michael Hess) was based on eight independent interviews.

NIST's basic description of its methodology for NCSTAR 1-9 Chapter 5 and Section 5.7.5 as well as its assertions regarding the objectivity and validity of the analyses contained in Chapter 5 do not address the central claims nor the underlying relevant data quality arguments contained in Section G.

Second, NIST's basic description of the methodology and results of its analysis of "Hypothetical Blast Scenarios" does not address the central claims nor the underlying relevant data quality arguments contained in Section G because it fails to respond to the fundamental criticisms made at the beginning of Section G. As Section G notes, NIST and its contractors assumed no attempts at noise abatement and dismissed the possibility of much quieter thermite-based devices being used (despite the fact that steel recovered from WTC 7 exhibited severe erosion indicative of a thermate reaction). Using the strawman premise that a noise of 130 to 140 decibels would need to have been emitted from WTC 7 if the building had been destroyed with explosives, NIST ignored and distorted eyewitness reports and audio recordings indicative of explosions occurring at the onset of and during WTC 7's collapse. Far more important than whether the observed noises reached NIST's strawman decibel level (based on the flawed premise that RDX was used to sever a column) is whether these noises could have been caused by structural failures and/or the impact of falling debris. The Initial Decision completely avoids addressing these relevant data quality arguments.

Similarly, NIST's restatement of the findings of its analysis of two videos recorded on West Street and one video recorded on West Broadway during the collapse of WTC 7 fails to address the relevant data quality arguments contained in Section G — one of which is specifically critical of the analysis restated by NIST.

The Initial Decision states that "None of the camera operators, interviewers, or interviewees heard any sound that attracted their attention before the east penthouse started to descend." But, as noted in Section G of the Request, NIST's own audio and timeline analysis indicates that the noise heard by the people in the West Broadway video must have been created about .7 seconds prior to the initiation of the east penthouse collapse. The NIST WTC 7 Report states (*see* NCSTAR 1-9, p. 289):

> *Review of the interview clip showed that people in the video responded to the WTC 7 collapse 1.4 s before the clip from Camera 4 started,* ***or 1.3 s after the east penthouse began to descend into the building. Allowing 2 s for sound to reach the camera location, this is very close to the time that the east penthouse began to descend.*** *People at this location were able to hear the collapse of the east penthouse, while observers on West Street did not hear loud noises until the global collapse started.* (Emphasis added.)

Section E of the Request notes, "NIST's observations and estimate actually place the creation of this noise at .7 seconds before the east penthouse began to descend." Nevertheless, the Initial Decision ignores this relevant data quality argument and actually goes further than claiming "this is very close to the time that the east penthouse began to descend," claiming instead that "none of the camera operators, interviewers, or interviewees heard any sound that attracted their attention

before the east penthouse started to descend." Objective review of this claim and the related facts reveals it to be false. Based on the available evidence, the sharp noise that MSNBC's Ashleigh Banfield, the woman she was interviewing, and the crowd of people around them heard from 650 meters away (approximately 7 football fields) that caused them to quickly and involuntarily turn toward WTC 7 was created before the east penthouse began to descend. As noted in the Request, it appears highly doubtful that the cascade of floor failures alleged by NIST or structural failures and debris impact higher up in the building — all of which would have taken place inside the building — could have caused the noise heard by Banfield and others.

Finally, NIST's statement that "the rescue events documented in NCSTAR 1-9, Section 6.5.2, are based on eight independent interviews" completely fails to address the relevant data quality arguments contained in Section G regarding the eyewitness reports of Barry Jennings and Michael Hess of an explosion occurring inside WTC 7 on the morning of 9/11 — especially in light of the fact that NIST will not release these interviews.

*Relevant Data Quality Arguments in Section G to Which NIST Failed to Respond*

The following is a point-by-point list of the relevant data quality arguments contained in Section G to which NIST failed respond substantively or at all in its Initial Decision. Some of these arguments are briefly addressed above but are also listed here in order to provide a complete list of the relevant data quality arguments to which NIST must respond in its Final Decision if it does not revise the NIST WTC 7 Report as requested.

1. NIST's analysis of "Hypothetical Blast Scenarios," described in Appendix D of NCSTAR 1-9, consisted of determining the lowest mass of explosive needed to sever a critical structural member (Column 79 was chosen) and performing blast modeling to determine the amount of window breakage and noise that would result. Working with contractors from Loizeaux Group International and Applied Research Associates, NIST determined the lowest mass of explosive needed to sever Column 79 was 4 kg (9 lb) of RDX explosives in linear shaped charges, and that detonating this amount of RDX explosives would result in a sound level of approximately 130 to 140 decibels 1 km away for locations where sound propagation was unobstructed. However, NIST and its contractors assumed no attempts at noise abatement and dismissed the possibility of much quieter thermite-based devices being used, despite the fact that steel recovered from WTC 7 exhibited severe erosion indicative of a thermate reaction.

2. Using the strawman premise that a noise of 130 to 140 decibels would need to have been emitted from WTC 7 if the building had been destroyed with explosives, the NIST WTC 7 Report ignored and distorted eyewitness reports and audio recordings indicative of explosions occurring at the onset of and during WTC 7's collapse, stating, "There were no witness reports of such a loud noise, nor was such a noise heard on the audio tracks of video recordings of the WTC 7 collapse." However, there are in fact a number of eyewitness reports and audio recordings of noises that indicate the occurrence of explosions at the onset of and during WTC 7's collapse. Far more important than whether the observed noises reached NIST's strawman decibel level (based on the flawed premise that RDX was used to sever a column) is whether these noises could have been caused by structural failures and/or

the impact of falling debris. Careful review of the eyewitness reports and audio recordings suggests the noises could not have been caused by structural failures or the impact of falling debris, leaving explosions as the only remaining explanation. The eyewitness reports and audio recordings are as follows:

a. NYU medical student named Darrell, interviewed twice on 1010 WINS Radio within minutes after the collapse:

   Pages 56 and 57 of the Request contain the transcript of Darrell's interviews. Darrell heard what sounded like a sudden clap of thunder, followed by what looked like a shockwave ripping through the building and blasting out the windows, followed by the bottom floor caving out and the building crashing down to the ground, with the structure remaining intact until it hit the ground. It is clear from the amount of time elapsed in the sequence of events described by Darrell that the "clap of thunder" he heard corresponded to the collapse of the east penthouse approximately 7 to 9 seconds before the initiation of global collapse. Darrell's observation of a "clap of thunder" is far more consistent with the detonation of explosives bringing down the east penthouse than with a successive cascade of floor failures. This interpretation is corroborated by the seismic signals recorded at LDEO. Moreover, all of the other phenomena described in Darrell's account — especially the perceived shockwave blasting out the windows — are also consistent with the controlled demolition scenario described above.

b. Video clip of MSNBC's Ashleigh Banfield interviewing a Lower Manhattan resident at the onset of WTC 7's collapse:

   This video clip is discussed from pages 57 to 60 of the Request. In addition to the points discussed above in this Appeal, the Request addressed a number of other facts that support the interpretation that the noise Banfield and others heard was indeed an explosion:

   - Just 20 seconds before Banfield heard the noise from WTC 7, she had the following exchange with MSNBC's Brian Williams:

     *Williams: "Monica, I have to go to Ashleigh Banfield. We might have had something on the ground. Ashleigh?"*

     *Banfield: "Well, at first we had thought, Brian,* ***that we'd heard another explosion,*** *but I think it was just another truck that was headed down to the south [the direction of WTC 7]."*

   - Banfield's initial suspicion of another explosion going off shortly before the collapse of WTC 7 (before she dismissed it as a truck) is corroborated by CBS's Scotty Pelley. Reporting the collapse of WTC 7 minutes after it occurred, Pelley said to CBS's Dan Rather: "When you're down there, Dan, you hear smaller secondary explosions going off every 15 or 20 minutes."

- In addition, in a CNN video that appears to have been shot from Greenwich Street and Warren Street, approximately 700 feet from WTC 7, a noise is heard in the distance. Workers in the foreground hear the noise and turn in the direction of WTC 7, while a person off camera says, "You hear that? Keep your eye on that building. It'll be coming down soon." The cameraman for CNN then says, "The building is about to blow up. Move it back."

- Thus, Banfield's and Pelley's perception of explosions going off in the vicinity prior to WTC 7's collapse, as well as the noise and reactions captured in the CNN video, add weight to the interpretation that the noise Banfield and others heard at the onset of the east penthouse collapse was indeed an explosion. Of course, this interpretation is also supported by Darrell's account and by the seismic signals recorded at LDEO.

- In addition to the eyewitness evidence contained in the MSNBC clip, physicist and researcher David Chandler has analyzed the audio track from the clip and concluded that nine blasts were captured. An excerpt from Chandler's video *WTC 7: Sound Evidence for Explosions* is contained on pages 59 and 60 of the Request. Therefore, the MSNBC clip contains both eyewitness evidence and audio evidence indicating explosions at the onset of WTC 7's collapse.

c. Other Witness Behavior and Audio Evidence Captured on Video:

Two other videos recorded during the collapse of WTC 7 contain additional evidence indicating an explosion at the onset of the east penthouse collapse. The first video was recorded near 84 William Street, which is in the Financial District of Lower Manhattan a little over 2,000 feet from where WTC 7 stood. This video clip is discussed on pages 60 and 61 of the Request. Given the apparent volume and suddenness of the noise, which are indicated by the reporter's reaction and can be heard in the audio track despite the loud sound of a nearby siren, it appears highly doubtful that structural failures or debris impact inside the building caused the noise, especially when we consider the obstructed path between WTC 7 and the camera. The second video was recorded on the west side of West Street, near Harrison Street. This video was the first video clip reviewed by NIST in its study of the audio signature associated with the collapse of WTC 7. Contrary to NIST's assessment of the video clip, careful review reveals a sudden, muffled, low-pitch sound approximately two seconds before the east penthouse begins to collapse. Accounting for the 2-second delay in sound transmission between WTC 7 and the camera, this sound was apparently generated approximately 4 seconds prior to the initiation of the east penthouse collapse. This sound is not conclusive by itself, but is consistent with the seismic signals, eyewitness evidence, and other audio evidence indicating the occurrence of an explosion at the onset of WTC 7's collapse.

d. NYPD officer Craig Bartmer:

In September 2006, about five years after 9/11, former NYPD officer Craig Bartmer gave a video interview to filmmaker Dylan Avery in which he described witnessing what he perceived as explosions going off during the collapse of WTC 7. An excerpt from Bartmer's interview is contained on page 62 of the Request. This interview was widely circulated on the Internet. Because NIST's WTC 7 investigation was active until 2008, NIST should have interviewed Bartmer. However, there is no indication that NIST did. As David Chandler notes in *WTC 7: Sound Evidence for Explosions*, Bartmer's description of a series of explosions is consistent with the audio track of the MSNBC video clip, which, according to Chandler, captured "two blasts followed by seven more, regularly spaced all in two and a half seconds."

3. In summary, using the strawman premise that a noise of 130 to 140 decibels would need to have been emitted from WTC 7 if the building had been destroyed with explosives, NIST ignored and distorted a number of eyewitness reports and audio recordings indicative of explosions occurring at the onset of and during WTC 7's collapse. Review of these eyewitness reports and audio recordings reveals that they are far more consistent with the detonation of explosives than with structural failures and debris impact, corroborating the seismogram data discussed above. As a result, NIST's claim that "there were no witness reports of such a loud noise, nor was such a noise heard on the audio tracks of video recordings of the WTC 7 collapse" fails to comply with the OMB Guidelines and NIST IQS because it lacks objectivity. NIST's claim is inaccurate, unreliable, and biased because it ignores and distorts a number of eyewitness reports and audio recordings indicative of explosions, in part based on the strawman premise that a noise of 130 to 140 decibels would need to have been emitted from WTC 7 if the building had been destroyed with explosives.

4. The NIST WTC 7 Report also distorts eyewitness reports of an explosion occurring inside WTC 7 on the morning of 9/11. These eyewitness reports were first given on television on September 11, 2001, by Michael Hess, the New York City corporation counsel, and Barry Jennings, deputy director of the Emergency Services Department for the New York City Housing Authority, after the two men had been trapped together inside WTC 7 for at least 90 minutes. Both men were also interviewed by NIST in the spring of 2004. Jennings then gave two more videotaped interviews in subsequent years, before his untimely death in 2008, and Hess gave one more videotaped interview.

   Based on the interviews NIST conducted with Hess and Jennings, the NIST WTC 7 Report provides the following account (*see* NCSTAR 1-9, p. 298):

   > *As all of the emergency responder restructuring operations were underway, three people became temporarily trapped inside WTC 7. Two New York City employees had gone to the OEM Center on the 23rd floor and found no one there.* ***As they went to get into an elevator to go downstairs, the lights inside WTC 7 flickered as WTC 2 collapsed. At that point, the elevator they were attempting to catch no longer worked, so they started down the staircase. When they got to the 6th floor, WTC 1 collapsed, the lights went out in the staircase, the sprinklers (at an unspecified location) came on briefly, and the staircase filled with smoke and debris.*** *The two*

> *men went back to the 8th floor, broke out two windows, and called for help. Fire fighters on the ground saw them and went up the stairs.*
>
> *. . . As the firefighters went up, they vented the stairway and cleared some of the smoke. They first met the security officer on the 7th floor, and fire fighters escorted him down the stairs. Other fire fighters from the group continued up the stairs, shined their flashlights through the staircase smoke and called out. The two trapped men on the 8th floor saw the flashlight beams, heard the firefighters calling, and went down the stairway. The firefighters took the men outside and directed them away from the building. (Emphasis added.)*

NIST's account of Hess and Jennings' experience in WTC 7 is striking for the fact that it omits the most notable aspect of what Jennings, and initially Hess, described witnessing as they reached the 6th floor: a big explosion occurring inside the building, which, according to Jennings, caused the landing they were standing on to give way. Hess and Jennings each described the occurrence of this explosion independently on television soon after being rescued from the building. (They both initially described the explosion occurring when they reached the 8th floor, but both of them clarified in later interviews that they reached the 6th floor before going back up to the 8th floor, which is reflected in NIST's account.) Their accounts on the day of 9/11 were as follows:

> *Michael Hess on UPN 9 News: I was up in the emergency management center on the 23rd floor. And when all the power went out in the building, another gentleman and I walked down to the 8th floor where* ***there was an explosion****. And we've been trapped on the 8th floor with smoke, thick smoke, all around us, for about an hour and a half. But the New York Fire Department, as terrific as they are, just came and got us out.*
>
> *Barry Jennings on WABC-TV: Well, me and Mr. Hess, the corporation counsel, were on the 23rd floor. I told him, "We gotta get out of here." We started walking down the stairs. We made it to the 8th floor.* ***Big explosion. Blew us back into the 8th floor.*** *And I turned to Hess, I said, "This is it. We're dead. We're not going to make it out of here." I took a fire extinguisher, and I bust the window out. That's when this gentleman here heard my cries for help, this gentleman right here. And he kept saying, "Stand by. Somebody's coming to get you." They couldn't get to us for an hour because they couldn't find us.*

Although Hess later changed his account to the narrative put forward by NIST — according to which the event that Hess and Jennings experienced was actually debris from the collapse of WTC 1 impacting WTC 7 at 10:28 AM — Jennings continued to maintain that he had witnessed an explosion. The first videotaped interview Jennings gave after 9/11 was in late 2007 to filmmaker Dylan Avery. The second videotaped interview Jennings gave after 9/11 was to the BBC for its July 2008 documentary *9/11: The Third Tower*. Hess gave his only videotaped interview to the BBC for a second edition of *9/11: The Third Tower* that aired in late 2008, after Jennings' untimely death. Excerpts from Jennings' 2007 interview with

Avery are presented from page 65 to 67 of the Request. The relevant portions of the edited BBC interviews are presented on pages 68 and 69 of the Request.

5. Unfortunately, it is impossible to review Jennings' interview with NIST because NIST declined a 2009 FOIA request for the full text of Jennings' and Hess' interviews "on the basis of a provision allowing for exemption from FOIA disclosure if the information is 'not directly related to the building failure.'"[2] Of course, it defies reason to assert that the testimony of Hess and Jennings is "not directly related to the building failure." Even if we assume NIST's Probable Collapse Sequence to be true, the event they witnessed from inside the building — the impact of debris and the ignition of fires in WTC 7 — is the event that ultimately led to the collapse of WTC 7. To assert that their testimony is "not directly related to the building failure" is thus preposterous.

6. In any case, assuming that Jennings provided the same account to NIST that he did in every other interview he gave, the NIST WTC 7 Report ignores and distorts the vast majority of his account. Without even mentioning Jennings' interpretation of what he witnessed, the NIST WTC 7 Report claims that the event he witnessed was actually caused by debris from the collapse of WTC 1 impacting WTC 7 at 10:28 AM. However, NIST's account is untenable for the simple reason that Hess and Jennings must have reached the 6th floor well before 10:28 AM.

   As Jennings noted in his 2007 interview with Dylan Avery, he recalls reaching the 6th floor before the collapse of WTC 2 at 9:59 AM. His account is based on his recollection of being called to WTC 7 shortly after the first airplane strike at 8:46 AM, reaching the 23rd the floor around the time of the second airplane strike at 9:03 AM, and leaving the 23rd floor with Hess after finding the emergency operations center (EOC) already evacuated. Also, Jennings distinctly remembers, after busting out the 8th floor window and calling for help, watching firefighters come to their aid and then run away twice — the first time following the collapse of WTC 2 at 9:59 AM and the second time following the collapse of WTC 1 at 10:28 AM.

   Contrary to Jennings' account, the NIST WTC 7 Report states that Hess and Jennings began to leave the 23rd floor at 9:59 AM. But even if we accept that Hess and Jennings began to leave the 23rd floor at 9:59 AM, it is inconceivable that it would take them 29 minutes to descend 17 floors, which would mean an average of 1 minute and 42 seconds per floor.

   As noted above, Jennings said in his interview with the BBC, "I wanted to get out of that building in a hurry. So I started, instead of taking one step at a time, I'm jumping landings." Given the speed at which Hess and Jennings were probably descending the staircase, even a conservative estimate of 20 seconds per floor means that it would have taken them about 6 minutes to reach the 6th floor. Add 1 minute for the amount of time it might have taken them to find the stairwell starting at 9:59 AM (although NIST's account suggests no delay in finding the stairwell), and they would still reach the 6th floor by 10:06 AM, which is 22 minutes before the collapse of WTC 1. It is also virtually impossible that their departure from the 23rd floor was any later than the 9:59 AM time given by NIST, because, according to

[2] Letter of August 12, 2009, from Catherine S. Fletcher, NIST, to a FOIA request of August 8, 2009, from Ms. Susan Peabody, for "[t]he complete texts of NIST's 2004 interviews of Michael Hess and Barry Jennings."

NIST, the third and final evacuation order was issued at 9:44 AM, and thus it is unlikely that police and security would have escorted them to the 23rd floor much later than 9:44 AM. Therefore, based on this analysis alone, it is inconceivable that the phenomena they witnessed on the 6th floor of the stairwell was caused by the collapse of WTC 1 at 10:28 AM.

7. Given that it must have taken Hess and Jennings no more than 7 minutes to descend from the 23rd floor to the 6th floor, it is entirely plausible that they reached the 6th floor and then made their way up to the 8th floor before the collapse of WTC 2 at 9:59 AM, as reported by Jennings. If we add 3 minutes for the amount of time it might have taken them to go back to the 8th floor and bust open the window — which means a total of 10 minutes from the moment they started to leave the 23rd floor to the moment Jennings busted open the window on the 8th floor — this would require them to have reached the EOC by 9:49 AM. According to NIST, this is 5 minutes after Deputy OEM Commissioner Richard Sheirer verbally ordered the complete evacuation of WTC 7, including the EOC. Thus, even if Hess and Jennings did not arrive at the EOC when Jennings recalls (by 9:03 AM), an arrival as late as 9:49 AM would explain why they found the EOC evacuated and would still allow them ample time to reach the 8th floor and bust open the window by 9:59 AM.

8. However, there is reason to suspect that the EOC was actually fully evacuated much earlier than 9:44 AM, meaning that Hess and Jennings might have arrived at the EOC and found it empty much earlier. According to Deputy OEM Commissioner Richard Sheirer in his statement to the 9/11 Commission, which NIST cites as its source for the 9:44 AM evacuation order:

> *Almost instantly after the South Tower had been hit [9:03 AM**]**, I contacted the EOC to confirm that air support was on its way to New York. At that time, the EOC informed me that that there were still planes unaccounted for that may have been heading for New York. I relayed this information to the command post in the North Tower lobby. At the same time, OEM evacuated the EOC. The rest of 7 World Trade Center had been evacuated earlier, but after the report of a possible third plane, we had to get our people out of the building.*

In contrast, the NIST WTC 7 report states the following (*see* NCSTAR 1-9, p. 296):

> *At approximately 9:32 a.m., after a report of a third aircraft heading into the city, a second order was given in the OEM office to evacuate the WTC 7 facility. A number of personnel stayed in the OEM office and continued to work. Again, at approximately 9:44 a.m., following the news that the Pentagon had been attacked, a Deputy OEM Commissioner verbally ordered the complete evacuation of WTC 7 (Sheirer 2004). This order included the evacuation of the OEM operations center on the 23rd floor.*

As indicated in Sheirer's statement, the exchange of information about unaccounted for planes and the decision to evacuate the EOC happened shortly after WTC 2 was hit at 9:03 AM. However, citing Sheirer's statement and no other source, the NIST WTC 7 Report gives an entirely different account, asserting a first evacuation order at 9:32 AM and a second one

at 9:44 AM. Nowhere in Sheirer's statement are two separate evacuation orders mentioned, nor is the Pentagon attack, nor is NIST's claim that personnel stayed in the OEM after the first evacuation order at 9:32 AM.

Thus, it is entirely plausible that Hess and Jennings reached the EOC and found it empty much earlier than 9:44 AM, consistent with Jennings' account. But, as stated above, even if Hess and Jennings reached the EOC closer to 9:59 AM, it is inconceivable, based on the time that NIST gave for their departure from the EOC, that it would have taken them until 10:28 AM to reach the 6th floor.

9. It is also inconceivable that debris impacting the south face of WTC 7 could cause a landing in a stairwell on the northern side of the building's core to give way or at least make the stairwell impassable. (*See* Figure 3-2 of NCSTAR 1-9 on page 72 of the Request, which shows the stairwell on the northern side of the building's core.) Apparently recognizing this issue, the NIST WTC 7 Report makes no mention of the landing giving way or any other structural damage to the stairwell. Instead, the NIST WTC 7 Report implies that Hess and Jennings retreated to the 8th floor because the staircase "filled with smoke and debris." The NIST WTC 7 Report does not explain how debris impacting the south face of WTC 7 could cause a stairwell on the northern side of the building's core to fill with debris. Nor does it attempt to account for the damage described by Jennings.

10. Furthermore, Jennings' account of an explosion occurring inside WTC 7 before the collapse of WTC 1 at 10:28 AM and continuing to hear explosions until he was rescued is consistent with video footage recorded at the intersection of West Broadway and Murray Street, two blocks (approximately 470 feet) north of WTC 7. This video is discussed on pages 72 and 73 of the Request. This video footage, which was featured in the documentary *9/11 Stories from the City*, captures the unmistakable sound of a large explosion coming from the direction of WTC 7. The documentary places the footage chronologically after 10:15 AM and before 10:28 AM. Although the explosion captured on this video is likely to be a different explosion from the one witnessed by Hess and Jennings because it appears to happen later (although it is possibly the same explosion), the occurrence of this explosion so close to WTC 7 lends further credence to Jennings' interpretation that he and Hess witnessed an explosion inside WTC 7. It is also highly consistent with Jennings' account of continuing to hear explosions after the initial explosion he witnessed.

11. Therefore, based on Jennings' consistent account of an explosion in WTC 7 and the impossibility that the event he and Hess witnessed was caused by the collapse of WTC 1 at 10:28 AM, as well as the video footage described above that is consistent with Jennings' account, it is evident that he and Hess were witness to an explosion inside WTC 7 on the morning of 9/11. Under this scenario, the process of destroying WTC 7 that culminated in the building's total collapse at 5:20 PM began amidst the chaotic events of that morning. As for why the destruction may have begun in the morning but was not completed until 5:20 PM, it is not unreasonable to consider that whoever was responsible for the destruction of WTC 7 under this scenario intended to bring it down earlier in the day, but either botched the attempt or decided to delay bringing it down. A botched or delayed plan to bring down WTC 7 earlier in the day may explain the numerous explosions reported between 10:38 AM and

approximately 12:00 PM in the vicinity of the World Trade Center (which are also consistent with Jennings' account of hearing numerous explosions before he was rescued from WTC 7). Some of those reports are presented from page 74 to 77 of the Request in chronological order. The first 11 clips are news clips featuring anchors and on-the-ground reporters. The final clip comprises excerpts of footage shot from an elevated position looking south toward the WTC site, in which the person filming narrates what he is observing. Although there is no clear-cut evidence of the location of the observed explosions in the clips, the person shooting from the elevated position tends to direct the camera toward WTC 7 after hearing explosions. Furthermore, especially in regard to the last explosion he observed, new smoke is seen emanating from around the base of WTC 7 on the eastern side, as shown in Figure 16 below.

12. In summary, the NIST WTC 7 Report distorts eyewitness reports of an explosion occurring inside WTC 7 on the morning of 9/11. Michael Hess and Barry Jennings each described the occurrence of an explosion independently on television soon after being rescued from WTC 7. Although Hess later changed his account to the narrative put forward by NIST, Jennings continued to maintain that he had witnessed an explosion. NIST's explanation that the event witnessed by Hess and Jennings was caused by the collapse of WTC 1 at 10:28 AM is untenable based on the fact that they must have reached the 6$^{th}$ floor well before 10:28 AM. In an apparent attempt to make the timeline fit with its explanation, NIST reported that the final evacuation order from the EOC was given at 9:44 AM, but this time is unsupported, and in fact contradicted, by the evidence provided by NIST. Furthermore, Jennings' account of an explosion occurring inside WTC 7 before the collapse of WTC 1 at 10:28 AM and continuing to hear explosions until he was rescued is consistent with video footage recorded two blocks north of WTC 7 that captured the unmistakable sound of an explosion between 10:15 AM and 10:28 AM.

    As a result, NIST's claim that the event witnessed by Hess and Jennings was caused by the collapse of WTC 1 at 10:28 AM fails to comply with the OMB Guidelines and NIST IQS because it lacks objectivity. First, NIST's claim is inaccurate, unreliable, and biased because it distorts the initial reports of Hess and Jennings and the account that Jennings continued to stand by in subsequent interviews. Second, NIST's claim is inaccurate, unreliable, and biased

because it relies on the untenable assertion that it took Hess and Jennings approximately 29 minutes to descend 17 stories despite the fact that they were rushing to evacuate the building. Third, NIST's claim is inaccurate, unreliable, and biased because it does not explain how debris impacting the south face of WTC 7 could cause a stairwell on the northern side of the building's core to fill with debris, nor does it attempt to account for the damage described by Jennings. Fourth, NIST's claim is inaccurate, unreliable, and biased because it ignores other video and eyewitness evidence that is consistent with Jennings' account.

In addition, NIST's claim violates the utility element of information quality because care was not taken to make sufficient background and detail available regarding its claim, even though greater transparency would have enhanced the usefulness of the information disseminated. Given the obvious importance of Hess' and Jennings' interviews, NIST should have published all, or at least portions of, these interviews. Similarly, NIST's claim violates the transparency standard imposed upon influential information because NIST did not practice a degree of transparency sufficient to facilitate reproducibility. NIST's claim, which is based on its interviews with Hess and Jennings, cannot be validated or invalidated because the public has not been given access to NIST's interviews with Hess and Jennings.

### 2. Actions NIST Must Take to Comply with the DQA, OMB Guidelines, and NIST IQS

To comply with the DQA, the OMB Guidelines, and the NIST IQS, NIST must take one of the following three actions. In the Requesters' view, only the first action is analytically sound.

1. Revise the NIST WTC 7 Report to (1) reflect that there are eyewitness report and audio recordings indicative of explosions at the onset of and during the collapse of WTC 7 and (2) faithfully reflect the account of Barry Jennings, according to which there was a big explosion inside WTC 7 before 10:28 AM that caused the 6th floor landing he and Michael Hess were standing on to give way. NIST must then discard its Probable Collapse Sequence and develop a new Probable Collapse Sequence that is consistent with the occurrence of an explosion at the onset of the east penthouse collapse as well as explosions later in the collapse sequence and explosions earlier in the day. This would be accomplished by simulating the failure of Columns 79, 80, and 81 high in the building, followed by the near-simultaneous failure of all columns lower in the building over 8 stories, as requested in Section E of the Request. As part of the first requested correction, NIST should attempt to interview the witnesses discussed in Section G and NIST should commission a more in-depth audio analysis of the three videos cited in Section G. As part of the second requested correction, NIST must revise its account of the EOC evacuation orders, or, alternatively, must amend the NIST WTC 7 Report to include evidence supporting NIST's account of the evacuation orders.; or

2. Amend the NIST WTC 7 Report to include analysis and information that satisfies the objectivity, utility, transparency, and reproducibility standards of information quality. Specifically, NIST must publish a new appendix to the NIST WTC 7 Report containing all interviews that indicate explosions did not occur at that time (the names of individuals can be redacted), and NIST must publish its interviews with Hess and Jennings in a new appendix to

the NIST WTC 7 Report (NIST's assertion that the testimony of Hess and Jennings is "not directly related to the building failure" defies reason, and therefore their interviews are not exempt from disclosure). Furthermore, NIST must explain how, based on documented or experimental evidence, it took Hess and Jennings approximately 29 minutes to descend 17 floors (an average of 1 minute and 42 seconds per floor). Also, your Final Decision must include a substantive response to each of the relevant data quality arguments listed above, which would essentially be the same analysis that would be added to the NIST WTC 7 Report explaining why the eyewitness and audio evidence cited above is not indicative of explosions at the onset of and during the collapse of WTC 7 nor of an explosion occurring inside WTC 7 on the morning of 9/11; or

3. Provide a substantive response in your Final Decision to each of the relevant data quality arguments listed above. Your Final Decision must explain why the eyewitness and audio evidence cited above is not indicative of explosions at the onset of and during the collapse of WTC 7 nor of an explosion occurring inside WTC 7 on the morning of 9/11. In particular, your Final Decision must explain how, based on documented or experimental evidence, it took Hess and Jennings approximately 29 minutes to descend 17 floors (an average of 1 minute and 42 seconds per floor). In addition, your Final Decision must identify where this analysis and information is already contained in the NIST WTC 7 Report, thus precluding the need to amend the report.

## H. SEVERELY ERODED STEEL FROM WTC 7

The central claim in Section H of the Request is that, despite the discovery of "severe erosion in several beams" from the World Trade Center, NIST neglected to perform tests to determine the cause of the erosion in one such beam recovered from WTC 7, and then falsely stated that no identifiable steel was recovered from WTC 7, thus violating the OMB Guidelines and NIST IQS.

The primary requested corrections were for NIST to (1) obtain the WTC 7 steel sample from the Worcester Polytechnic Institute (WPI) and conduct analyses to determine the cause of the severe erosion, (2) conduct further experiments to reproduce the observed severe erosion and determine the viability of the gypsum wallboard hypothesis versus the viability of the thermate/nano-thermite hypothesis, (3) Revise FAQ #27 in the NIST WTC 7 FAQs to reflect that identifiable steel *was* recovered from WTC 7, and (4) discard its Probable Collapse Sequence and develop a new Probable Collapse Sequence that is consistent with physical evidence of incendiaries being used in the destruction of WTC 7.

Unlike most other sections of the Request, Section H did not include alternative requests in the event that NIST maintained that further analyses were unnecessary or in the event that NIST maintained that no identifiable steel was recovered from WTC 7. Section H did note, however, that if NIST had reason to doubt whether the steel sample taken to WPI was actually from WTC 7, or to doubt whether the steel shipped to NIST from the scrapyards was actually from WTC 7, NIST should have stated these reasons in FAQ #27.

As described more fully below, NIST's response to the central claim and the four requests in Section H is demonstrably in error, wholly unsubstantive, and brazenly unscientific. The Initial Decision amounts to a refusal to conduct further analyses of the severely eroded steel on the preposterous grounds that this steel cannot be confirmed as coming from WTC 7 when there is every indication it did come from WTC 7. Merely a reasonable possibility that the severely eroded steel came from WTC 7 would be enough for any genuinely scientific investigation to want to establish the cause of the severe erosion and determine how it may have contributed to WTC 7's collapse, especially in light of the fact that severe erosion was observed "in several beams." Furthermore, the Initial Decision completely avoids responding to the other relevant data quality arguments contained in Section H regarding the viability of the gypsum wallboard hypothesis versus the viability of the thermate/nano-thermite hypothesis.

### 1. NIST's Erroneous, Unsubstantive, and Unscientific Response to Section H

Removing the nonessential opening and closing sentences of NIST's response to Section H, the response reads as follows:

> *NIST disagrees with the assertion that NIST omitted an analysis of the severely eroded WTC 7 steel members from the NIST WTC 7 Report. FAQ #27 provides clear reasons why the steel samples removed from the WTC site before NIST investigation began could not be identified as steel from WTC 7, as described by FEMA Report 403. Appendix C in the FEMA 403 report on the WTC events of 9/11 provides the analysis of three metal samples and concludes that WTC buildings 4, 5, 6, and 7 had similar grades of steel and member types. The FEMA 403 report explains that only the steel from buildings WTC 1 or 2 could be positively identified after the WTC steel had been moved to four salvage yards. (See FEMA 403 Appendix D). The statement in FEMA Appendix C that "the first [sample] appeared to be from WTC 7" is consistent with the FEMA 403 report conclusion regarding positive identification of WTC 1 or 2 steel, but not of WTC 7 steel.*
>
> *In the absence of a method to confirm that the FEMA 403 Sample 1 that was tested at the Worcester Polytechnic Institute is in fact steel from WTC 7, there is no justifiable basis for conducting further analyses to examine other theories that explains the cause of the erosion in the sample, revise FAQ #27, or modify the Probable Collapse Sequence for WTC 7. The Probable Collapse Sequence is consistent with the data and information collected by NIST and meets OMB Guidelines and NIST IQS for quality.*

In essence, NIST does three things in its response: (1) It makes the brazenly unscientific claim that there is "no justifiable basis" for conducting further analyses of the severely eroded steel in the absence of a method to "confirm" that the steel is in fact from WTC 7. (2) In support of that claim, it makes largely unsupported and error-riddled assertions about the inability to positively identify steel from WTC 7. (3) It implies through its use of the term "other theories" to refer to the thermate/nano-thermite hypothesis that the gypsum wallboard hypothesis has been

scientifically proven, when in fact, as shown in the Request, the experiments conducted to date only cast doubt on that hypothesis.

First, NIST's primary claim is brazenly unscientific because any genuinely scientific investigation into the collapse of WTC 7 would seek to establish the cause of the severe erosion in the recovered piece of steel if there were a reasonable possibility that the steel came from WTC 7. A genuinely scientific investigation would not require absolute certainty that the steel came from WTC 7 in order to examine it. Only if there were significant reason to doubt that the steel came from WTC 7 would a genuinely scientific investigation not seek to examine it. However, NIST provides no such significant reason in FAQ #27 nor in its Initial Decision.

In fact, there is every indication that the severely eroded steel came from WTC 7. First, all of the professors who studied the piece of steel concluded it came from WTC 7. The following is a chronological list of statements from these professors:

1. "Engineers Have a Culprit in the Strange Collapse of 7 World Trade Center: Diesel Fuel" by James Glanz in *The New York Times*, November 29, 2001:

> *A combination of an uncontrolled fire and the structural damage might have been able to bring [Building 7] down, some engineers said. But that would not explain steel members [plural] in the debris pile that appear to have been partly evaporated in extraordinarily high temperatures, Dr. Barnett said.* (Underlining added.)

2. "An Initial Microstructural Analysis of A36 Steel from WTC Building 7" by Jonathan Barnett, Ronald R. Biederman, and R.D. Sisson, Jr. in the *JOM*, December 2001:

> *A section of an A36 wide flange beam retrieved from the collapsed World Trade Center Building 7 was examined to determine changes in the steel microstructure as a result of the terrorist attack on September 11, 2001. . . . While the exact location of this beam could not be determined, the unexpected erosion of the steel found in this beam warranted a study of the microstructural changes that occurred in the steel."* (Underlining added.)

3. "FEMA Report, Appendix C" by Jonathan Barnett, Ronald R. Biederman, and R.D. Sisson, Jr. in the *JOM*, May 2002:

> *Two structural steel members with unusual erosion patterns were observed in the WTC debris field. The first appeared to be from WTC 7 and the second from either WTC 1 or WTC 2. Samples were taken from these beams and labeled Sample 1 and Sample 2, respectively. A metallurgic examination was conducted.*
>
> ***C.2 Sample 1 (From WTC 7) [Section Header]***
>
> *Several regions in the section of the beam shown in Figures C-1 and C-2 were examined to determine microstructural changes that occurred in the A36*

*structural steel as a result of the events of September 11, 2001, and the subsequent fires. Although the exact location of this beam in the building was not known, the severe erosion found in several beams warranted further consideration.* (Underlining added.)

4. "Metallographic Examination of Heavily Eroded Structural Steel from World Trade Center Buildings 1, 2 and 7" by Ronald R. Biederman, Erin Sullivan, George F. Vander Voort, and R. D. Sisson, Jr., (Unpublished), late 2002:

*The FEMA team obtained the structural steel examined in this study. The steel from WTC 7 was ASTM A36. The nominal composition of A36 is 0.28% C max, 0.8-1.2% Mn, 0.04% P, 0.05% S, 0.15-0.3% Si balance Fe. The as- fabricated wide flange beam analyzed had a microstructure that consisted of a banded hot worked mixture of ferrite and pearlite as shown in Fig. 1. . . .*

***WTC 7 [Section Header]***

*In severely "eroded" areas in the A36 steel, where the thickness had been reduced substantially, heating in a hot-corrosive environment was evident in the microstructure.* (Underlining added.)

5. "Metal Removal via Slag Attack of the Steel from Building 7 of the World Trade Center — Some Observations" by R.D. Sisson, Jr, and Ronald R. Biederman in the *Journal of Failure Analysis and Prevention*, October 2006:

*Steel beam samples from Building 7 were collected during the FEMA forensic investigation after the September 11, 2001, attack. The Building 7 sample was identified by its location. The samples were collected by the FEMA forensic team from the "pile of rubble" that had been burning for many days.*

***Building 7 – A36 Steel [Section Header]***

*"The microstructure of the steel from Building 7 is typical of a structural steel such as ASTM A36."* (Underlining added.)

6. Conspiracy Files: 9/11 — The Third Tower, *The BBC*, 2008:

*Narrator: In New England, the claims of the mysterious melted steel from Tower 7 has been unraveled. It was found by fire protection engineer Jonathan Barnett in a salvage yard.*

*Jonathan Barnett: It came from a much larger beam. This was the size of steel that they used in the construction in Tower 7. They didn't use this particular kind of steel in Towers 1 or Towers 2. So that's why we know its pedigree.* (Underlining added.)

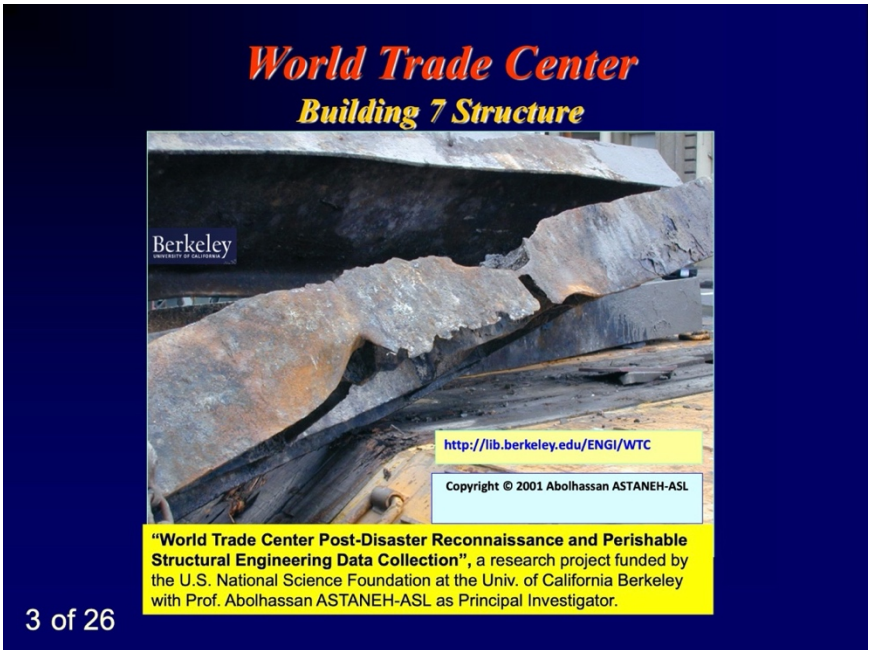
7. Skype Text Conversation Between Researcher David Cole and Jonathan Barnett, 2013 (the entire conversation is included in Exhibit C of this Appeal):

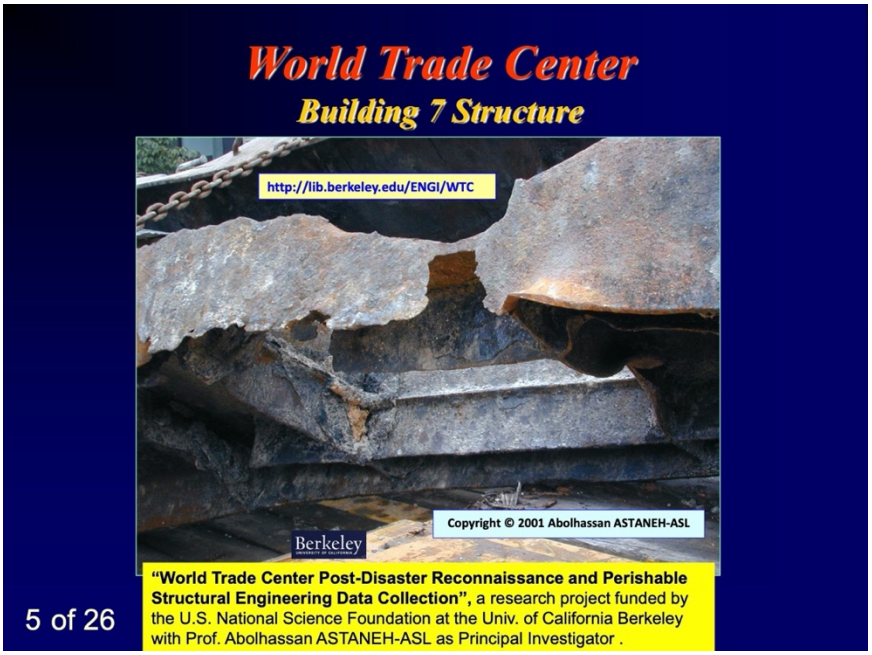
> *[5/31/2013 9:01:47 PM] David Cole: The photo of the beam is obviously the one sample #1 came from. I can see many similarities comparing it to the photos taken in the lab.*
> *[5/31/2013 9:02:21 PM] David Cole: But the FEMA team must have been there before you sampled it.*
> *[5/31/2013 9:04:51 PM] Jonathan Barnett: There were list of people that could have been there*
> *The pic did not make it to me by the way*
> *[5/31/2013 9:06:45 PM] David Cole: Shall I try again, or by email?*
> *[5/31/2013 9:07:01 PM] David Cole: It's the same photo I shared with you some months ago*
> *[5/31/2013 9:08:48 PM] Jonathan Barnett: Try again*
> *[5/31/2013 9:09:32 PM] *** David Cole sent Beam_1.jpg ****
> *[5/31/2013 9:10:53 PM] Jonathan Barnett: Yeah*
> *[5/31/2013 9:11:00 PM] Jonathan Barnett: That's the piece*
> *[5/31/2013 9:11:37 PM] Jonathan Barnett: Note it's size*
> *[5/31/2013 9:11:53 PM] Jonathan Barnett: That's how you can tell it was from tower 7*
> *[5/31/2013 9:12:54 PM] David Cole: You mean the thinness*
> *[5/31/2013 9:13:14 PM] Jonathan Barnett: No the depth of the web* (Underlining added.)

As noted in the Request and cited by NIST in its Initial Decision, while Appendix C of the FEMA Report does state that the first sample "appeared" to be from WTC 7, there is no doubt expressed throughout the rest of the appendix, nor in the professors' other papers, nor in interviews they gave that the steel came from WTC 7. As late as 2013, Jonathan Barnett stated to researcher David Cole that he believed the steel came from WTC 7.

In addition to the severely eroded piece of steel studied by the professors at WPI, there were other steel members believed to be from WTC 7 that experienced severe erosion, which the FEMA report mentions when it states "severe erosion found in several beams warranted further consideration." (*See* FEMA Report, Appendix C, p. C-1.) Some steel members that experienced severe erosion were documented by Berkeley professor Abolhassan Astaneh-Asl in a series of photos taken between September 21 and 23, 2001.[3] Professer Astaneh-Asl states in the slideshow presentation of the photos: "The photos are most likely showing steel from WTC 7. Photos on Pages 16 to 18 have 'WTC7' or '7' on them." Photos of one beam in particular are shown below.

[3] Professor Astaneh-Asl states in the referenced slideshow that the photos were taken on October 8, 2001. The timestamp on the original photos indicates they were taken from September 21 to 23, 2001. Slideshow presentation: http://digitalassets.lib.berkeley.edu/wtc/502-WTC-Astaneh-PPT-containing-photos-shot-on--Oct-8-2001-Final-for-Archives.pdf. Time-stamped photos: https://www.ae911truth.org/images/PDFs/20140419131232922-final.pdf




Photos by David Morris assisting Dr. Astaneh-Asl in his small WTC study. September 20-23, 2001. Church and Walker Streets, Lower Manhattan. Source of both slides: http://digitalassets.lib.berkeley.edu/wtc/502-WTC-Astaneh-PPT-containing-photos-shot-on--Oct-8-2001-Final-for-Archives.pdf

NIST has also made at least two statements not challenging the conclusion that the severely eroded steel studied at WPI came from WTC 7. The first statement is on page 233 of NCSTAR 1-3C, currently available on NIST's website:

> *Unlike the analysis of the steel from WTC 7 (Sample #1 of Appendix C, FEMA/BPAT study) where corrosion phases and morphologies were able to*

> *determine a possible temperature region, no comments were made concerning the microstructure observed in the corroded regions which may have yielded addition information in which to make the assertion of the temperature range for Sample #2.* (Underlining added.)

The second statement, noted in the Request, was at a technical briefing on August 26, 2008, for the release of NIST's WTC 7 draft report, where NIST's lead investigator Dr. Shyam Sunder was asked if NIST had tested "any WTC 7 debris for explosive or incendiary chemical residues." Without being asked specifically about the severely eroded steel at WPI, Dr. Sunder volunteered the following:

> *With regard to the issue of residue, there is reference often made to a piece of steel from Building 7 that is documented in the earlier FEMA report that deals with some kind of a residue that was found, sulfur-oriented residue. And, in fact, that was found by a professor who was then at the Worcester Polytechnic Institute, Professor Jonathan Barnett. But that piece of steel has been subsequently analyzed by Professor Barnett and by Professor Rick Sisson, who is also from the Worcester Polytechnic Institute, and they reported in a BBC interview that aired on July 6 that there was no evidence that any of the residue in that steel, in that piece of steel, had any relationship to an undue fire event in the building or any other kind of incendiary device in the building.*

In addition to those statements, the subject line of an email sent by FEMA investigator William Baker to the FEMA team (which contained the measurements of the severely eroded beam) states "Size of beam sampled by J. Barnett and J. Gross," indicating that NIST WTC investigator John Gross not only posed next to the severely eroded steel beam (*see* the Request, p. 82) but was involved in removing the sample from it. (*See* Exhibit D of this Appeal.) A subsequent email from Jonathan Barnett to the FEMA team — which includes an "@nist.gov" email address, presumably that of John Gross because he was the only member of the FEMA team who worked for NIST at that time — with the subject line "WTC 7 Test results" indicates that Gross was privy to conversations about the steel beam where it was stated that the steel beam came from WTC 7. (*See* Exhibit D of this Appeal.)

It was not until NIST published the original version of the NIST WTC 7 FAQs on September 17, 2010, two years after the end of its investigation, that NIST first claimed that WTC 7's steel did not contain distinguishing characteristics like the steel from WTC 1 and WTC 2 and therefore could not be identified. The FAQ stated:

> ***Your entire investigation included no physical evidence. How can you be so sure you know what happened?***
>
> *In general, much less evidence existed for WTC 7 than for the two WTC towers. The steel for WTC 1 and WTC 2 contained distinguishing characteristics that enabled it to be identified once removed from the site during recovery efforts. However, the same was not true for the WTC 7 steel.*[4]

[4] https://www.nist.gov/pao/questions-and-answers-about-nist-wtc-7-investigation

It is unknown based on NIST's statements regarding the steel believed to be from WTC 7 (both the steel sample held at WPI and the steel shipped to NIST from the scrapyards) when exactly NIST determined that the steel could not be positively identified as being from WTC 7 and therefore would not be used in its investigation. As shown in Exhibit E page 3 of the Request, eight steel members identified by FEMA investigators and SEAoNY volunteers as being from WTC 7 were shipped to NIST in the spring of 2002. NIST has never explained when or why it decided not to consider these eight steel members in its investigation (presumably on the grounds that they could not be positively identified as being from WTC 7).

As pointed out in the Request, NIST's lack of interest in examining the steel at WPI to determine the cause of the severe erosion and how it may have contributed to the collapse of WTC 7 is difficult to comprehend or justify. (*See* the Request, p. 81.) It seems that the professors at WPI were eager to work with NIST to conduct further analysis of the severely eroded steel or hoped that NIST would at least investigate it further. For example, WPI's newspaper, *Transformations*, reported in spring 2002: "The FEMA report calls for further metallurgic investigations, and Barnett, Biederman and Sisson hope that WPI will obtain NIST funding and access to more samples."[5] Further, as shown in Exhibit C of this Appeal, Jonathan Barnett made several comments via Skype on May 31, 2013, and June 30, 2013, expressing disappointment that NIST did not examine the severely eroded steel:

**May 31, 2013**

*[5/31/2013 9:57:55 PM] David Cole: Would you be surprised to see a photo of Mr. Gross with your beam?*
*[5/31/2013 9:59:18 PM] Jonathan Barnett: Lol*
*[5/31/2013 9:59:47 PM] Jonathan Barnett: He liked to be photographed*
*[5/31/2013 10:00:07 PM] Jonathan Barnett: He didn't bother to examine it in detail*
*[5/31/2013 10:01:02 PM] David Cole: You mean after the sample was taken, right?*
*[5/31/2013 10:01:19 PM] David Cole: In the lab*
*[5/31/2013 10:02:53 PM] Jonathan Barnett: Right*
*[5/31/2013 10:03:14 PM] Jonathan Barnett: NIST didn't express an interest*

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*[5/31/2013 10:24:45 PM] Jonathan Barnett: I do wish NIST had done what I asked and studied this in detail*

**June 30, 2013**

*[5:19:19 PM] Jonathan Barnett: In any case, NIST didn't want to study it which gave me a chance to do so*

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[5] https://digitalcommons.wpi.edu/cgi/viewcontent.cgi?article=1039&context=wpijournal-all

*[5:25:47 PM] Jonathan Barnett: In hindsight I wish we had kept more samples from. 7*
*[5:26:15 PM] David Cole: Mr. Gross posed with it not fewer than three times.*
*[5:26:28 PM] David Cole: This photo is one of two*
*[5:26:58 PM] David Cole: A different camera took the third one.*
*[5:28:06 PM] Jonathan Barnett: Lol. Camera hog. Seriously, I imagine he thought it was really interesting; although not interesting enough for him to have NIST do the analysis. Maybe they didn't have the available resources*
*[5:28:59 PM] Jonathan Barnett: It is very unusual which is why I had the analysis done*
(Underlining added.)

NIST's continued lack of interest in examining the severely eroded steel is now on full display in the Initial Decision. In support of its claim that there is "no justifiable basis" for conducting further analyses of the severely eroded steel, the Initial Decision makes largely unsupported and error-riddled assertions about the inability to positively identify steel from WTC 7. Appendix C of the FEMA Report (which presents analysis of two steel samples, not three) does not conclude that WTC buildings 4, 5, 6, and 7 had similar grades of steel and member types, as the Initial Decision claims, nor does Appendix C even mention buildings 4, 5, and 6. (Appendix D of the FEMA Report also does not state that WTC buildings 4, 5, 6, and 7 had similar grades of steel and member types.) Further, the Initial Decision claims falsely that Appendix D of the FEMA Report "explains that only the steel from buildings WTC 1 or 2 could be positively identified after the WTC steel had been moved to four salvage yards." In fact, Appendix D includes no such explanation. Rather, Appendix D makes the following statements indicating that inspectors were able to confidently identify WTC 7 steel:

> *WTC steel data collection efforts were undertaken by the Building Performance Study (BPS) Team and the Structural Engineers Association of New York (SEAoNY) to identify significant steel pieces from WTC 1, 2, 5, and 7 for further study.*
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>
> *Specifically, the engineers looked for the following types of steel members: . . . Badly burnt pieces from WTC 7.*
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> *The engineers were able to identify many pieces by their markings. Each piece of steel was originally stenciled in white or yellow with information telling where it came from and where it was going. A sample of the markings can be seen in Figure D-5.*
>
> *For example, a given piece might be marked, "PONYA WTC 213.00 236B4-9 558 35 TONS." Translated, this meant the column was destined for the Port of New York Authority's World Trade Center as part of contract number 213.00. Its actual piece number was 236B, and it was to be used between floors 4 and 9 in*

*tower B (WTC 2). Its derrick division number was 558, which determined which crane would lift it onto the building and the order in which it was to be erected. Other markings might include the name of the iron works or shipping instructions to those responsible for railway transportation (Gillespie 1999).*

*Additional markings (and duplicates of stenciled markings) may sometimes be found stamped into the steel pieces. These stamped markings are about 3/4 inch tall.*

*In the absence of markings, member size is the quickest and easiest means for the engineers to establish an approximate original location for a piece.*

(Note: In the paragraphs above, Appendix D provides examples only of how steel from WTC 1 and WTC 2 was identified. But it does not state that steel from WTC 7 was unidentifiable.)

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*Pieces that were searched for and inspected include perimeter or core columns near the impact area of WTC 1 or WTC 2, burnt pieces from WTC 7, and connection pieces from WTC 5 (see Figures D-12 through D-18).*

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*Pieces have been identified that are from WTC 1, 2, 5, and 7.*

Furthermore, the Steel Data Collection Spreadsheet at the end of Appendix D includes 4 entries that are explicitly regarding steel from WTC 7 (*see* page 2 of 13 in the Steel Data Collection Spreadsheet of FEMA Appendix D) as well as several references to "burnt" and "fire-damaged" steel members, which may have been identified as being from WTC 7 but not noted as such in the spreadsheet. Cross-referencing the Steel Data Collection Spreadsheet with the labels in the map showing 8 steel members shipped to NIST (*see* Exhibit E of the Request), we find that all 8 are listed in the Steel Data Collection Spreadsheet (these are members C-31, C-42, C-66, C-72b, C-74, C-78, C-85, M-11) — although they are not listed as being from WTC 7, which suggests that more than 4 entries from the spreadsheet are WTC 7 steel. In addition, as noted in the Request, Appendix D includes two photos of columns identified as being from WTC 7.

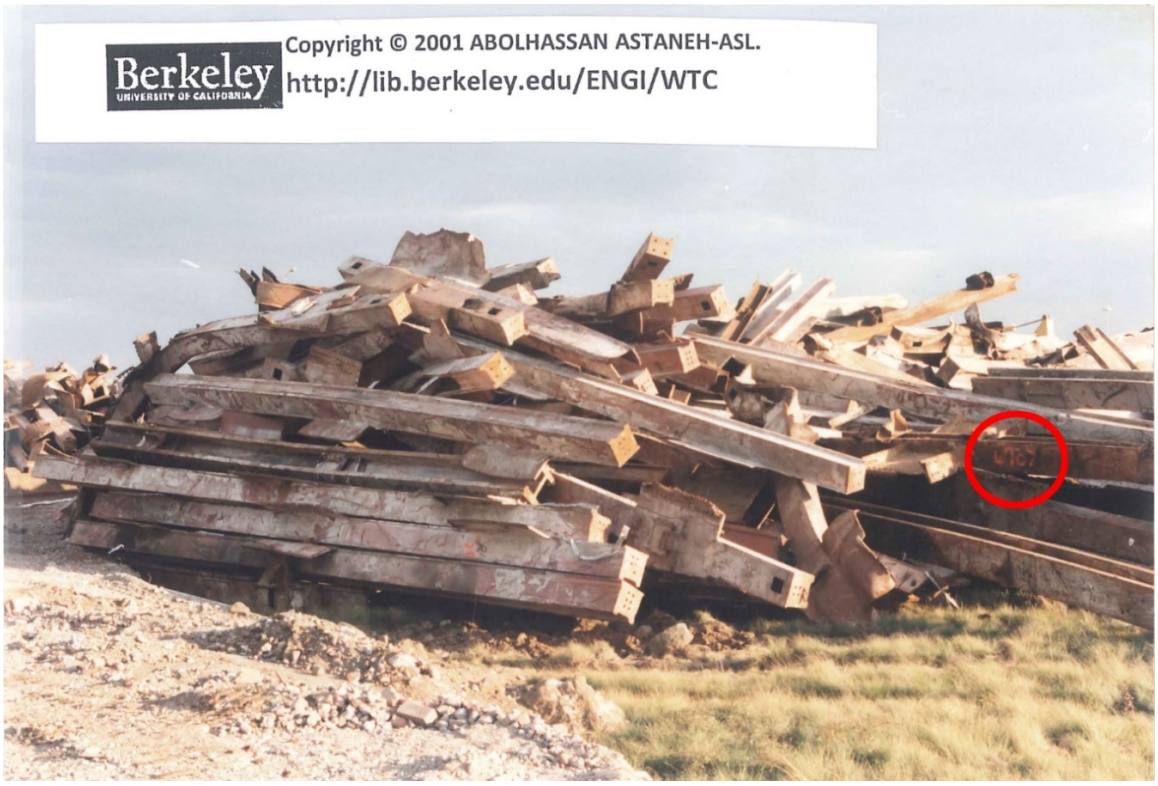
Contrary to NIST's assertion that WTC 7 steel did not contain markings, many steel members removed from the WTC 7 debris pile were tagged with a "WTC 7" marking, as shown in the images below. These may have helped FEMA investigators and SEAoNY volunteers identify steel as being from WTC 7.


Photo: Roger Lemoyne. September 20, 2001. Canal Street, Lower Manhattan. Source: https://www.gettyimages.com/detail/news-photo/twisted-metal-and-concrete-are-carried-up-canal-street-from-news-photo/1165270


Photo: Roger Lemoyne. September 20, 2001. Canal Street, Lower Manhattan. Source: https://www.gettyimages.com/detail/news-photo/twisted-metal-and-concrete-are-carried-up-canal-street-from-news-photo/1165278



Photos by David Morris assisting Dr. Astaneh-Asl in his small WTC study. September 20-23, 2001. Church and Walker Streets, Lower Manhattan. Source of both slides: http://digitalassets.lib.berkeley.edu/wtc/502-WTC-Astaneh-PPT-containing-photos-shot-on--Oct-8-2001-Final-for-Archives.pdf




Original photo: Abolhassan Astaneh-Asl/University of California in Berkeley. Unknown date. Taken at Hugo Neu Schnitzer East's Claremont scrap yard in Jersey City, NJ. Source: *Astaneh-Asl's Google Drive account / File: 20140419133203476-final.pdf, PDF p. 2*

Photo: Dean Koutsoubis for FEMA/ASCE WTC Study. February 8th, 2002. Metal Management Northeast's facility in Newark, NJ. Source: *911datasets.org / International_Center_for_911_Studies_NIST_FOIA / Release_32 / Release 32 / 42A0375 - G33D9 / WTCI-102-I -GMS-CD#8-Multiple STEEL / Newark / M-Misc / W14x730 Filled / P2080056.JPG*


Photo: John Fisher/Lehigh University. Taken on October 2001 for FEMA/ASCE WTC Study. A column paint-tagged with "WTC7" sticks out of a pile, right below the severely eroded girder found by Barnett/WPI, Gross/NIST et al. Source of original image: *911datasets.org / International_Center_for_911_Studies_NIST_FOIA / Release_37 / Release 37 / 42A0525 - G38D4 / WTCI-63-FEMA / CD1 / Fisher photos / WTC Folders / Fire Damage / 10_2001_16-18 pile of sections with fire damage girder.jpg*

Note that the final photo above shows a column tagged with "WTC 7" in the same pile where the severely eroded beam sampled by the FEMA investigators and shipped to WPI was found (see the deformed beam with holes in it on top of the pile at center).

Also contrary to NIST's assertion that WTC 7 steel did not contain markings, some steel members from WTC 7 did include still-visible markings that were applied by the steel fabricator. (*See* Exhibit E of this Appeal for three figures pertaining to three steel members from WTC 7.) These markings may not have been decipherable to the FEMA investigators and SEAoNY volunteers if they didn't know the steel fabricator contract number. However, they should have been decipherable to NIST if any such markings were visible on the members shipped to NIST.

As noted in Appendix D of the FEMA Report, in the absence of markings, member size could also be informative as to the original location of the member. For example, in an email to many members of the FEMA team (which included NIST WTC investigator John Gross), FEMA investigator William Baker provided the measurements he took of the severely eroded steel member believed to be from WTC 7. (*See* Exhibit D of this Appeal.) These measurements were as follows: Depth (d) = 23.50; Flange thickness (tf) = .562; Flange width (bf) = 8.875; Web thickness (tw) = .438. According to the Nucor-Yamato Steel Structural Shapes catalogue, this

would make the steel member either a W24 x 68 beam or a W24 x 76 beam. WTC 7 contained a large quantity of both size beams. (*See* Exhibit D of this Appeal.)

Finally, the timing of when the severely eroded steel beam was identified strongly suggests that it came from WTC 7. Based on the timestamp of photos taken of the severely eroded steel beam shown below, we know that it was first identified in the scrapyard on October 8, 2001. Meanwhile, we know based on a photo taken of WTC 7, WTC 6, and WTC 5 on October 25, 2001, shown below, that the debris pile of WTC 7 was almost entirely cleaned up by that time while no major work had apparently begun on WTC 6 and WTC 5, portions of which were still intact and standing because those buildings had not collapsed into piles of rubble like WTC 7 did. All three photos were obtained by researcher David Cole as part of NIST FOIA Request #12-057.


Filename - PA080076.JPG
ImageDescription - OLYMPUS DIGITAL CAMERA
Make - OLYMPUS OPTICAL CO.,LTD
Model - E-10
DateTimeOriginal - 2001:10:08 15:29:50
J. Rossberg from CD1
WTCI-63-FEMA


Filename - DSCN0338.JPG
ImageDescription -
Make - NIKON
Model - E950
25 OCT 2001
N. Iwankiw from CD2
WTCI-63-FEMA
WTC 5
WTC 6

Summarizing the information presented above, there is every indication that the severely eroded steel examined at WPI came from WTC 7. NIST provides no significant reason in FAQ #27 nor in its Initial Decision to doubt that the steel came from WTC 7. Any genuinely scientific investigation into the collapse of WTC 7 would seek to establish the cause of the severe erosion in the recovered piece of steel if there were a reasonable possibility that the steel came from WTC 7, especially in light of the fact that severe erosion was observed "in several beams."

In addition, through its use of the term "other theories" to refer to the thermate/nano-thermite hypothesis, the Initial Decision implies that the gypsum wallboard hypothesis has been scientifically proven, when in fact, as shown in the Request, the experiments conducted to date only cast doubt on that hypothesis. The Initial Decision completely avoids addressing the following relevant data quality arguments regarding the viability of the gypsum wallboard hypothesis versus the viability of the thermate/nano-thermite hypothesis:

1. Regarding Sisson's statement in the BBC documentary *9/11: The Third Tower*, which Dr. Sunder referenced in the 2008 technical briefing, we see that Sisson essentially performed an about-face from being "shocked" in 2001, to not finding the severe erosion of the steel "very mysterious at all" in 2008. However, closer scrutiny of the 2006 follow-up paper that Sisson co-authored with Biederman reveals that they were unable to reproduce the observed erosion through experiments. Sisson and Biederman state in the paper (*see* Sisson, Jr, R.D. and R.R. Biederman, 2006):

> *The metal removal rates from A36 steel by this liquid slag are not known and may be highly dependent on impurity content as well as oxygen and sulfur partial pressures in the atmosphere of the fire.* ***However, preliminary experiments at 1,100 °C with mixtures of FeS and FeO placed on the steel surface and heated in air indicated that the reaction was not fast and dissolved little metal in 24 h. This observation indicates that the liquid slag attack probably took place during the prolonged exposure to the fire in the rubble.***
>
> *Another frequently asked question concerns the source of the sulfur. Some of the sulfur may have come from the fuel on the airplanes or the fuel that was stored in Building 7. However, this source would have been short-lived in the fires. Sulfuric acid in acid rain or $SO_2$ or $SO_3$ in the atmosphere could also contribute sulfur to the slag.* ***A more probable source of sulfur is the materials in the building, such as gypsum (hydrated calcium sulfate) board or other construction materials.***

In other words, despite placing mixtures of iron sulfide (FeS) and iron oxide (FeO) directly on the steel surface and heating the environment to 1,100 °C for 24 hours, "the reaction was not fast and dissolved little metal." But rather than questioning their hypothesis that this mechanism produced the observed severe erosion, Sisson and Biederman jumped straight to assuming that it was merely a matter of exposing the steel to these conditions for a longer period of time. Instead of providing clear conclusions backed by experimental evidence (for example, subjecting the steel to the same conditions for several days and reproducing the

severe erosion), Sisson and Biederman offered weak, speculative assertions such as "the liquid slag attack probably took place during the prolonged exposure to the fire in the rubble" and "a more probable source of sulfur is the materials in the building."

2. Civil engineer Jonathan Cole conducted a similar but more real-world experiment, which he documented in the video *9/11 Experiments: The Mysterious Eutectic Steel*. Cole used a wide flange beam packed with crushed gypsum board, crushed concrete, aluminum scraps, steel scraps, and diesel fuel, and he burned it for 24 hours, continually adding fuel such as brush, furniture, floor panels, and wood logs. At the end of his experiment he reported, "**The aluminum, concrete, drywall, diesel fuel, and building materials did not cause any intergranular melting.** So, if [these materials] did not cause the intergranular melting and sulfidation, then some uncommon substance that is not normally found in buildings must have caused it."

3. Besides Sisson and Biederman failing to provide evidence of sustained temperatures between 940 °C and 1,100 °C in the WTC 7 debris pile, their hypothesis is fatally flawed for the simple reason that iron does not react with gypsum, which is composed of calcium sulfate. In chemical terms, iron is not electropositive enough to reduce sulfate. Gypsum wallboard is commonly used for fire protection for the fundamental reason that it cannot burn. The notion of gypsum wallboard burning for a sustained period of time and forming a liquid eutectic with iron is illogical on its face.

4. A simple and straightforward competing hypothesis has been put forward that readily explains the oxidation, sulfidation, and severe erosion of steel in WTC 7: the use of thermate. This hypothesis was first posited by retired BYU physics professor Steven Jones in the paper "Revisiting 9/11/2001 — Applying the Scientific Method," which, in addition to being published in *The Journal of 9/11 Studies*, is archived on NIST's website.[6] "Thermate" is made by adding sulfur to thermite, which is a well-known incendiary consisting of a mixture of powdered aluminum and iron oxide. According to Jones, thermate "combines aluminum powder and iron or other metal oxides with sulfur. The thermate reaction proceeds rapidly and is in general faster than basic thermite in cutting through steel due to the presence of sulfur. (Elemental sulfur forms a low-melting-temperature eutectic with iron)." Jones notes that, in addition to explaining the observed eutectic reaction, thermate also explains the observed oxidation and sulfidation: "When you put sulfur into thermite it makes the steel melt at a much lower temperature, so instead of melting at about 1538 °C it melts at approximately 988 °C, and you get sulfidation and oxidation in the attacked steel . . ." (*See* Jones, 2007.)

5. In the NIST WTC 7 FAQs, NIST dismisses the use of thermite and thermate as a hypothesis for the destruction of WTC 7. (*See* NIST WTC FAQs, FAQ #14, or page 88 of the Request.) NIST essentially offers three reasons for dismissing the use of thermite/thermate: (1) the amount needed and the impracticality of applying it, (2) that the observed fires have been shown to explain WTC 7's collapse, and (3) that testing for thermite and thermate would not necessarily have been conclusive. Each reason is discussed below.

[6] https://www.nist.gov/system/files/documents/2017/05/09/JonesWTC911SciMethod.pdf

a. With respect to the amount of thermite/thermate needed and the impracticality of applying it, NIST's answer totally ignores the possible use of thermite cutter charges capable of directing molten iron from the thermite/thermate reaction toward a steel member so as to rapidly and efficiently cut through the steel member. This technology was well developed prior to 9/11. For example, the patent for a "cutting torched and associated methods" granted on February 6, 2001, relates to "an apparatus and method for cutting target material of substantial thickness using a thermite-based charge" (*See* Patent No. US 6,183,569 B1; and an excerpt from the patent on pages 89 and 90 of the Request.) Therefore, the first reason NIST gives for dismissing the use of thermite/thermate in FAQ #14 of the NIST WTC 7 FAQs is arbitrary, misleading, and totally insufficient as a grounds for dismissing the thermate hypothesis.

b. Second, with respect to NIST's claim that the observed fires have been demonstrated to explain WTC 7's collapse, Part 1 of Section V of this Request makes it clear that the observed fires have *not* been demonstrated to explain the collapse. As described in detail above, NIST's Probable Collapse Sequence both is physically impossible and fails to explain the observed structural behavior. Thus, NIST cannot use the alleged viability of its demonstrably unviable hypothesis to dismiss a competing hypothesis. To the contrary, because NIST's Probable Collapse Sequence is physically impossible and fails to explain the observed structural behavior, more attention and weight should be given to the competing hypothesis.

c. Third, with respect to NIST's claim that "analysis of the WTC steel for the elements in thermite/thermate would not necessarily have been conclusive," the *possibility* of a scientific analysis not being conclusive is never a basis for not conducting that analysis. In fact, it is absolutely normal, even expected, for a single analysis not to be conclusive. Furthermore, there is a host of testing and experimentation that could be conducted for the purpose confirming or disconfirming the thermite/thermate hypothesis. "Analysis of the WTC steel for the elements in thermite/thermate" is just one analysis among many that can and should be conducted.

In summary, NIST's claim that there is "no justifiable basis" for conducting further analyses of the severely eroded steel is brazenly unscientific. To the contrary, because there is every indication that this severely eroded steel came from WTC 7 — and the experiments conducted to date only cast doubt on the gypsum wallboard hypothesis as the cause of the erosion — there is no justifiable basis for not conducting further analyses of this steel. With NIST's only stated reason for not conducting further analyses of the severely eroded steel refuted, it is time for NIST to finally study this piece of steel, establish the cause of its severe erosion, and determine whether the severe erosion of this and other steel members contributed to the collapse of WTC 7.

### 2. Actions NIST Must Take to Comply with the DQA, OMB Guidelines, and NIST IQS

To comply with the DQA, the OMB Guidelines, and the NIST IQS, NIST must take one of the following two actions. In the Requesters' view, only the first action is analytically sound.

1. Obtain the WTC 7 steel sample from the Worcester Polytechnic Institute (WPI) and conduct analyses to determine the cause of the severe erosion as well as further experiments to reproduce the observed severe erosion and determine the viability of the gypsum wallboard hypothesis versus the viability of the thermate/nano-thermite hypothesis. Further, revise FAQ #27 in the NIST WTC 7 FAQs to reflect that identifiable steel *was* recovered from WTC 7. Then discard the Probable Collapse Sequence and develop a new Probable Collapse Sequence that is consistent with physical evidence of incendiaries being used in the destruction of WTC 7.

2. Provide a substantive response in your Final Decision to each of the relevant data quality arguments listed above. In particular, your Final Decision must provide (1) a significant reason to doubt that the severely eroded steel came from WTC 7, (2) an explanation of exactly when and why NIST determined that the steel thought to be from WTC 7 could not be positively identified as being from WTC 7 and therefore would not be used in its investigation, and (3) a substantive response to the relevant data quality argument that the experiments conducted to date only cast doubt on the gypsum wallboard hypothesis as the cause of the severe erosion.

## CONCLUSION

For all of the foregoing reasons, we, the undersigned Requesters, urge you to require the responsible NIST personnel to take the corrective actions requested in the original Request and in this Appeal.

Please heed this reasonable request to revise the NIST WTC 7 Report and, in so doing, promote the public interest on this matter of utmost importance at this critical moment in history, re-establish NIST's reputation as an agency of integrity and excellence, and honor the names of those who perished in the World Trade Center on 9/11.

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| /s/ James Reed<br>James Reed<br>Architect | **[REDACTED]**<br>Address | **[REDACTED]**<br>Contact Information |
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|---|---|---|
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| /s/ Leland Roberts<br>Leland Roberts<br>Architect | **[REDACTED]**<br>Address | **[REDACTED]**<br>Contact Information |
| /s/ Tom Robertson<br>Tom Robertson<br>Structural Engineer | **[REDACTED]**<br>Address | **[REDACTED]**<br>Contact Information |
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| /s/ Eric Ruston<br>Eric Ruston<br>Structural Engineer | **[REDACTED]**<br>Address | **[REDACTED]**<br>Contact Information |
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| Bernard G. Stroh<br>Structural Engineer | Address | Contact Information |
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| Alan Stump<br>Architect | Address | Contact Information |
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| Joseph Testa<br>Structural Engineer | Address | Contact Information |

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## APPEAL ENCLOSURES

Original Request for Correction

NIST's Initial Decision

Email Correspondence Regarding the Initial Decision

**Exhibit A**

Letter from Dr. J. Leroy Hulsey, Professor Emeritus of Civil Engineering, University of Alaska Fairbanks

**Exhibit B**

Declaration of André Rousseau, Applied Geophysicist, on September 28, 2020

**Exhibit C**

Skype Conversation between FEMA Investigator and WPI Professor Jonathan Barnett and Researcher David Cole March 2013 to January 2014

**Exhibit D**

Size of Severely Eroded Steel Beam

**Exhibit E**

Analysis of Markings on WTC 7 Steel Members

## REQUEST FOR CORRECTION ENCLOSURES

**Exhibit A**

Hulsey, J.L., Quan, Z., and Xiao, F., 2020. A Structural Reevaluation of the Collapse of World Trade Center 7 – Final Report. Department of Civil and Environmental Engineering, College of Engineering and Mines, Institute of Northern Engineering, University of Alaska Fairbanks, Fairbanks, AK, INE Report 18.17, 112 pp.

**Exhibit B**

Declaration of André Rousseau, Applied Geophysicist

André Rousseau CV

**Exhibit C**

Email from NIST public affairs officer Michael Newman to David Cole dated October 25, 2013

**Exhibit D**

Table: Expansion of Beam K3004 vs. Temperature

**Exhibit E**

Documentation Indicating WTC 7 Steel Shipped to NIST

## APPEAL REFERENCES

Note: This includes only new references not included in the Request for Correction references.

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