



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 30, 2024

Bruce Bader
Quality Assurance Manager
Bentley Systems Inc.
11988 El Camino Real Ste 300
San Diego, CA, 92130

SUBJECT: NUCLEAR REGULATORY COMMISSION VENDOR INSPECTION REPORT OF BENTLEY SYSTEMS INC. NO. 99902127/2024-201, NOTICE OF VIOLATION, AND NOTICE OF NONCONFORMANCE

Dear Mr. Bader:

On August 12 — 16, 2024, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at the Bentley Systems Inc. (hereafter referred to as Bentley) facilities in San Diego, CA. The purpose of this limited-scope routine inspection was to assess Bentley's compliance with provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 21, "Reporting of Defects and Noncompliance," and selected portions of Appendix B, "Quality Assurance Program Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities."

This inspection specifically evaluated Bentley's implementation of quality activities associated with piping and three-dimensional structural analysis software products used for safety-related applications at U.S. nuclear power plants. The enclosed report presents the results of the inspection. This NRC inspection report does not constitute NRC endorsement of Bentley's overall quality assurance (QA) or 10 CFR Part 21 program. The NRC inspection team discussed the preliminary inspection findings with you at the conclusion of the on-site portion of the inspection.

Based on the results of this inspection, the NRC has determined that one Severity Level IV violation of NRC requirements occurred. The NRC evaluated the violation in accordance with the agency's Enforcement Policy, which is available on the NRC's Web site at <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>.

The enclosed Notice of Violation (NOV) cites one violation, and the subject inspection report details the circumstances surrounding the violation. Violation 99902127/2024-201-01 cites Bentley for failing to adopt appropriate procedures to evaluate deviations and failures to comply and identify defects or failures to comply associated with substantial safety hazards, as soon as practicable, as required by 10 CFR Part 21.21(a).

You are required to respond to this letter and to follow the instructions specified in the enclosed NOV when preparing your response. In your response to the enclosed NOV, Bentley should

document the results of the extent of condition review for the finding and determine if there are any effects on other safety-related components. If you have additional information that you believe the NRC should consider, you may provide it in your response to the NOV. The NRC's review of your response to the NOV also will determine if further enforcement action is necessary to ensure compliance with regulatory requirements.

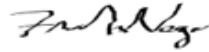
In addition, during this inspection, the NRC inspection team found that the implementation of your QA program did not meet certain regulatory requirements contractually imposed on you by NRC licensees. Specifically, the NRC inspection team determined that Bentley was not adequately implementing its QA program in the area of Criterion II, "Quality Assurance Program" of Appendix B to 10 CFR Part 50. The specific finding and references to the pertinent requirements are identified in the enclosures to this letter. In response to the enclosed notice of nonconformance (NON), Bentley should document the results of the extent of condition review for this finding and determine if there are any effects on safety-related components.

Please provide a written statement or explanation within 30 days of this letter in accordance with the instructions specified in the enclosed NOV and NON. We will consider extending the response time if you show good cause for us to do so.

In accordance with the requirements in 10 CFR 2.390, "Public inspections, exemptions, requests for withholding," of the NRC's "Rules of Practice," a copy of this letter, its enclosure(s), and your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response, (if applicable), should not include any personal privacy, proprietary, or safeguards information (SGI) so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request that such material is withheld from public disclosure, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information).

If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, "Protection of safeguards information: performance requirements."

Sincerely,



Vega, Frankie signing on behalf
of Kavanagh, Kerri
on 09/30/24

Kerri Kavanagh, Chief
Quality Assurance Vendor Inspection Branch
Division of Reactor Oversight
Office of Nuclear Reactor Regulation

Docket No.: 99902127

EPID No.: I-2024-201-0002

Enclosures:

1. Notice of Violation
2. Notice of Nonconformance
3. Inspection Report No. 99902127/2024-201 and Attachment

SUBJECT: NUCLEAR REGULATORY COMMISSION VENDOR INSPECTION REPORT OF BENTLEY SYSTEMS INC. NO. 99902127/2024-201, NOTICE OF VIOLATION, AND NOTICE OF NONCONFORMANCE DATE: September 30, 2024

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NRR-106

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NOTICE OF VIOLATION

Bentley Systems Inc.
11988 El Camino Real Ste 300
San Diego, CA, 92130

Docket No. 99902127
Report No. 2024-201

Based on the results of a U.S. Nuclear Regulatory Commission (NRC) inspection conducted at the Bentley Systems Inc.'s (hereafter referred to as Bentley) facility in San Diego, CA from August 12 through August 16, 2024, one violation of NRC requirements was identified. In accordance with the NRC's Enforcement Policy, this violation is listed below:

- A. Section 21.21, "Notification of failure to comply or existence of a defect and its evaluation," of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 21, paragraph (a)(1) requires, in part, that "Each individual, corporation, partnership, dedicating entity, or other entity subject to the regulations in this part shall adopt appropriate procedures to evaluate deviations and failures to comply to identify defects and failures to comply associated with substantial safety hazards as soon as practicable." 10 CFR 21.3 defines a "deviation" as "a departure from the technical requirements included in a procurement document, or specified in early site permit information, a standard design certification or standard design approval."

Contrary to the above, as of August 16, 2024, Bentley failed to adopt appropriate procedures to evaluate deviations and failures to comply and identify defects or failures to comply associated with substantial safety hazards, as soon as practicable. Specifically, Bentley's Quality Assurance Procedure (QAP) 9.5, "10 CFR 21 Notification," Revision 13, dated September 25, 2020, did not:

- include (1) definitions for the terms as defined in 10 CFR 21.3, such as deviation, defect, and substantial safety hazard, and (2) criteria for evaluating deviations and failures to comply to identify defects and failures to comply associated with substantial safety hazards, as required by 10 CFR 21.21(a).
- contain criteria to implement the requirements of 10 CFR 21.21(b). As a result, Bentley did not notify its customers of all deviations (e.g., high errors that produce both non-conservative and conservative results) within 5 days of Bentley's determination that it does not have the capability to perform the evaluation so that its customers may evaluate the deviations, as required by 10 CFR 21.21(b).

This issue has been identified as Violation 99902127/2024-201-01.

This is a Severity Level IV violation (Section 6.9.d of the NRC Enforcement Policy).

Under the provisions of 10 CFR Part 2.201, "Notice of Violation," Bentley is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Chief, Quality Assurance and Vendor Inspection Branch, Division of Reactor Oversight, Office of Nuclear Reactor Regulation, within 30 days of the date of the letter transmitting this notice of violation. This reply should be clearly marked as a "Reply to a Notice of Violation" and should include (1)

the reason for the violation or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence if the correspondence adequately addresses the required response. Where good cause is shown, the NRC will consider extending the response time.

If you contest this enforcement action, provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System, which is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>, to the extent possible it should not include any personal privacy, proprietary, or Safeguards Information (SGI) so that the agency can make it available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information.

If you request that such material be withheld, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information would create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If SGI is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, "Protection of Safeguards Information: Performance Requirements."

Dated this 30th day of September 2024

NOTICE OF NONCONFORMANCE

Bentley Systems Inc.
11988 El Camino Real Ste 300
San Diego, CA, 92130

Docket No. 99902127
Report No. 2024-201

Based on the results of a U.S. Nuclear Regulatory Commission (NRC) inspection conducted at the Bentley Systems Inc.'s (hereafter referred to as Bentley) facility in San Diego, CA from August 12 through August 16, 2024, Bentley did not conduct certain activities in accordance with NRC requirements that were contractually imposed on Bentley by its customers or NRC licensees:

- A. Criterion II, "Quality Assurance Program," of Appendix B to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50 requires the establishment of a "quality assurance program which complies with the requirements of [Appendix B to 10 CFR Part 50]. This program shall be documented by written policies, procedures, or instructions and shall be carried out in accordance with those policies, procedures, or instructions... [A regular review [of] the status and adequacy of the quality assurance program [shall be performed]]"

Purchase Order (PO) 002014, dated May 8, 2024, and PO 6137042, dated June 26, 2024, required Bentley Systems to meet Appendix B to 10 CFR Part 50 in procurement of Bentley Systems' software products and services.

Contrary to the above, as of August 16, 2024, Bentley failed to establish an adequate quality assurance (QA) program that met the applicable provisions of Appendix B, as specified in POs 002014 and 6137042 for the procurement of Bentley software products and services. Specifically, Bentley's Quality Assurance Policy Manual, Revision 11, dated March 25, 2024, and its referenced implementing procedures did not establish adequate policies, procedures, and instructions of a quality assurance program which complies with the appropriate provisions of Appendix B to 10 CFR Part 50. In addition, Bentley did not ensure that activities affecting quality are carried out in accordance with documented policies and procedures. Examples were identified in the following areas:

- Bentley's Procedure, Quality Assurance Procedure (QAP) 2.0, "Software Lifecycle and Documentation," Revision 13, dated September 25, 2020, did not incorporate the development environment and processes used in the Azure DevOps (ADO) into QAP 2.0 or its referenced procedures. Further, no procedures or instructions have been developed to govern the workflow, test, and software anomalies tracking activities in ADO.
- Bentley's Procedure, QAP 5.4, "Software Defect Tracking," Revision 13, dated September 25, 2020, classifies an error as critical if analytical software module produces unconservative results. This procedure classifies an error as high severity when the error prevents the use of primary section(s) or feature(s) of the software and for which no feasible avoidance exists. Bentley's error report No. 1427565, "Self Weight Distribution for Quadrilateral Plates," dated May 2, 2024, and error report No. 1221514, "Wind load panel formation affected by support nodes," dated June 16, 2023, did not provide an adequate technical basis for these errors being classified as high instead of critical.

- Bentley's Procedure QAP 6.4, "Software Tools," Revision 13, dated September 25, 2020, did not include requirements for the evaluation, review, testing and acceptance, and configuration control of an accepted tool. As a result, the software tool evaluation report performed for the ADO tool did not document the reviews and testing performed for the acceptance of this tool.
- Bentley's QA Policy Manual, Revision 11, Section 16, "Corrective Action," and Procedure QAP 9.1, "Corrective Action Report," Revision 13, dated March 25, 2020, did not specify whether software errors are considered conditions adverse to quality or significant conditions adverse to quality. As such, software errors within released Bentley products are not consistently screened to determine whether these errors should be entered into Bentley's corrective action program.

Corrective Action Report (CAR) 23-002 was generated for not auditing all the elements of the QA program. The QA manager created this CAR, performed the corrective actions, verified the corrective actions, evaluated the effectiveness of corrective actions, and closed the CAR on November 15, 2023. This CAR stated that the corrective action to correct the issue includes conducting an audit of all elements of the QA program. However, the CAR stated that the audit was rescheduled for May 2024 and completed on June 18, 2024, which contradicts the closure of the CAR on November 15, 2023.

- Bentley QA Policy Manual, Revision 11, Section 18, "Audits" states, "A system of planned and periodic audits has been established in order to verify that established QA procedures are being applied to all activities affecting quality." Section 2.5 of the QA Policy Manual it states that the scope, adequacy, implementation, and effectiveness of the QA Program are assessed at least once every year. Bentley did not conduct audits of all aspects of its QA program in 2021, 2022, and 2023. A QA program audit completed in 2024, A-24-01, was performed. However, all aspects Bentley's QA program were not audited as required by the Bentley QA Policy Manual.

This issue has been identified as Nonconformance 99902127/2024-201-02.

Please provide a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Chief, Quality Assurance and Vendor Inspection Branch, Division of Reactor Oversight, Office of Nuclear Reactor Regulation, within 30 days of the date of the letter transmitting this Notice of Nonconformance. This reply should be clearly marked as a "Reply to a Notice of Nonconformance" and should include for each noncompliance: (1) the reason for the noncompliance or, if contested, the basis for disputing the noncompliance; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken to avoid further noncompliance; and (4) the date when the corrective action will be completed. Where good cause is shown, the NRC will consider extending the response time.

In accordance with the requirements of 10 CFR 2.390, "Public inspections, exemptions, requests for withholding," of the NRC's "Rule of Practice," your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading_rm/adams.html. To the extent possible, it should not include any

personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction.

If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

Dated this 30th day of September 2024.

**U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
DIVISION OF REACTOR OVERSIGHT
VENDOR INSPECTION REPORT**

Docket No.: 99902127

Report No.: 99902127/2024-201

Vendor: Bentley Systems Inc.
Bruce Bader
Bruce.Bader@bentley.com

Nuclear Industry Activity: Bentley Systems Inc. supplies and supports safety-related software products used for piping analysis and three-dimensional structural analysis by the commercial nuclear industry.

Inspection Dates: August 12 – 16, 2024

Vendor Location: 11988 El Camino Real Ste 300
San Diego, CA, 92130

Inspection Team Leader: Deanna Zhang
NRR/DRO/IQVB

Inspectors: Aaron Armstrong NRR/DRO/IQVB
Dong Park NRR/DRO/IQVB
John Bozga NRR/DEX/EMIB, technical specialist

Approved by: Kerri Kavanagh, Chief
Quality Assurance and Vendor Inspection Branch
Division of Reactor Oversight
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

Bentley Systems
99902127/2024-201

The U.S. Nuclear Regulatory Commission (NRC) staff conducted a routine vendor inspection at the Bentley Systems Inc.'s (hereafter referred to as Bentley) facility in San Diego, CA, to verify it had implemented an adequate quality assurance (QA) program that complies with the requirements of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," and 10 CFR Part 21, "Reporting of Defects and Noncompliance." The NRC inspection team conducted this inspection on-site (with the exception of one remote inspection team member) from August 12 – 16, 2024.

This technically-focused inspection specifically evaluated Bentley's implementation of its QA and 10 CFR Part 21 programs as applied to the design, development, and testing activities for software used in safety-related applications at U.S. nuclear power plants.

The following regulations served as the bases for the NRC inspection:

- Appendix B to 10 CFR Part 50
- 10 CFR Part 21

During this inspection, the NRC inspection team implemented Inspection Procedure (IP) 43002, "Routine Inspections of Nuclear Vendors," dated February 10, 2023; and IP 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting of Defects and Noncompliance," dated February 10, 2023.

The results of this inspection are summarized below.

10 CFR Part 21

The NRC inspection team issued Violation 99902127/2024-201-01. Violation 99902127/2024-201-01 cites Bentley's failure to adopt appropriate procedures to evaluate deviations and failures to comply and identify defects and failures to comply associated with substantial safety hazards as soon as practicable. Specifically, Bentley's implementing procedure for 10 CFR Part 21 did not contain accurate criteria for the evaluation of deviations and failures to comply to determine whether defects or failures to comply associated with substantial safety hazards exist as required by 10 CFR 21.21(a).

Quality Assurance Program

The NRC inspection team issued Notice of Nonconformance (NON) 99902127/2024-201-02. NON 99902127/2024-201-02 cites Bentley's failure to establish an adequate quality assurance program that met the applicable provisions of Appendix B to 10 CFR Part 50. Specifically, Bentley's Quality Assurance Policy Manual, Revision 11 and its referenced procedures did not adequately document the policies, procedures, and instructions of a quality assurance program which complies with the appropriate provisions of Appendix B. In addition, Bentley did not ensure that activities affecting quality are carried out in accordance with documented policies and procedures.

Nonconforming Materials, Parts, or Components and Corrective Actions, Internal Audits, Design Control, and Test Control

The NRC inspection team review of the Bentley's controls for nonconforming materials, parts, or components, the corrective actions program, internal audits program, and design control and test control. The NRC inspection team identified issues with the design control program, controls for nonconforming material, parts, or components, corrective actions program, and internal audits program. These issues are documented as examples for NON 99902127/2024-201-02 and details regarding the issues identified are documented in the Report Details.

REPORT DETAILS

1. 10 CFR Part 21 Program

a. Inspection Scope

The U.S. Nuclear Regulatory Commission (NRC) inspection team reviewed Bentley Systems Inc. (hereafter referred to as Bentley) policies and implementing procedures that govern the implementation of its Title 10 of the *Code of Federal Regulations* (10 CFR) Part 21, "Reporting of Defects and Noncompliance," program to verify compliance with the regulatory requirements. The NRC inspection team also evaluated the 10 CFR Part 21 postings and verified compliance with the requirements of 10 CFR 21.6, "Posting Requirements." The NRC inspection team observed that Bentley does not procure safety-related items. The NRC inspection team also verified that Bentley's corrective action procedures provide a link to the 10 CFR Part 21 program.

The NRC inspection team also discussed the 10 CFR Part 21 program with Bentley's management and technical staff. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

b. Observations and Findings

The NRC inspection team reviewed Bentley's procedure Quality Assurance Procedure (QAP) 9.5, "10 CFR 21 Notification," Revision 13, dated September 25, 2020, and observed that this procedure did not adopt appropriate procedures to evaluate deviations and failures to comply and identify defects or failures to comply associated with substantial safety hazards, as soon as practicable. Specifically, QAP 9.5 did not:

- include (1) definitions for the terms as defined in 10 CFR 21.3, such as deviation, defect, and substantial safety hazard, and (2) criteria for evaluating deviations and failures to comply to identify defects and failures to comply associated with substantial safety hazards, as required by 10 CFR 21.21(a).
- contain criteria to implement the requirements of 10 CFR 21.21(b). As a result, Bentley did not notify its customers of all deviations (e.g., high errors that produce both non-conservative and conservative results) within 5 days of Bentley's determination that it does not have the capability to perform the evaluation so that its customers may evaluate the deviations, as required by 10 CFR 21.21(b).

This issue has been identified as Violation 99902127/2024-201-01. Bentley created Corrective Action Report (CAR) 24-013, dated August 16, 2024, to address this issue.

c. Conclusion

The NRC inspection team identified a violation associated with Bentley's failure to implement the regulatory requirements of 10 CFR Part 21. Violation 99902127/2024-201-01 cites Bentley for failing to adopt appropriate procedures to evaluate deviations and failures to comply and identify defects and failures to comply associated with substantial safety hazards.

2. Quality Assurance Program

a. Inspection Scope

The NRC inspection team reviewed Bentley's policies and implementing procedures that govern the establishment and execution of Bentley's quality assurance program to verify compliance with the requirements of Criterion II, "Quality Assurance Program," of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities."

The NRC inspection team reviewed Bentley's Quality Assurance Policy Manual, Revision 11, and its referenced procedures to verify that Bentley's quality assurance (QA) program identifies items and activities to which it applies, are documented by written policies, procedures, or instructions, and meets the requirements of Appendix B to 10 CFR Part 50. In addition, the NRC inspection team reviewed the training policies and procedures for indoctrination and training of personnel performing activities affecting quality and selected a sample of the training records from Bentley personnel to verify that that these personnel have completed the requisite training.

Additionally, the NRC inspection team discussed Bentley's QA program and organizational structure with Bentley's management and technical staff. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

b. Observations and Findings

The NRC inspection team reviewed a select sample of POs from Bentley's customers for the procurement of Bentley's safety-related software. The NRC inspection team observed that the requirements from these POs were not met by Bentley in the implementation of its QA program. Specifically, PO 002014, dated May 8, 2024, and PO 6137042, dated June 26, 2024, required Bentley to meet Appendix B to 10 CFR Part 50 for the procurement of Bentley's software products and services. However, Bentley did not establish an adequate QA program that met the applicable provisions of Appendix B to 10 CFR Part 50 for the supplied Bentley software products and services. Specifically, Bentley's Quality Assurance Policy Manual, Revision 11 and its referenced procedures did not document adequate policies, procedures, and instructions of a QA program which complies with the appropriate provisions of Appendix B. In addition, Bentley did not ensure that activities affecting quality are carried out in accordance with documented policies and procedures. For example:

- Bentley's Procedure, QAP 2.0, "Software Lifecycle and Documentation," Revision 13, dated September 25, 2020, did not incorporate the development environment and processes used in the Azure DevOps (ADO) into QAP 2.0 or its referenced procedures. Further, no procedures or instructions have been developed to govern the workflow, test, and software anomalies tracking activities in ADO.
- Bentley's Procedure, QAP 5.4, "Software Defect Tracking," Revision 13, dated September 25, 2020, classifies an error as critical if analytical software module produces unconservative results. This procedure classifies an error as high severity when the error prevents the use of primary section(s) or feature(s) of the software and for which no feasible avoidance exists. Bentley's error report No. 1427565, "Self Weight Distribution for Quadrilateral Plates," dated May 2, 2024, and error report No. 1221514, "Wind load panel formation affected by support nodes," dated June 16,

2023, did not provide an adequate technical basis for these errors being classified as high instead of critical.

- Bentley's Procedure QAP 6.4, "Software Tools," Revision 13, dated September 25, 2020, did not include requirements for the evaluation, review, testing and acceptance, and configuration control of an accepted tool. As a result, the software tool evaluation report performed for the ADO tool did not document the reviews and testing performed for the acceptance of this tool.
- Bentley's QA Policy Manual, Revision 11, Section 16, "Corrective Action," and Procedure QAP 9.1, "Corrective Action Report," Revision 13, dated March 25, 2020, did not specify whether software errors are considered conditions adverse to quality or significant conditions adverse to quality. As such, software errors within released Bentley products are not consistently screened to determine whether these errors should be entered into Bentley's corrective action program.

CAR 23-002 was generated for not auditing all the elements of the QA program. The QA manager created this CAR, performed the corrective actions, verified the corrective actions, evaluated the effectiveness of corrective actions, and closed the CAR on November 15, 2023. This CAR stated that the corrective action to correct the issue includes conducting an audit of all elements of the QA program. However, the CAR stated that the audit was rescheduled for May 2024 and completed on June 18, 2024, which contradicts the closure of the CAR on November 15, 2023.

- Bentley QA Policy Manual, Revision 11, Section 18, "Audits" states, "A system of planned and periodic audits has been established in order to verify that established QA procedures are being applied to all activities affecting quality." Section 2.5 of the QA Policy Manual states that the scope, adequacy, implementation, and effectiveness of the QA Program are assessed at least once every year. Bentley did not conduct audits of all aspects of its QA program in 2021, 2022, and 2023. A QA program audit completed in 2024, A-24-01, was performed. However, all aspects Bentley's QA program were not audited as required by the Bentley QA Policy Manual.

This issue has been identified as Nonconformance 99902127/2024-201-02.

c. Conclusion

The NRC inspection team issued Nonconformance 99902127/2024-201-02 in association with Bentley's failure to implement the regulatory requirements in Criterion II of Appendix B to 10 CFR Part 50. Nonconformance 99902127/2024-201-02 cites Bentley for failing to establish an adequate QA program in compliance with Appendix B to 10 CFR Part 50, as required by purchasers of Bentley's software products and services.

3. Design Control and Test Control

a. Inspection Scope

The NRC inspection team reviewed Bentley's policies and implementing procedures that govern the implementation of its design control and test control programs to verify compliance with the regulatory requirements of Criterion III, "Design Control," and Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50.

The NRC inspection team reviewed a select sample of software design, development, testing, and release documents. The NRC inspection team performed a live trace of one feature within the AutoPIPE software product from the design, development, and verification and validation activities. The NRC inspection team reviewed Bentley's processes and tools used for software development, review, testing, and configuration management of software releases provided to U.S. nuclear power plants..

In addition, the NRC inspection team discussed Bentley's program for design control and test control with Bentley's management and technical staff. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

b. Observations and Findings

b.1 Software Lifecycle

The NRC inspection team reviewed Bentley's procedure QAP 2.0, "Software Lifecycle and Documentation," Revision 13, and observed that this procedure did not adequately incorporate the software development environment, ADO, and processes used in ADO into QAP 2.0 and its referenced procedures. The NRC inspection team observed that no procedures or instructions have been developed to govern the workflow, test, and software error tracking activities in ADO. Examples include:

- Use of branching for parallel software development and testing of software features in ADO on a software release was not documented in QAP 2.0.
- QAP 5.1, "Software Version Control," Revision 13, required that configuration management tools support unlimited branching and provide safe merging for unimpeded parallel development. However, this procedure did not specify the branching strategy used by Bentley to avoid contradictions during parallel code development. This procedure also did not identify the configuration items that must undergo configuration control.

Bentley created CAP 2024-016, dated August 16, 2024, to address this issue.

b.2 Software Tools

The NRC inspection team reviewed Bentley's Procedure QAP 6.3, "Software Tools," Revision 13, and observed that this procedure did not include requirements for the evaluation, review, testing and acceptance, and configuration control of an accepted tool. In addition, QAP 6.3 did not address changes to a software tool and its impact on the software product to determine the level of reviews and retesting that will be required. As a result, the NRC inspection team observed that the software tool evaluation report performed for the Azure DevOps tool did not document the reviews and testing performed for the acceptance of this tool. This evaluation report also did not document whether changes to the Azure DevOps tool would require re-reviews and retesting.

Bentley created CAP 2024-017, dated August 16, 2024, to address this issue.

These issues provide details to support examples 1 and 2 of Nonconformance 99902127/2024-201-02.

c. Conclusion

The NRC inspection team concluded that Bentley is implementing its test control program in accordance with the requirements of Criterion XI of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team determined that WEC is implementing its policies and procedures associated with its test control program.

As stated in Section 2 of this inspection report, the NRC staff issued Nonconformance 99902127/2024-201-02 in association with Bentley's failure to adequately implement the regulatory requirements in Criterion II of Appendix B to 10 CFR Part 50. The issues cited in Section 3.b above related to design control provide details that support the examples cited in Nonconformance 99902127/2024-201-02.

4. Nonconforming Materials, Parts, or Components and Corrective Action

a. Inspection Scope

The NRC inspection team reviewed Bentley's policies and implementing procedures that govern the implementation of its control of nonconforming parts, materials, or components and corrective action programs to verify compliance with the requirements of Criterion XV, "Nonconforming Materials, Parts, or Components," and Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50, respectively.

The NRC inspection team also reviewed a sample of corrective action reports (CARs) to verify: (1) adequate documentation and description of conditions adverse to quality; (2) an appropriate analysis of the cause of these conditions and the corrective actions taken to prevent recurrence; (3) direction for review and approval by the responsible authority; (4) a description of the current status of the correction actions; and (5) the actions taken to verify timely and effective implementation of the corrective actions. In addition, the NRC inspection team confirmed that the corrective action process provides a link to the 10 CFR Part 21 program.

Additionally, the NRC inspection team discussed the nonconformance and corrective action program with Bentley's management and technical staff. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

b. Observations and Findings

b.1 Software Defect Tracking (Nonconforming Conditions)

The NRC inspection team reviewed QAP 5.4, "Software Defect Tracking," Revision 13, which stated that an error is classified as critical if analytical software module produces unconservative results. This procedure classified an error as high when the error prevents the use of primary section(s) or feature(s) of the software and for which no feasible avoidance exists. The NRC inspection team reviewed a sample of Bentley high error reports and observed that two reports were classified as "high" severity without sufficient technical

basis for the classification. Specifically, Bentley's high error report:

- No. 1427565, "Self Weight Distribution for Quadrilateral Plates" dated May 2, 2024, stated that this software error could give both conservative and unconservative results. This contradicts the classification criteria provided in QAP 5.4 for a "high" severity error.
- No. 1221514, "Wind load panel formation affected by support nodes", dated June 16, 2023, described that this error could underestimate the wind load on the structural model. Bentley stated that it is assumed that the user would be able to identify that the software produced incorrect wind loads on the structural model. The NRC staff observed that this assumption did not have any documented technical basis.

The NRC inspection team also observed that terminologies used in severity levels of errors are inconsistent between the QA Policy Manual, Revision 11 and QAP 5.4. Further, the NRC inspection team observed that Section 15 of the QA Policy Manual, Revision 11 required that "applications software designed and maintained by Bentley are subjected to a control process for the identification, evaluation, and ultimate disposition of nonconforming items." However, Bentley's Quality Procedures Manual, Revision 13, did not specify how nonconforming items are to be controlled.

This issue is documented as example 3 of Nonconformance 99902127/2024-201-02.

b.2 Corrective Actions Program

The NRC inspection team reviewed Bentley's QA Policy Manual, Revision 11, Section 16, "Corrective Action," which stated, in part, that "The corrective action process is applied to identify deficiencies in the QA Program, Quality Procedures, and their implementation on safety-related activities. The applications software designed and maintained by Bentley is also subjected to a control process which promptly identifies, tracks, and resolves software errors. These measures require that corrective actions are documented and implemented in a timely manner." Section 16.2 of Bentley's QA Policy Manual stated that "where conditions adverse to quality involve corrective action for items that are not directly related to the applications software, the process defined by the implementing procedures shall apply. Conditions adverse to quality shall be identified promptly and corrected as soon as practical." Section 16.3 of Bentley's QA Policy Manual discussed the corrective action process that applies to significant conditions adverse to quality. The NRC inspection team observed that neither Bentley's QA Policy Manual or its implementing procedures (e.g., QAP 5.4, "Software Defect Tracking," Revision 13, QAP 9.1, "Corrective Action Report," Revision 13) specified whether software errors are considered conditions adverse to quality or significant conditions adverse to quality. As such, software errors within released Bentley products are not consistently screened to determine whether these errors should be entered into Bentley's corrective action program.

The NRC inspection team reviewed CAR 23-002, which was generated for not auditing all the elements of the QA program and observed that the CAR was created, the actions were taken, and corrective action verified, and the effectiveness of corrective action, closure of the corrective action were all completed and signed by the QA manager on November 15, 2023. This CAR stated that the corrective action to correct the issue includes conducting an audit of all elements of the QA program. However, the CAR stated that the audit was rescheduled for May 2024 and completed on June 18, 2024, which contradicts the closure of the CAR on November 15, 2023.

Bentley created CAR 2024-015, dated August 16, 2024, to address this issue.

These issues are documented as example 4 of Nonconformance 99902127/2024-201-02.

c. Conclusion

As stated in Section 2 of this inspection report, the NRC staff issued Nonconformance 99902127/2024-201-02 in association with Bentley's failure to adequately implement the regulatory requirements in Criterion II of Appendix B to 10 CFR Part 50. The issues cited in Section 4.b above related to control of nonconforming materials, parts, or services and corrective actions program provide details that support the examples cited in Nonconformance 99902127/2024-201-02.

5. Internal Audits

a. Inspection Scope

The NRC inspection team reviewed Bentley's policies and implementing procedures that govern its internal audit program to verify compliance with the requirements of Criterion XVIII, "Audits" of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed Bentley's internal audit plans, internal audit reports, and corrective actions generated during internal audits. The NRC inspection team verified that the audit documents reviewed were adequately completed and that Bentley adequately corrected the conditions identified in CARs generated during internal audits. Additionally, the NRC inspection team verified that Bentley's procedures described the scope and purpose of audits to be performed, the audit frequency, the auditing criteria, and the creation of corrective actions when required. The NRC inspection team verified that the audit teams were performed using qualified auditors, and that the auditors did not audit their own work. The NRC inspection team reviewed the qualification records of the lead auditors who performed the audits and verified that qualification activities met Bentley's requirements for lead auditors. The NRC inspection team verified that internal audits were performed using checklists.

The NRC inspection team discussed the internal audits program with Bentley's management and technical staff. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

b. Observations and Findings

The NRC inspection team reviewed Bentley QA Policy Manual, Section 18, "Audits" which stated, "A system of planned and periodic audits has been established in order to verify that established QA procedures are being applied to all activities affecting quality. A similar system of management assessment or audit has also been established for determining the effectiveness of the QA program implementation." Section 2.5 of this QA Policy Manual stated that the scope, adequacy, implementation, and effectiveness of the QA Program are assessed at least once every year. CAR 19-006, dated September 12, 2019, stated, in part, that "Internal audit program is being identified as ineffective." Following the closure of this CAR, Bentley did not perform a comprehensive internal audit of its QA Program for 2021, 2022, and 2023. CAR 23-002, dated November 1, 2023, also identified that, "All the elements of the QA Program had not been audited during 2022 and 2023." Bentley performed an internal audit of its QA program in April of 2024, as documented in Audit Report A-24-01, "Audit Plan and Audit Report, Date of Audit: April 23 – April 25, 2024,"

dated June 18, 2024. However, the NRC inspection team observed that this audit did not verify compliance with all aspects of the Bentley QA program as required by the Bentley QA Policy Manual. Specifically, Bentley did not audit implementations of procedures QAP 1.3, "Personnel Qualification," Revision 13, QAP 3.4, "Software Readiness Review," Revision 13, and QAP 3.7, "Independent Verification," Revision 13.

These issues are documented as example 5 of Nonconformance 99902127/2024-201-02.

Bentley created CAR 2024-014, dated August 16, 2024, to address this issue.

c. Conclusion

As stated in Section 2 of this inspection report, the NRC staff issued Nonconformance 99902127/2024-201-02 in association with Bentley's failure to adequately implement the regulatory requirements in Criterion II of Appendix B to 10 CFR Part 50. The issues cited in Section 5.b above related to internal audits program provide details that support the examples cited in Nonconformance 99902127/2024-201-02.

6. Entrance and Exit Meetings

On August 12, 2024, the NRC inspection team presented the inspection scope during an entrance meeting with Mr. Josh Taylor, Vice President of Structural Engineering, and Mr. Bruce Bader, Quality Assurance Manager, and other members of Bentley's management and technical staff. On August 16, 2024, the NRC inspection team presented the inspection results to Mr. Josh Taylor and Mr. Bruce Bader and other members of Bentley management and technical staff. The attachment to this report lists the attendees of the entrance and exit meetings, as well as those individuals whom the NRC inspection team interviewed.

ATTACHMENT

1. ENTRANCE/EXIT MEETING ATTENDEES

Name	Position	Affiliation	Entrance	Exit	Interviewed
Josh Taylor	Vice President Structural Engineering	Bentley	X	X	X
Bruce Bader	Quality Assurance Manager	Bentley	X	X	X
Joanie Mayberry	QA&R Subscription Admin	Bentley	X	X	X
Phil Senior	Product Manager, AutoPIPE	Bentley	X	X	X
Waqar Ahmed	Director, Development	Bentley	X	X	X
Sudip Chakraborty	Director, Product Management	Bentley	X	X	X
Debajit Das	Test Manager, STAAD Products	Bentley	X*	X*	X*
Yaser Sohaib	Test Manager, AutoPIPE	Bentley	X*	X*	X*
Bilah Shah	Development Manager, AutoPIPE	Bentley	X*	X*	X*
Carlos Aguera	Product Manager, STAAD.Pro	Bentley	X*	X*	X*
Dhiman Banerjee	Development Manager, STAAD.Pro	Bentley	X*	X*	X*
Deanna Zhang	Inspector	NRC	X	X	

Aaron Armstrong	Inspector	NRC	X	X	
Dong Park	Inspector	NRC	X	X	
John Bozga	Technical Specialist	NRC	X*	X*	
Kerri Kavanagh	Branch Chief	NRC	X*		
Aixa Belan	Acting Branch Chief	NRC	X*	X*	

* - Attended virtually

2. INSPECTION PROCEDURES USED:

- Inspection Procedure (IP) 43002, "Routine Inspections of Nuclear Vendors," dated February 10, 2023
- IP 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting of Defects and Noncompliance," dated February 10, 2023

3. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Item Number	Status	Type	Description
99902127/2024-201-01	Opened	Notice of Violation (NOV)	10 CFR 21.21, paragraphs (a)
99902127/2024-201-02	Opened	Notice of Nonconformance (NON)	Criterion II of Appendix B to 10 CFR 50

4. DOCUMENTS REVIEWED

Quality Assurance and Work Procedures

- Quality Assurance Policy Manual, Revision 11, dated March 29, 2024
- Quality Assurance Procedures Manual, Revision 13, dated September 25, 2020
- QAP 1.1, "Quality Program Documents," Revision 13, dated September 25, 2020
- QAP 1.2, "Indoctrination and Training," Revision 13, dated September 25, 2020
- QAP 1.3, "Personnel Qualification," Revision 13, dated September 25, 2020
- QAP 2.0, "Software Life Cycle and Documentation," Revision 13, dated September 25, 2020
- QAP 3.1, "Software Quality Plan and Planning Review," Revision 13, dated September 25, 2020
- QAP 3.2, "Software Design Specification and Design Review," Revision 13, dated September 25, 2020
- QAP 3.3, "Software Design Implementation," Revision 13, dated September 25, 2020
- QAP 3.4, "Software Readiness Review, Revision 13," dated September 25, 2020
- QAP 3.5, "Software Coding Standards, Revision 13," dated September 25, 2020
- QAP 3.6, "Benchmark Calculations," Revision 13," dated September 25, 2020
- QAP 3.7, "Independent Verification," Revision 13, dated September 25, 2020
- QAP 4.1, "Software Verification and Validation Plan," Revision 13, dated September 25, 2020
- QAP 4.2, "Software Verification and Validation Report," Revision 13, dated September 25, 2020
- QAP 4.3, "Beta Test and Beta Test Review," Revision 13, dated September 25, 2020
- QAP 5.1, "Software Version Control," Revision 13, dated September 25, 2020

- QAP 5.2, "Software Release Review," Revision 13, dated September 25, 2020
- QAP 5.4, "Software Defect Tracking," Revision 13, dated September 25, 2020
- QAP 6.2, "Procurement Control," Revision 13, dated September 25, 2020
- QAP 6.3, "Software Tools," Revision 13, dated September 25, 2020
- QAP 9.1, "Corrective Action Report," Revision 13, dated September 25, 2020
- QAP 9.2, "Audits and Surveillance," Revision 13, dated September 25, 2020
- QAP 9.3, "Management Assessment," Revision 13, dated September 25, 2020
- QAP 9.5, "10 CFR Part 21 Notification," Revision 13, dated September 25, 2020
- QAP 10.0, "Quality Records and Access Control," Revision 13, dated September 25, 2020

Purchase Orders (PO) and Contracts

- PO 002014, dated May 8, 2024
- PO 6137042, dated June 26, 2024
- Contract No. 10198163, dated June 1, 2012
- PO 168602 dated May 8, 2024
- PO 0046623 dated March 28, 2024

Certificate of Compliance (CoC) and Select Program Agreement (CLA)

- CLA 10801315
- CoC AutoPIPE No: 23.00.01 for PO 10669735-001, dated February 9, 2024
- Amendment 01 to SUB Bentley Enterprise 365 Order Form Issued To: Bentley Systems LLC Agreement Number: CW78377, May 23, 2023

Software Design and Development Documents

- Software Quality Plan for AutoPIPE 2023, Revision 1, dated November 24, 2023
- Software Design Specification for Feature No. 106900 in AutoPIPE Version 23.00.01, Revision 0, dated August 14, 2023
- Software Design Specification for Feature No. 167908 in AutoPIPE Version 23.00.01, Revision 0, dated August 14, 2023
- Software Quality Plan for STAAD.Pro 2023, dated December 13, 2023
- Software Design Specification for Feature 1277828, "Refactor slenderness for single angle member for AISC 360 code in STAAD. Pro Software Version 23.00.02.XX, Revision 0, dated October 18, 2023

Test Plan, Test Report, and Verification and Validation Plans and Reports

- Software Verification and Validation Plan for AutoPIPE 2023, Software Version 23.00.01,

Revision 1, dated December 7, 2023

- Software Verification and Validation Report for AutoPIPE 2023, Software Version 23.00.01, dated December 13, 2023
- Test Plan for AutoPIPE 2023 Feature No. 1067900, “Add ASME NCD 2021 Edition,”
- Test Report for AutoPIPE 2023 Feature No. 1067900, “Add ASME NCD 2021 Edition,”
- Test Plan for AutoPIPE 2023 Feature No. 1067908, “ASME B31.1.2022”
- Test Report for AutoPIPE 2023 Feature No.1067908, “ASME B31.1.2022”
- Software Verification and Validation Plan for STAAD.Pro 2023, Revision 1, dated December 14, 2023
- Software Verification and Validation Report for STAAD.Pro 2023, Software Version 23.00.03.25, dated February 5, 2024

Software Readiness Review and Release Reports

- Software Readiness Review for AutoPIPE 2023, dated January 9, 2024
- Software Release Report for AutoPIPE 2023, dated February 8, 2024
- Software Readiness Review for STAAD.Pro 2023, dated February 5, 2024
- Software Release Form for STAAD.Pro 2023, dated February 23, 2024

Software Tools Evaluation Report

- Software Tools Evaluation Report for MathCAD Version 14.0, dated September 6, 2011
- Software Tools Evaluation Report for Azure DevOps, Azure DevOps Services, dated June 21, 2021

Corrective Action Reports (CARs) Reviewed During the NRC Inspection

- CAR 19-006, dated September 12, 2019
- CAR 23-002, dated November 1, 2023
- CAR 22-005, dated September 10, 2022
- CAR 22-006, dated September 10, 2022
- CAR 22-007, dated September 10, 2022
- CAR 22-019, dated November 16, 2022
- CAR 22-020, dated November 16, 2022
- CAR 22-021, dated November 16, 2022
- CAR 22-022, dated November 16, 2022
- CAR-24-008, dated June 15, 2024

- CAR-24-007, dated June 15, 2024
- CAR-24-006, dated June 15, 2024
- CAR-24-004, dated June 15, 2024
- CAR-24-001, dated April 22, 2024
- CAR-23-001, dated September 7, 2023
- CAR-23-003, dated November 27, 2023

Corrective Action Reports (CARs) Opened During the NRC Inspection

- CAR 2024-013, dated August 16, 2024
- CAR 2024-014, dated August 16, 2024
- CAR 2024-015, dated August 16, 2024
- CAR 2024-016, dated August 16, 2024
- CAR 2024-017, dated August 16, 2024

Critical Error Reports

- AutoPIPE Report No. 1053328, ASME B31J: Program does not consider thermal expansion for the rigid lengths of branch elements, December 23, 2022
- AutoPIPE Report No. 1081769, Minimum sustained margin may be calculated incorrectly from sustained combinations, October 20, 2023
- AutoPIPE Report No. 1093311, Rigid Length of a beam is not correctly used for its stiffness calculations, Mar 28, 2023
- AutoPIPE Report No. 1094104, ASME material libraries: Density values for certain standard pipe materials may be inaccurate, October 20, 2023
- AutoPIPE Report No. 1265695, Ultimate Force Gap inputs for an Incline Support may incorrectly get linked to existing Incline Supports in the model, October 23, 2023
- AutoPIPE Report No. 1304731, Forces and Moments for Dynamic and SAM load case(s) may be incorrectly used for tee stress calculations, December 11, 2023
- AutoPIPE Report No. 1346363, ASME Flange Analysis: Incorrect bolt effective diameters for Fine and 8-Thread bolts may lead to unconservative bolt tensile stress values, May 14, 2024
- AutoPIPE Report No. 1369621, Tee axial stress calculations may incorrectly use tee local axial force instead of pipe local axial force, May 14, 2024
- AutoPIPE Report No. 1376192, Misconfigured ASME B31J tees may use incorrect SIF and flexibility values for stress results, May 14, 2024
- AutoPIPE Report No. 1382809, Converting a Close Miter bend to a Wide Miter bend through Input Grid may result in incorrect SIF and Flexibility Factor, April 11, 2024
- AutoPIPE Report No. 748539, Copy/Paste: Pasting piping points with soil applied modifies existing model data, April 7, 2022
- AutoPIPE Report No. 812329, Some flanges are not being reported in the Flange Analysis Summary report, May 2, 2022

- AutoPIPE Report No. 817745, ASME B31 codes: Bends are using SIF < 1 when “Pressure Correction for user SIF” and “Override all other In-plane and Out-plane SIFs at this point” checkboxes are enabled for user SIF, April 8, 2022
- AutoPIPE Report No. 817745, ASME B31 codes: Bends are using SIF < 1 when “Pressure Correction for user SIF” and “Override all other In-plane and Out-plane SIFs at this point” checkboxes are enabled for user SIF, April 8, 2022
- AutoPIPE Report No. 956742, Code Compliance may not display the positive face of a node although the results for the positive face may be higher, August 31, 2022
- AutoPIPE Report No. 96511, Adding mass points per span changes B31J static analysis results, September 1, 2022
- AutoPIPE Report No. 974207, Sustain Margin hot allowable is not limited to 20ksi for ASME B31.3 2012 and later, and ASME B31.12IP 2019, January 23, 2023
- AutoPIPE Report No. 981578, Ultimate force gap: Program may not breakaway the support when force on support exceeds breakaway limit, January 26, 2023
- STAAD.Pro No. 1350894, AISC 360 05/10/16: Incorrect slenderness for single angles, April 2024
- STAAD.Pro No. 907508, Failure to include additional eccentricity moment for single angle profiles under compression as per AISC 360-16 clause E5, November 2022

High Severity Error Reports

- STAAD.Pro No. 1176400, AISC 360-05/10 Slenderness of Single Angle, April 15, 2023
- STAAD.Pro No. 1199138, AISC 360-16: Incorrect H2-1 at the Heel of an Equal Angle, May 11, 2023
- STAAD.Pro No. 1221514, Wind load panel formation affected by support nodes, June 16, 2023
- STAAD.Pro No. 1419270 AISC 341-16: Web Stiffener parameters, April 18, 2024
- STAAD.Pro No. 1392128, Design code parameter conflicting with other codes, March 7, 2024
- STAAD.Pro No. 1427565, Self weight distribution for quadrilateral plates, May 2, 2024
- STAAD.Pro No. 774908, AISC 360-16, Effect of eccentricity for single angle profiles, December 10, 2021
- STAAD.Pro No. 846868, Incorrect design shear area, March 16, 2022
- STAAD.Pro No. 969825, AISC 360—10/05: Combined flexure and tension, August 17, 2022

Training Records

- Lead Auditor Qualification Records for Sudip Chakraborty

Internal Audit Reports

- 2024 Audit Schedule
- 2023 Audit Schedule

- 2022 Audit Schedule
- A-24-01, Audit Plan and Audit Report, Date of Audit: April 23 – April 25, 2024, dated June 18, 2024
- A-23-01, Audit Plan and Audit Report, Date of Audit: September 22 – 29, 2023, dated October 10, 2023
- A-23-02, Audit Plan and Audit Report, Date of Audit: October 1 - November 30, 2023, dated November 30, 2023
- A-22-02, Audit Plan and Audit Report, Date of Audit: July 27 - September 6, 2022, dated September 27, 2022
- A-22-03, Audit Plan and Audit Report, Date of Audit: July 20 - September 6, 2022, dated November 22, 2022
- A-22-04, Audit Plan and Audit Report, Date of Audit: August 2 – August 18, 2022, dated September 22, 2022
- A-21-01, Audit Plan and Audit Report, Date of Audit: September 1 – September 10, 2021, dated November 5, 2021
- A-21-02, Audit Plan and Audit Report, Date of Audit: October 12 – October 15, 2021, dated November 2, 2021
- A-20-01, Audit Plan and Audit Report, Date of Audit: January 5 – July 1, 2020, dated September 11, 2020
- A-20-02, Audit Plan and Audit Report, Date of Audit: January 5 – July 1, 2020, dated September 10, 2020