

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ZETEC, INC.

Petitioner

v.

WESTINGHOUSE ELECTRIC CO.

Patent Owner

Case IPR2015-00280

Patent 6,823,269

AMENDED PETITION FOR *INTER PARTES* REVIEW UNDER 37 C.F.R. § 42.100

Pursuant to Paper No. 3, mailed December 9, 2014, Petitioner Zetec, Inc. submits this Amended Petition in which arguments have been removed from the claim charts. No substantive changes have been made to the original Petition.

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EXHIBIT LIST

Exhibit	Description
1101	U.S. Patent No. 6,823,269 (“Junker”)
1102	Amended Complaint (<i>Westinghouse Electric Company, LLC v. Zetec, Inc.</i> (Civil Action No. 2:13-cv-01124-NBF W.D. Pennsylvania))
1103	Declaration of Sean P. Sullivan
1104	Declaration of Greg Colvin
1105	Sullivan, S.P. “Guidelines for Qualifying Eddy Current Technology for CANDU Steam Tube Inspection”, CANDU Owners Group (COG) R&D Program: Technical Committee No. 19, WPIR 1987, COG-98-371-I, March 1999
1106	U.S. Patent No. 4,194,149 (“Holt”)
1107	U.S. Patent No. 6,566,871 (“Hölzl”)
1108	U.S. Patent No. 4,763,274 (“Junker ‘274”)
1109	EP 0 990 897 (“Winslow”)
1110	Merriam Webster dictionary definition of noise
1111	Merriam Webster dictionary definition of combine
1112	U.S. Patent No. 6,823,269 (“Junker”) Prosecution File History
1113	Nov. 20, 2014 Minute Entry of <i>Markman</i> Hearing in W.D.Pa. Case 2:13-cv-01124

On behalf of Zetec, Inc. (“Zetec”) and in accordance with 35 U.S.C. §311 and 37 C.F.R. §41.100, *inter partes* review is respectfully requested for claims 1-10 of U.S. Patent No. 6,823,269 (“the ‘269 Patent”) (Ex. 1101).

I. MANDATORY NOTICES UNDER 37 C.F.R. §42.8(a)(1)

As set forth below and pursuant to 37 C.F.R. §42.8(a)(1), the following mandatory notices are provided as part of this Petition.

A. Real Party-In-Interest Under 37 C.F.R. §42.8(b)(1)

Zetec, Inc. is the real party-in-interest for Petitioner.

B. Related Matters Under 37 C.F.R. §42.8(b)(2)

The ‘269 Patent is presently the subject of a patent infringement lawsuit brought by the Assignee of the ‘269 Patent, Westinghouse LLC, against Zetec, Inc., captioned *Westinghouse LLC v. Zetec, Inc.*, United States District Court for the Western District of Pennsylvania, Case No.: 2:13-cv-01124 (Ex. 1102). Zetec brought a previous petition for *Inter Partes* Review on January 6, 2014 (IPR2014-00384), for which the Patent Trial and Appeal Board denied Institution on July 23, 2014. Petitioner is not aware of any judicial proceedings that may affect, or be affected by a decision in this proceeding.

C. Lead and Back-Up Counsel Under 37 C.F.R. §42.8(b)(3)

Pursuant to 37 C.F.R. §§42.8(b)(3) and 42.10(a), Petitioner provides the following designation of counsel.

Lead Counsel	Back-Up Counsel
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Pursuant to 37 C.F.R. §42.10(b), a Power of Attorney accompanies this Petition.

D. Service Information Under 37 C.F.R. §42.8(b)(4)

Service information for lead and back-up counsel is provided in the designation of lead and back-up counsel, above. Service of any documents via hand-delivery may be made at the postal mailing address of the respective lead or back-up counsel designated above.

II. PAYMENT OF FEES UNDER 37 C.F.R. §42.103

The undersigned authorize the Office to charge \$23,000.00 to Deposit Account No. 03-0075 for the fees set forth in 37 C.F.R. §42.15(a) for this Petition for *Inter Partes* Review of ten claims. The undersigned further authorizes payment via the above-referenced Deposit Account for any additional fees due in connection with this Petition.

III. REQUIREMENTS FOR *INTER PARTES* REVIEW UNDER 37 C.F.R. §42.104

As set forth below and pursuant to 37 C.F.R. §41.104, each requirement for *inter partes* review of the ‘269 Patent is satisfied.

A. Grounds for Standing Under 37 C.F.R. §42.104(a)

Petitioner hereby certifies that the ‘269 Patent is available for *inter partes* review and that the Petitioner is not barred or estopped from requesting *inter partes* review challenging the claims of the ‘269 Patent on the grounds identified herein. More particularly, Petitioner certifies that (1) Petitioner is not the owner of the ‘269 Patent; (2) Petitioner has not filed a civil action challenging the validity of a claim of the ‘269 Patent; (3) this Petition is filed less than one year after the date on which Petitioner, the Petitioner’s real party-in-interest, or a privy of the Petitioner was served with a complaint alleging infringement of the ‘269 Patent; (4) the estoppel

provisions of 35 U.S.C. §315(e) (1) do not prohibit this *inter partes* review; and (5) this Petition is filed after the later of (a) the date that is nine months after the date of the grant of the ‘269 Patent or (b) the date of termination of any post-grant review of the ‘269 Patent.

B. Identification of Challenge Under 37 C.F.R. §42.104(b) and Relief Requested

Petitioner requests that claims 1-10 of the ‘269 Patent be found invalid.

1. Claims for Which *Inter Partes* Review is Requested Under 37 C.F.R. §42.104(b)(1)

Petitioner requests *inter partes* review of claims 1-10 of U.S. Patent No. 6,823,269.

2. The Specific Art and Statutory Ground(s) on Which the Challenge is Based Under 37 C.F.R. §42.104(b)(2)

Inter partes review of the ‘269 Patent is requested in view of the following references:

(1) Guidelines for Qualifying Eddy Current Technology for CANDU Steam Tube Inspection (“Sullivan”) (Ex. 1105); (2) U.S. Patent no. 4,194,149. Method for Generating the Eddy Current Signature of a Flaw in a Tube Proximate a Contiguous Member Which Obscures the Flaw Signal. (“Holt”) (Ex. 1106); (3) U.S. Patent no. 6,566,871. Process and Device for Testing A Workpiece by Means of Eddy Currents. (“Hölzl”) (Ex. 1107); (4) U.S. Patent No. 4,763,274. Machine Implemented Analysis of Eddy Current Data. (“Junker ‘274”) (Ex 1108); (13) EP 0 990 897 A2. Method and System for Determining Pipeline Defects. (“Winslow”) (Ex. 1109).

Each of the patents and non-patent publications listed above is prior art to the ‘269 Patent under 35 U.S.C. §§ 102(a), (b), and/or (e), as established in Section V(A), below.

Claim	Proposed Statutory Rejections Based on Sullivan
1	Anticipated under 35 USC 102(b) by Sullivan
2	Obvious under 35 USC 103(a) over Sullivan
3	Obvious under 35 USC 103(a) over Sullivan and in view of Junker ‘274

Claim	Proposed Statutory Rejections Based on Sullivan
4	Obvious under 35 USC 103(a) over Sullivan in view of Winslow
5	Obvious under 35 USC 103(a) over Sullivan and in view of Junker '274
6	Obvious under 35 USC 103(a) over Sullivan in view of Junker '274
7	Obvious under 35 USC 103(a) over Sullivan in view of Junker '274
8	Obvious under 35 USC 103(a) over Sullivan in view of Holt
9	Anticipated under 35 USC 102(b) by Sullivan.
10	Obvious under 35 USC 103(a) over Sullivan

Claim	Proposed Statutory Rejections Based on Holt in view of Junker '274
1	Obvious under 35 USC 103(a) over Holt in view of Junker '274
2	Obvious under 35 USC 103(a) over Holt in view of Junker '274
3	Obvious under 35 USC 103(a) over Holt in view of Junker '274
4	Obvious under 35 USC 103(a) over Holt in view of Junker '274
5	Obvious under 35 USC 103(a) over Holt in view of Junker '274
6	Obvious under 35 USC 103(a) over Holt in view of Junker '274
7	Obvious under 35 USC 103(a) over Holt in view of Junker '274
8	Obvious under 35 USC 103(a) over Holt in view of Junker '274
9	Obvious under 35 USC 103(a) over Holt in view of Junker '274
10	Obvious under 35 USC 103(a) over Holt in view of Junker '274 and Winslow

3. How the Challenged Claim(s) are to be Construed Under 37 C.F.R. §42.104(b)(3)

A claim subject to *inter partes* review receives the “broadest reasonable construction in light of the specification of the patent in which it appears.” 42C.F.R. § 42.100(b). Petitioner submits, for the purposes of the IPR only, that the claim terms are presumed to take on their

ordinary and customary meaning that the term would have to one of ordinary skill in the art in view of the Specification of the '269 Patent. The following term constructions are those in the accompanying chart that are not agreed to by the patentee. Note that on November 20, 2014 the court in the pending litigation with the patentee (W.D. Pa. case 2:13-cv-01124) entered a minute entry (Ex. 1113) resolving the terms “noise” and “combining.” Zetec was unable to contact witness Greg Colvin in time for him to consider these definitions prior to this filing, but neither definition is at odds with the definitions he relied on in his opinion dated Nov. 19, 2014.

Field Site

Proposed construction: “a location remote from a laboratory site.” To overcome a rejection of the claims the patentee argued in a response dated Nov. 19, 2003 that the reference cited by the examiner, (Junker, '274, Ex. 1108) “does not teach generating two distinct sets of data at two remote locations” (p. 7 of response, last paragraph). Thus, since Claim 1 states that one set of data is collected “at a laboratory site” it follows that the “field site” must be “remote from” the laboratory site. Note also that the specification of the '269 patent (Ex. 1101) states “the data obtained from the specimen will also be referred to laboratory data, because it can be obtained at a site remote from the field” (2:58-61).

Laboratory site

Proposed construction: “a location remote from the field site.” As stated above for “field site,” the patentee argued during prosecution that the field site and the laboratory sites were remote from each other. This construction is consistent with the '269 Patent specification, which states: “the data obtained from the specimen will also be referred to as laboratory data, because it can be obtained at a site remote from the field.” (Ex. 1101, 2:58-61). The proposed

construction is also consistent with the prosecution history in which the patentee argued in a November 19, 2003 amendment that Junker '274 (Ex. 1108) “does not teach generating two distinct sets of data at remote locations” (Ex. 1112, p. 16).

Claim term	Construction	Basis for Construction
field site (claim 1)	a location remote from a laboratory site	'269 patent: 2:11-30, file history of '269 patent (Ex. 1112, p. 16).
laboratory site (claim 1)	a location remote from the field site	'269 patent: 2:58-61, file history of '269 patent (Ex. 1112, p. 16).
noise (claim 1)	an unwanted signal including but not limited to background and scatter	Agreed by patentee in W.D. Pa. case 2:13-cv-01124 per Minute Entry dated Nov. 20, 2014 (Ex. 1113)
combining (claim 1)	plain and ordinary meaning but not limited to “obscures the individual characteristics” or “united into a single number”	Agreed by patentee in W.D. Pa. case 2:13-cv-01124 per Minute entry dated Nov. 20, 2014 (Ex. 1113)
signal strength (claim 2)	signal amplitude	agreed by patentee in W.D.Pa. case
calibration standard (claim 3)	A specimen created in accordance with a standard code, such as the ASME code	agreed by patentee in W.D. Pa. case
orientation / signal orientation (claim 4)	phase or rotation / signal phase or rotation	agreed by patentee in W.D. Pa. case
mathematical model (claim 10)	a symbolic model whose properties are expressed in mathematical symbols and relationships	Agreed by patentee in W.D. Pa. case

4. How the Construed Claim(s) are Unpatentable Under 37 C.F.R. §42.104(b)(4)

An explanation of how construed claims 1-10 of the '269 Patent are unpatentable under the statutory grounds identified above, including the identification of where each element of the

claim is found in the prior art patents or printed publications, is provided in Section VI, below.

5. Supporting Evidence Under 37 C.F.R. §42.104(b)(5)

The exhibit numbers of the supporting evidence relied upon to support the challenge and the relevance of the evidence to the challenge raised, including identifying specific portions of the evidence that support the challenge are provided in Section VI, below.

IV. SUMMARY OF THE '269 PATENT

A. Description of the Alleged Invention of the '269 Patent

Petitioners herein provide background information and a summary of the '269 patent insofar as it is pertinent to the Claims 1- 10 challenged by this petition. This information is being provided in order to facilitate the Board's understanding of the '269 patent and should not be construed as claim interpretation.

In various industrial settings, components must be periodically checked for flaws. For example, in a nuclear reactor, steam generator tubes must often be examined for holes and cracks. Testing of tubes is accomplished by inserting eddy current probes into the tubes, inducing eddy currents in the tubes, and reading the eddy currents in tubes thus induced. (col. 1, lines 15-21) When eddy currents are induced in a tube with cracks or flaws, the eddy currents have noticeable characteristics. Specially trained data analysts review the induced eddy currents and determine that the tubes have flaws by identifying those characteristics (col. 1, lines. 49-58).

Data analysts need specialized training in order to be able to review eddy currents and determine, based on that review, if the tubes have flaws (col. 1, lines 54-58). In the '269 patent, data is generated which may be used for such training. To generate that data, two types of data are combined (col. 2, lines 9-16). The first type of data is created by reading eddy currents induced in a tube at a field site, such as a nuclear reactor (col, 2, lines 11- 16) . The first type of

data generated in this manner includes noise, i.e. unwanted signals that can obscure a flaw (col. 1, lines 29-53). Source of noise include field data that might be encountered in a field inspection, from a specific nuclear power generating facility (col. 3, lines 2-7). The second type of data is generated by: a) creating a specimen that simulates the tube at the field site but without any of the aforementioned noise, b) creating a flaw (e.g. a hole) in the specimen, and c) generating the second type of data at a laboratory site by inducing eddy currents in the specimen (col. 2, lines 6-11).

The first type of data generated from the component at the field site and the second type of data generated from the specimen at the laboratory site are then combined. (col. 2, lines 11-16) In this manner, “combined data” is generated. The “combined data” is useful for training purposes because it includes data from the specimen (with the added flaw) and data from the component at the field site (with the noise) and simulates a flaw as it would appear in a field site tube (col. 2, lines 2-6). One reason to do this is so that standard size flaws can be used to test inspection techniques and train technicians (col. 1, lines 6-10).

Against the above backdrop, claim 1 of the ‘269 patent is summarized:

a) A component (e.g. a tube) is examined (e.g. by inducing eddy currents) and data is collected at a field site as a result of the examination. The collected data includes noise.

b) A specimen that simulates the component is created. The specimen is created with a flaw (e.g. a hole).

c) Data is generated from the specimen (e.g. by inducing eddy currents) at a laboratory site remote from the field site.

d) The data collected at the field site and the data generated at the laboratory site are combined. The combined data includes: a) characteristics of the flaw in the specimen, and b)

characteristics of the data collected at the field site (e.g. noise).

Dependent claims 2, 3 and 4, include the above features and further relate to data calibration. Dependent claims 5- 9 include the above features and further relate to data collection. Dependent claim 10 includes the above features and further relates to the use of a mathematical model to simulate a flaw.

B. Summary of the Prosecution History of the ‘269 Patent

The ‘269 Patent was filed April 12, 2002, and issued November 23, 2004, with 18 claims, of which claims 1, 11, and 14 are independent. The ‘269 Patent as filed included claims 1-24, of which Claim 1 and 2 were independent. In a first office action dated October 6, 2003, Claims 1-6, 10-14, 18 and 21-24 were rejected. Claims 7-9, 15-17, 19 and 20 were objected to as being based on rejected claims but allowable if rewritten in independent form to include the limitations of the independent claim and any intervening limitations. Claim 1 was rejected as anticipated under 35 USC § 102(b) over US Patent no. 4,763,274 (“Junker ‘274”) (Ex. 1108). The applicants subsequently cancelled Claim 1. Claims 2-24 were rejected as obvious under 35 USC § 103 over Junker et al. in view of US Patent no. 5,623,204. In response, the applicants amended Claim 2 (now Claim 1) to include the limitation of the laboratory site being “remote from the field site” from original Claim 3 and that the “data collected at the field site includes noise” and argued for allowance of amended Claim 2 (now Claim 1) over the references.

The applicants argued for allowance of amended Claim 2 in that “Junker does not teach generating two distinct sets of data at two remote locations, one at the component being examined, and the second at a remote laboratory site from the specimen” (Amendment dated Nov. 19, 2003, p. 7).

The November 19, 2003 Amendment included two new independent Claims 25 and 26,

which represented previously dependent Claims 7 and 15, which had been indicated as allowable, and which were rewritten into independent form. As such, new Claim 25 (now Claim 11) included the limitations of original Claims 2, 5 and 7 and new Claim 26 (now Claim 14) included the limitations of original Claims 2, 5 and 15. The amendment to Claim 2 was the only amendment required to allow the independent Claims, as new Claims 25 and 26 were based on dependent claims that the examiner had indicated as allowable.

A Notice of Allowance dated January 2, 2004, was issued in response to the November 19, 2003. The Notice allowed Claims 2, 5-6, 8-14, 16, 20 and 24-26. The Examiner's reasons for allowance repeated the text of independent Claims 2, 25 and 26 and stated that the prior art of record did not teach the methods as stated in each of those claims. Original dependent Claims 5, 6, 10-14, 18 and 24 correspond to the claims now numbered 2-10 in the '269 patent. Claims 25 and 26 correspond to independent Claims 11 and 14 of the '269 Patent. Original Claim 2 corresponds to issued Claim 1 of the '269 Patent. Original dependent Claims 8 and 9 correspond to issued Claims 12 and 13 in the '269 Patent. Original dependent Claims 16, 17, 19 and 20 correspond to the claims now numbered 15-18, respectively, in the '269 Patent.

V. THERE IS A REASONABLE LIKELIHOOD THAT AT LEAST ONE CLAIM OF THE ' PATENT IS UNPATENTABLE UNDER 37 C.F.R. §42.104(b)(4)

A. Identification of the References as Prior Art

Sullivan, S.P. Guidelines for Qualifying Eddy Current Technology for CANDU Steam Generator Tube Inspection. March 1999. Published by Atomic Energy of Canada, Ltd. ("**Sullivan**") (Ex. 1105). The Sullivan report was distributed to over 30 practitioners in the steam generation inspection industry, listed on the second to last page and given a designation indicating that it was available upon request. (Sullivan Dec.)(Ex. 1103). Based on the date of

publication, Sullivan is 35 USC §102(b) prior art.

U.S. Patent no. 6,566,871. Process and Device for Testing A Workpiece by Means of Eddy Currents. (“**Hölzl**”) (Ex. 1107). Filed Sept. 17, 2001. Issued May 20, 2003. Foreign application priority date Sept. 15, 2000 based on German patent application 100 45 715. Based on the U.S. filing date, Hölzl is 35 USC §102(e) prior art.

EP 0 990 897 A2. Method and System for Determining Pipeline Defects. (“**Winslow**”) (Ex. 1109). European Patent Application. Filed Sept. 30, 1999. Published April 5, 2000. Winslow is 35 USC §102(b) prior art. Winslow claims priority to U.S. Patent No. 6,359,434 filed Sept. 30, 1998.

None of the foregoing references were of record during prosecution of the ‘269 Patent, and none were relied upon in any rejection of the claims.

U.S. Patent no. 4,194,149. Method for Generating the Eddy Current Signature of a Flaw in a Tube Proximate a Contiguous Member Which Obscures the Flaw Signal. (“**Holt**”) (Ex. 1106). Filed December 15, 1977. Issued March 18, 1980. Holt et al. is 35 USC § 102(b) prior art.

U.S. Patent No. 4,763,274. Machine Implemented Analysis of Eddy Current Data. (“**Junker ‘274.**”) (Ex. 1108). Issued on August 9, 1988. Therefore, Junker et al. is prior art to the ‘269 Patent under 35 U.S.C. §102(b).

Junker ‘274 and Holt were cited during prosecution of the ‘269 Patent, however only Junker ‘274 was relied upon as a basis for a rejection. Junker ‘274. was the primary reference during prosecution, but was not combined with Holt in any rejection.

B. Summary of Invalidity Arguments

The alleged invention of non-destructive test data signal combination to produce a simulated flaw combined with field data was fully disclosed in an industry-distributed document in 1999 (Sullivan, Ex. 1105). This process was then called “signal injection” (Ex. 1104, Declaration of Greg Colvin, p. 1, ¶ 5, hereinafter “Colvin”) and was well known in the field of non-destructive testing of steam generators prior to the filing date of the ‘269 Patent. Sullivan was distributed to over 30 practitioners and was available to a wide audience of those in the relevant industry with no restrictions on distribution (Ex. 1103).

Combining non-destructive test signals, including lab-prepared reference signals with field signals was known as early as 1980. U.S. Patent 4,194,149 (Holt, Ex. 1106) described this process as to eddy current testing, with the only difference being that Holt sought to isolate a flaw in the field sample by combining it with a reference signal whereas the claims in the ‘269 Patent simulated the flaw where none existed in the field by combining it with a reference sample. As demonstrated below, the alleged invention was obvious over Holt in view of U.S. Patent no. 4,763,274 (“Junker ‘274”, Ex. 1108), as Junker ‘274 recognized the need to use simulated flaws and to combine them with field tubes.

As described in detail below, the remaining claims contain minor limitations added to the broad concept of combining two signals that involve either calibration of one or both signals (Claims 2, 4)—an obvious necessity whenever combining signals from multiple sources—or the source of the data (Claims 3, 5-10). None of these minor distinctions raises the anticipated and obvious broad concept of signal cut and paste to the level of patentability (See Colvin, Ex. 1104, p. 9, ¶29).

VI. DETAILED EXPLANATION UNDER 37 C.F.R. §42.104(b)

Several of the claims are demonstrated below to be anticipated under 35 U.S.C. §102. Section 102 embodies the concept of novelty—if a device or process has been previously invented (and disclosed to the public), then it is not new, and therefore the claimed invention is “anticipated” by the prior invention.

Several of the claims are demonstrated below to be obvious under 35 U.S.C. §103(a). To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981 (CCPA 1974). “All [relevant] words in a claim must be considered in judging the patentability of that claim against the prior art.” *In re Wilson*, 424 F.2d 1382, 1385 (CCPA 1970). Manual of Patent Examine Procedure (M.P.E.P.) 2143.03. It is important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. *KSR Int’l Co. v. Teleflex, Inc.*, 12 S.Ct. 1727, 1740 (2007).

The M.P.E.P. describes the obviousness framework to establish *prima facie* obviousness. See Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in *KSR Int’l Co. v. Teleflex Inc.*, Fed. Reg., Vol. 72, No. 195, October 10, 2007 (“Guidelines”); and Examination Guidelines Update: Developments in the Obviousness Inquiry After *KSR v. Teleflex*. Fed. Reg., Vol. 75, No. 169, Sept. 1, 2010 (“Guidelines Update”).

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981. “All [relevant] words in a claim must be considered in judging the patentability of that claim against the prior art.” *In re Wilson*, 424 F.2d 1382, 1385 (CCPA 1970). M.P.E.P. 2143.03. It is important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the

elements in the way the claimed new invention does. *KSR Int'l.* 12 S.Ct. at, 1740. Moreover, the Guidelines state that a claimed invention is likely obvious if it is a combination of known prior art elements that would reasonably have been expected to maintain their respective properties or functions after they have been combined. See *Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1335 (Fed. Cir. 2009).

Explanations as to the obviousness rationale for each reason for invalidity are given in the explanations of invalidity and claim charts below, but as a general matter, it is noted that all of the references applied herein are directed to non-destructive testing and thus would have been pertinent to the problem the inventor was trying to resolve and well understood by those of ordinary skill in the art. “The scope of analogous art is to be construed broadly and includes references that are reasonably pertinent to the problem the inventor was trying to solve.” *Ecolab, Inc. v. FMC Corp.* 569 F.3d, 1335 (Fed. Cir. 2009).

In several instances the dependent claims include such obvious elements such as using different probes at the two different test locations, or using the same type of probe at both locations. In these instances, common sense in light of well-known technology is a valid rationale for an obviousness rejection. See M.P.E.P. §2143 citing *Muniauction, Inc. v. Thomson Corp.*, 532 F.3d 1318 (Fed. Cir. 2008) (obvious to use web for transactions).

A. Claims 1-10 wherein Claims 1 and 9 are Anticipated by Sullivan (Ex. 1105).

Claim 1 is anticipated by Sullivan. As summarized in the claim chart below and described in detail here Sullivan discloses each element of Claim 1 of the ‘269 patent. Claim 1 is directed to “A method of synthesizing nondestructive examination data to be used for training data analysts and/or testing inspection techniques comprising the steps of” The method involved combining examination data from a component in the field with examination data from

a laboratory-prepared specimen containing a flaw to create a data file that contains both the background from the field data and the flaw from the lab specimen. Sullivan (Ex. 1105) describes guidelines for qualifying eddy current techniques, which would be “testing inspection techniques” and in Section 4.5 describes the process of “signal injection.” As described in Sullivan, “signal injection” was a process for synthesizing nondestructive eddy current examination data (Colvin, Ex. 1104, p.3, ¶14).

Claim 1 further states: “generating data collected at a field site of a component from non-destructive examination of the component, which data collected at the field site includes noise.” “Field site” is construed to mean any location remote from the laboratory site where a specimen was prepared (Colvin, Ex. 1104, ¶15). Sullivan describes in Section 4.5 “a data file generated from a scan of an in-service tube.” One of ordinary skill in the art at the time of filing of the ‘269 Patent would have understood this description to be a non-destructive test in the form of an eddy current scan of a tube from a field site and that the scan of such an “in-service” tube would have included background noise (Colvin, Ex. 1104, ¶15). This understanding is further supported by the statement in Sullivan, p. 14, Section 4.5, which states: “This method can be used to simulate the distortion of flaw signals by the background noise encountered in scans of the in-service SG tubes.”

Claim 1 further states: “creating a specimen that simulates the component undergoing non-destructive examination with a selected flaw. . . .” Sullivan describes the creation of a specimen that simulates a flaw in a steam generator tube in a number of instances. These include the following quotes: Pag 13, Section 4.3, first line: “tubes with laboratory-prepared flaws are considered to be acceptable in qualifying eddy current techniques” On the same page, three lines from the bottom, “laboratory-prepared samples should be scanned with the eddy current

techniques with flaw detection” On Page 14, Section 4.4, line 2, Sullivan states: “the flaws may be laboratory-induced.” On page 7, Section 3.2, lines 5-7. Sullivan states: “[The] flaw size detection requirement . . . should be established through . . . mock-ups that simulate the process of defect formation . . . and tube failures.” On Page 8, Section 3.4.1, last paragraph, Sullivan states: “Laboratory methods have been developed that can induce real fatigue cracks and SCC [stress corrosion cracks] in SG [steam generator] tubes.” Thus, “creating a specimen that simulates the component undergoing non-destructive examination with a selected flaw” was disclosed by Sullivan. One of ordinary skill in the art would have understood “selecting a certain portion of a data file with a flaw signal in it” in Section 4.5 of Sullivan to mean a flaw signal from a prepared specimen as disclosed in the sections of Sullivan quoted above (Colvin, Ex. 1104, p. 4, ¶16). This understanding is supported by the fact that Paragraph 4.5 is directed to simulating the distortion of flaw signals by background noise encountered in an in-service tube. One skilled in the art who was combining a signal from an in-service tube that had noise to create such a signal, would logically use a specimen from a tube that does not have noise, like the laboratory-prepared samples computer models of a noiseless flaw signals described in Sullivan (Colvin, Ex. 1104, p.4-5, ¶16).

Claim 1 further states: “generating nondestructive examination data at a laboratory site, remote from the field site, from the specimen of the component undergoing non-destructive examination” As described above, Sullivan discloses the laboratory preparation of a specimen tube with a flaw in it. Sullivan in Section 4.5 (p. 14) also states: “selecting a certain portion of a data file with a flaw signal in it.” One of ordinary skill in the art would have known that when Sullivan refers to the “data file with a flaw signal in it” that the data file was generated from the laboratory-prepared flaw and that the most logical location where that data file would

have been generated was wherever the laboratory prepared flaw was made, and that this is where one would have assumed Sullivan meant that the signal was prepared (Colvin, Ex. 1104, p. 5, ¶17). Further evidence that one of ordinary skill in the art would have understood the prepared flaw in Sullivan generated remote from the field site is found in the fact that Sullivan also describes generation of computer modeled flaws in Section 4.6 (p. 15) and it would not have been likely that such models would have been generated at the field site (Colvin, Ex. 1104, p.5)

Claim 1 further states: “combining at least some of the nondestructive examination data collected at the field site with at least some of the nondestructive examination data collected at the laboratory site. . . .” Sullivan in Section 4.5 (Ex. 1105, p. 14) describes this process and one of ordinary skill in the art would have known to perform this in view the following in Sullivan “selecting a certain portion of a data file with a flaw signal in it . . . and adding the result to appropriate sections of a data file generated from a scan of an in-service tube.” (Colvin, Ex. 1104, p. 5, ¶18). One of ordinary skill in the art would have understood that the data file with a flaw in it as described in Sullivan, is prepared and collected at the laboratory site, which would have been remote from the field site, and this is combined with the data file collected at the field site (Colvin, Ex. 1104, p. 5, ¶18).

Claim 1 concludes: “to establish a combined data train that reflects the nondestructive examination response to the selected flaw in a background representative of data collected at the field site.” This purpose is stated in Sullivan in Section 4.5 (p.14) “This method can be used to simulate the distortion of flaw signals by the background noise encountered in scans of the in-service SG tubes.” One of ordinary skill in the art would have understood this quote to describe creating the same data train as claimed in Claim 1 (Colvin, Ex. 1104, p. 6, ¶19).

For the reasons stated above, petitioner has demonstrated that Claim 1 is invalid as anticipated by Sullivan in that all of the elements of Claim 1 are present and arranged as stated in Claim 1. In the alternative, Claim 1 is invalid as obvious under 35 U.S.C §103 over Sullivan as one of ordinary skill in the art would have recognized to combine all of the claim elements as disclosed in Sullivan to produce the claimed subject matter (Colvin, Ex. 1104, pp. 3-6).

Claim 1	Anticipated by Sullivan, Ex. 1105
<p>A method of synthesizing nondestructive examination data to be used for training data analysts and/or testing inspection techniques comprising the steps of:</p>	<p>Sullivan p. 12, section 4. [page numbers here are those marked with exhibit number, not those internal to the document] describes “PROCEDURAL OPTIONS FOR PERFORMANCE DEMONSTRATIONS” which may be used “for qualifying eddy current [i.e. non-destructive examination] inspection techniques.” “The ‘signal injection’ method can superimpose flaw signals upon signals in data files from eddy current scans of in-service tubes” (p. 14, section 4.5, first three lines). Superposition of eddy current scans is a synthesis of nondestructive examination data. (Colvin, Ex. 1104 p.3, ¶14) “Data files generated by the signal injection method can be used to train and qualify eddy current data analysts” (p. 14, section 4.5, second paragraph).</p>
<p>generating data collected at a field site of a component from non-destructive examination of the component, which data collected at the field site includes noise;</p>	<p>Sullivan describes the generation of eddy current test data collected at a field site: “sections of a data file [are] generated from [an eddy current] scan of an in-service tube” (p. 14, section 4.5, first paragraph). An “in-service tube” is a tube located at a field site . Page 6, first paragraph describes steam generator (SG) tubes at the Bruce and Pickering Nuclear Generating Station). “[B]ackground noise [is] encountered in scans of the in-service SG tubes” (p.14, section 4.5, last line of first paragraph). See also p. 6, section 1, third paragraph: “Even in so-called identical SGs [steam generators] there can be significant variations in . . . background noise.”</p>
<p>creating a specimen that simulates the component undergoing non-destructive examination with a selected flaw;</p>	<p>Sullivan describes the creation and use of a specimen with a selected flaw. P. 14, section 4.5, line 1 refers to “flaw signals” and lines 2 – 3 refer to “a data file with a flaw signal in it...” Laboratory-prepared samples with flaws, and subsequent scanning of those samples</p>

	<p>to produce flaw signals are known. See page 13, section 4.3 first line: “tubes with laboratory-prepared flaws are considered to be acceptable in qualifying eddy current techniques...”. See also: page 13, three lines from the bottom: “...laboratory-prepared samples should be scanned with the eddy current techniques with flaw detection...”, page 14, section 4.4, line 2: “...The flaws may be laboratory-induced...” page 7, paragraph 3.2, lines 5-7: “ [The] flaw size detection requirement...should be established through...mock-ups that <u>simulate</u> the process of defect formation ... and tube failures” ; Page 8, section 3.4.1, last paragraph: “Laboratory methods have been developed that can induce real fatigue cracks and SCC [stress corrosion cracks] in SG [steam generator] tubes.”</p>
<p>generating nondestructive examination data at a laboratory site, remote from the field site, from the specimen of the component undergoing non-destructive examination;</p>	<p>Sullivan at page 14, paragraph 4.5, lines 1 – 2 describes a method which “can superimpose [1)] flaw signals upon [2)] signals in data files from eddy current scans of in-service tubes.” Generating flaw signals is shown on page 13, paragraph 4.3, first two lines: “Performance demonstrations using SG tubes with laboratory-prepared flaws are considered to be acceptable in qualifying eddy current techniques [if certain conditions are met]. See also page 13, last five lines: “Acceptable performance demonstrations can be performed with laboratory-prepared tubes...The laboratory-prepared samples should be scanned with the eddy current techniques.” A selection of a data signal is made from “a certain portion of a data file with a flaw signal in it.” (p. 14, paragraph 4.5, lines 2-3).</p>
<p>and combining at least some of the nondestructive examination data collected at the field site with at least some of the nondestructive examination data collected at the laboratory site</p>	<p>Sullivan at page 14, section 4.5, first paragraph performs the step of “superimpose.” When two items are superimposed they are combined (Colvin, Ex. 1104, p. 3, ¶14). Section 4.5, line 4 states: “adding” is taking place. Section 4.5 describes: “ [1)] selecting a certain portion of a data file with a flaw signal in it, ...and [3)] adding the result to appropriate sections of a data file generated from a scan of an in-service tube” (p.14).</p>
<p>to establish a combined data train that reflects the nondestructive</p>	<p>Sullivan, p. 14, section 4.5, end of first paragraph: “This method can be used to simulate the distortion of</p>

examination response to the selected flaw in a background representative of data collected at the field site.	flaw signals by the background noise encountered in scans of the in-service SG tubes.”
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Claim 2 is obvious under 35 USC 103(a) over Sullivan.

Claim 2 is directed to calibrating lab and field data to the same signal strengths, i.e. amplitude. This is step well known to those of ordinary skill in the art for any measurement method (Colvin, Ex. 1104, p. 9, ¶ 29). Sullivan states that “both real and simulated (lab) signals are normalized to that from a common calibration flaw” (p. 15, Section 4.6). Normalization is a method of equalizing amplitudes. It is well known that the term normalize can imply adjusting or calibrating based on signal strength (Colvin, Ex. 1104, p.9. ¶ 30). It would have been obvious to one of ordinary skill in the art to separately calibrate the data at the field site and at the laboratory site to produce consistent results. The stated purpose in the ‘269 patent is to simulate a flaw in the presence of noise. Therefore, the signals that are combined to perform this simulation must be calibrated to the same standard for the simulated signal to be realistic. (Colvin, p. 10, ¶30.). Thus, Claim 2 is obvious in view of Sullivan.

Claim 2	Obvious over Sullivan
The method of claim 1 including the steps of separately calibrating the data collected at the field site and the data collected at the laboratory site so that the data collected at the field site and the data collected at the laboratory site have the same relative signal strengths corresponding to a first flaw.	Sullivan discloses normalizing real and simulated signals to a common calibration flaw. (p. 15, paragraph 4.6, last tow lines of first bullet). Normalizing is understood by one of skill in the art to be adjusting signals to a common standard. (Colvin, Ex. 1104 p. 10, ¶30).

Claim 3 is obvious over Sullivan in view of Junker ‘274, Ex. 1108 .

Claim 3 depends from Claim 2 and merely adds that the “flaw is provided by a calibration standard.” The use of calibration standard flaws to calibrate an eddy current flaw detection system was well known at the time the ‘269 Patent was filed and, for example, is described in Junker ‘274 (Ex. 1108, col. 6, lines 1-15): “In order to calibrate the system a test section of tube . . . is provided with standard flaws.” Use of a calibration standard thus is an obvious step (Colvin, Ex. 1104, p. 10, ¶32). Thus Claim 3 is invalid as obvious over Sullivan in view of Junker ‘274.

Claim 3	Obvious over Sullivan in view of Junker ‘274
The method of claim 2 wherein the first flaw is provided by a calibration standard.	“In order to calibrate the system a test section of tube . . . is provided with standard flaws” (Ex. 1108, Col 6, lines 1-15).

Claim 4 is obvious over Sullivan (Ex. 1002) in view of Winslow (Ex. 1014). Claim 4 is directed to separately calibrating the data collected at each site based on “signal orientation.” Signal orientation is phase angle as agreed by the patentee (Claim construction chart, *infra*). As shown in the claim chart below, Winslow which is directed to eddy current non-destructive testing, discloses calibration or normalization as to phase angle. Winslow discloses that “pipeline analysis relies on relative changes in phase and amplitude values to indicate a change in pipeline wall thickness” i.e. a flaw. (p. 10, paragraph [0060]. Because signal phase is critical to detecting a flaw, it would have been obvious to one skilled in the art looking to simulate a flaw with field noise that the flaw signal and the field signal had to be calibrated to have the same phase orientation. It would further have been obvious to combine Sullivan with Winslow to produce a consistent combined data stream (Colvin, Ex. 1104, p. 11, ¶33).

Claim 4	Obvious over Sullivan in View of Winslow Ex . 1109
The method of claim 1 including the steps of separately calibrating the data collected at the field site and the data collected at the laboratory site so that the data collected at the field site and the data collected at the laboratory site have the same relative signal orientation.	Winslow: “pipeline analysis relies on relative changes in phase and amplitude values to indicate a change in pipeline wall thickness” i.e. a flaw. (Ex. 1109, p. 10, paragraph [0060].

Claim 5 is obvious over Sullivan (Ex. 1005) in view of Junker ‘274 (Ex. 1108). Claim 5 is directed to a common sense step of using a different eddy current detector at the lab and field sites (Colvin, Ex. 1104, p. 11, ¶34). Common sense may support a finding of obviousness. M.P.E.P. §2143 citing *Perfect Web Technologies, Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1328-29 (Fed. Cir. 2009). In addition to ordinary common sense, there are many reasons for which one of ordinary skill in the art would use two detectors including convenience, time-saving and damage to one of the detectors. (Colvin, Ex. 1104, p. 12, ¶34). Further, Junker ‘274 discloses the use of more than one probe in routine testing because recalibration of the system must be performed “each time the probe is changed” (Ex. 1108, col. 6, lines 10-12). Thus, Claim 5 is obvious over Sullivan in view of common sense, ordinary skill and Junker ‘274.

Claim 5	Obvious over Sullivan in View of Junker ‘274
The method of claim 1 wherein the data collected at the field site is collected from the step of operating a first eddy current detector and the data collected at the laboratory site is collected from the step of operating a second eddy current detector.	Junker ‘274 discloses the use of more than one eddy current detector (probe) in routine testing because recalibration of the system must be performed “each time the probe is changed” (Ex. 1108, col. 6, lines 10-12).

Claim 6 is obvious over Sullivan (Ex. 1105) and in view of Junker ‘274 (Ex. 1108).

Claim 6 depends from Claims 1 and 5 and is directed to the step of using the same type of

detector in the field and the lab. Claim 6 states “the method of claim 5, wherein the first and second detectors are the same type of detector.”

The use of the same type of eddy current detector would have been an obvious choice to make to one of ordinary skill in the art (Colvin, Ex. 1104, p. 13, ¶ 35). A stated purpose of Claim 1 is to train technicians to recognize flaws in test signals by combining signals into a single data stream. It would have been practical and obvious to one of ordinary skill in the art to use signals from the same type of detector to simulate a realistic flaw signal in the context of background noise. Different types of detectors would have different responses to field-acquired noise and to the laboratory prepared flaw, so a combined signal would be less realistic as coming from a single source if two different detector types were used (Colvin, Ex. 1104, p. 13, ¶36). In addition, Junker ‘274 states that recalibration is necessary whenever a probe (detector) is changed (Ex. 1108, col. 6, lines 10-12). This demonstrates either that a) more than one type of detector is used and recalibration is needed because of the different characteristics of the detectors or b) that where two of the same types of detector are used, the response of those detectors can be sufficiently different as to require recalibration. In either case, one skilled in the art who is trying to simulate the response to a flaw in noise, would preferably do so with the same type of eddy current detector to achieve the most realistic response, because Junker ‘274 demonstrates that different detectors respond sufficiently differently as to require recalibration and use of different types of detectors would naturally exhibit an even larger difference in response than two of the same type of detector (Colvin, Ex. 1104, p. 13, ¶36). Thus, Claim 6 is invalid because it would have been obvious in light of Junker ‘274 and as a practical matter to one skilled in the art at the time the ‘269 patent was filed.

Claim 6	Obvious over Sullivan in View of Junker ‘274
The method of claim 5 wherein the	One of ordinary skill in the art would use the same

<p>first and second detectors are the same type of detector.</p>	<p>type of detector to produce a realistic simulated combined signal. (Colvin, Ex. 1104, p. 13, ¶36).</p> <p>Recalibration is necessary whenever a probe is changed (Junker '274, Ex. 1108, col. 6, lines 10-12). One of ordinary skill in the art would want to minimize the difference between probes and use the same type of probe as a practical way to achieve this (Colvin, Ex. 1104, p.13, ¶36).</p>
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Claim 7 is obvious over Sullivan (Ex. 1105) view of Holt (Ex. 1106) and also in view of Junker '274. (Ex. 1108).

Claim 7 depends from Claims 1, 5, and 6 and is directed to the step of operating the detectors at the same operating frequencies. Claim 7 states: “the method of claim 6 wherein the first and second detectors are operated at substantially the same inspection frequencies.” The use of the same inspection frequencies would have been obvious and also necessary at the time of the filing of the '269 Patent because the materials under inspection (lab specimen and field tubes) would respond differently at different frequencies (Colvin, Ex. 1104, pp.13-14, ¶37). The stated purpose of Claim 1 is to simulate a response to the laboratory-prepared flaw in a background representative of data collected at a field site. One of skill in the art would use the same inspection frequencies to accurately simulate a single response. Having two signals acquired at different frequencies would not accurately simulate a realistic response (Colvin, Ex. 1104, pp13-14, ¶37). Holt demonstrates this issue: “these tapes [of two different eddy current signals that are combined] are then played back in synchronism and phase” (Ex. 1106, col. 5, lines 17-18). It would not be possible to do this if the data on the two tapes were acquired at two different frequencies (Colvin, Ex. 1104, pp. 13-14, ¶37) In addition, combining data acquired at different frequencies could result in cancelling out of information as described in Junker'274 (Ex. 1108, col. 12, lines 2-9) and thus would not result in the type of signal stated in Claim 1 or

serve the purpose of the method. “Frequency mixing is a means of cancelling or suppressing one of two superimposed signatures which have been produced at the same location. In eddy current inspection, the specific application of mixing is to ‘cancel’ the tube support plate signatures and, thus, expose any superimposed tube defect signatures.” For these reasons, Claim 7 is invalid as obvious over Sullivan in view of Holt or Junker ‘274.

Claim 7	Obvious over Sullivan in View of Holt
The method of claim 6 wherein the first and second detectors are operated at substantially the same inspection frequencies	<p>Two signals acquired at different frequencies would not accurately simulate a realistic combined response (Colvin, Ex. 1104, pp13-14, ¶37).</p> <p>“these tapes [of two different eddy current signals that are combined] are then played back <u>in synchronism and phase</u>” (Holt, Ex. 1106, col. 5, lines 17-18). Not possible if recorded at different frequencies (Colvin, Ex. 1104, pp13-14, ¶37).</p>

Claim 7	Obvious over Sullivan in View of Junker ‘274
The method of claim 6 wherein the first and second detectors are operated at substantially the same inspection frequencies	<p>Two signals acquired at different frequencies would not accurately simulate a realistic combined response (Colvin, Ex. 1104, pp13-14, ¶37).</p> <p>Junker ‘274: Combining frequencies results in adverse cancellation of signals: “Frequency mixing is a means of cancelling or suppressing one of two superimposed signatures which have been produced at the same location. In eddy current inspection, the specific application of mixing is to ‘cancel’ the tube support plate signatures and, thus, expose any superimposed tube defect signatures.” (Ex. 1108, col. 12, lines 2-9)</p>

Claim 8 is obvious over Sullivan (Ex. 1105) in view of Holt (Ex. 1106). Claim 8 depends from Claims 1, 5, and 6 and is directed to step of operating the detectors at the same data collection rates. Claim 8 states: “The method of claim 6 wherein the first and second

detectors are operated at substantially the same data collection rates.” The need for collection data rates to be the same is an obvious limitation in view of the stated purpose of the invention to create combined data signal for training purposes. The combined signal would not serve its intended purpose if the data rates were different for the in-service specimen and the lab specimen because the signal having two different data rates would not correctly show what an actual flaw would look like in an in-service specimen (Colvin, Ex. 1104, pp. 14-15, ¶38). In addition, Holt discloses field and lab data collection “made at identical speeds.” (Ex. 1106, col. 5, lines 17-18). Holt also states “these tapes [of two different eddy current signals that are combined] are then played back in synchronism and phase” (Ex. 1106, col. 5, lines 17-18). It would not be possible to play back the tapes in synchronism and phase if they were made at two different data collection rates (Colvin, Ex. 1104, pp. 14-15, ¶38). Claim 8 is invalid as obvious because it would have been obvious in light of well-known practice at the time of filing of the ‘269 Patent and also in view of Holt.

Claim 8	Obvious over Sullivan in View of Holt
The method of claim 6 wherein the first and second detectors are operated at substantially the same data collection rates	<p>Field and lab data collection “made at identical speeds.” (Ex. 1106, col. 5, lines 17-18).</p> <p>“these tapes [of two different eddy current signals that are combined] are then played back in synchronism and phase” (Ex. 1106, col. 5, lines 17-18).</p> <p>Not possible to play back in synchronism and phase if made at different data collection rates (Colvin, Ex. 1104, pp. 14-15, ¶38).</p>

Claim 9 is anticipated by Sullivan (Ex. 1105). Claim 9 states “a segment of data collected at one of either the field site or the laboratory site is combined with data collected at the other of either the field site or the laboratory site.” This is disclosed by Sullivan at p. 14, section

4.5: “portions of a data file with a flaw in it [are combined with] appropriate sections of a data file generated from a scan of an in-service tube.” Thus Claim 9 is invalid as anticipated by Sullivan.

Claim 9	Anticipated by Sullivan
The method of claim 1 wherein only a segment of data collected at one of either the field site or the laboratory site is combined with data collected at the other of either the field site or the laboratory site.”	“portions of a data file with a flaw signal in it . . . to appropriate sections of data file generated from a scan of an in-service tube” (Ex. 1105, p. 14, section 4.5).

Claim 10 is obvious over Sullivan (Ex. 1105).

Claim 10 is directed to using a mathematical model to create the specimen data. The use of mathematical or computer generated models was well known in the field of eddy current testing at the time of the filing of the ‘269 Patent (Colvin. Ex. 1104, pp. 15-16, ¶41. Sullivan also discloses use of a mathematical or computer simulated flaw “to accurately simulate probe responses to flaws equivalent to those found in in-service tubes” (Section 4.6, first bullet point). It would have been obvious to combine the signal injection teaching of Sullivan disclosed in Section 4.5 that anticipates Claim1 with the computer modeling teaching in Section 4.6 as a means for creating consistent flaw sample data without having to resort to preparing physical samples (Colvin, Ex. 1104, pp. 15-16). Claim 10 is therefore invalid as obvious over Sullivan in view of well-known practice at the time of filing of the ‘269 Patent and also over Paragraph 4.6 of Sullivan, which discloses the use of a computer model to simulate a flaw.

Claim 10	Obvious over Sullivan
The method of claim 1 wherein the specimen is a mathematical model and the data generated from the specimen is generated by the mathematical model.	“Computer modeling is a useful tool in providing realistic flaw signals with which eddy current probes can be calibrated” (Ex. 1105, p. 15, Section 4.6).

B. Claims 1-10 wherein Claims 1-9 are Obvious over Holt (Ex. 1106) in view of Junker '274 (1108).

Claim 1 states: “A method of synthesizing nondestructive examination data to be used for training data analysts and/or testing inspection techniques comprising the steps of . . .” The Abstract of Holt describes an inspection technique that is “a method for deriving an eddy current signature of a flaw in a tube proximate a contiguous member which is obscured in the composite signature of the flaw and contiguous member by subtracting from the composite signature a reference eddy current signature generated by a facsimile of the tube and the contiguous member” (Ex. 1106, p. 1). This procedure describes a synthesis of nondestructive examination data for inspection of steam generator tubes. Holt addresses the problem of finding a flaw in a steam generator tube when the flaw is located at a place in the tube that is near a support structure holding the tube. The support structure affects the eddy current signature and can obscure the flaw. Holt solves this by preparing a reference signal from a known undamaged tube with the same support material adjacent and subtracting the reference signal from a scan of an in-service tube near a support structure. The premise is that the effect of the support structure will be cancelled out leaving any information not common to both the reference tube and the in-service tube. This would theoretically include any flaws in the in-service tube and any noise that is not common to both signals, which is likely to be present because many forms of background noise are random and would not be common to both the reference and the in-service tube signals (Colvin, Ex. 1104, p. 6-7, ¶22). One such source of noise noted by Holt is wobble of the eddy current probe (Ex. 1106, col. 3 lines 21-25).

Claim 1 further states: “generating data collected at a field site of a component from non-destructive examination of the component, which data collected at the field site includes noise.”

Holt discusses the generation of eddy current data collected from an in-service steam generator tube at a field site (Ex. 1106, col. 4, lines 20-25). Holt further describes that the scan of the in-service tube includes noise in the form of interference from support structures (Ex. 1106, col. 3, lines 33-35).

Claim 1 further states: “creating a specimen that simulates the component undergoing non-destructive examination with a selected flaw. . . .” Holt discusses the generation of a reference eddy current signal by scanning a reference or facsimile tube having a support plate member (Ex. 1106, col. 3, lines 62-67). Holt does not specifically discuss that a specimen is created having a flaw, but Junker ‘274 discusses scanning a laboratory-prepared specimen tube with a flaw for the purpose of detecting a flaw in a component undergoing non-destructive examination. “The test section is provided with standard flaws in the form of 20%, 40%, 60% and 100% through-wall holes of specified diameter” (Ex. 1108, col. 6, lines 4-10). Junker ‘274 shows a technique of using a prepared flaw specimen to generate a reference signal to enhance the recognition of a flaw in the tube undergoing test in the field. It would have been obvious for a person of ordinary skill to combine the creation of a prepared flaw specimen in Junker ‘274 with the system of Holt, as both are directed to recognizing a flaw in an in-service tube and the use of a prepared specimen for the same purpose as in Claim 1 (Colvin, Ex. 1104, pp. 7-8, ¶24). “If a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. *KSR Int’l Co v Teleflex Inc.*, 82 USPQ2d 1385, 1396 (2007),

Claim 1 further states: “generating nondestructive examination data at a laboratory site, remote from the field site, from the specimen of the component undergoing non-destructive

examination” Holt also shows the reference data may be taken from a site remote from the in-service tube. “The reference tube and contiguous member may be adjacent to or remote from the service tube and contiguous member” (Ex. 1106, col. 4, lines 9-12).

Claim 1 further states: “combining at least some of the nondestructive examination data collected at the field site with at least some of the nondestructive examination data collected at the laboratory site. . . .” Holt describes that the “reference scan” is subtracted from the in-service scan to produce a flaw signal (Ex. 1106, col. 5, lines. 1-2). This is also described in Holt in Figure 3, blocks 34, 36 and column 4, lines 28-47. The term “combine” in the context of data is to unite more than one piece of data into a single number or expression (Colvin, Ex. 1104, pp. 8-9, ¶26). By subtracting the reference scan from the service scan, Holt combines two signals (*Id.*) Junker ‘274 also describes “combining” of two eddy current data signals, by mixing two signals acquired at different frequencies: “Frequency mixing is a means of cancelling or suppressing one of two superimposed signatures which have been produced at the same tube location. In eddy current inspection, the specific application of mixing is to “cancel” the tube support plate signatures and, thus, expose any superimposed tube defect signatures” (Ex. 1108, col. 12, lines 3-9).

Claim 1 further states: “to establish a combined data train that reflects the nondestructive examination response to the selected flaw in a background representative of data collected at the field site.” The combined data train in Holt subtracts out the support member (by combining the reference scan with the service scan) but the resulting data train in Holt would still contain a background representative of data collected at the field site, since only the support member signature is subtracted out while other noise on the signal would still be there, e.g. wobble as described in Junker ‘274 (Ex. 1108, col. 3, lines 21-25) (Colvin, Ex. 1104, p.9, ¶24). This

“establish[es] a combined data train that reflects the nondestructive examination response to the selected flaw in a background representative of data collected at the field site.” While Holt did not produce the combined data stream from a prepared specimen having a flaw and a remotely located field tube, Junker does show this (Ex. 1108, col. 6, lines 4-10), but just does not show that the prepared specimen and the field tube data are collected at different locations. It would have been obvious to one of ordinary skill in the art at the time of filing of the ’274 Patent to combine the teachings of Holt and Junker ’274 to produce a simulated flaw in the context of background noise for the purpose of creating a consistent or standardized flaw signature in a background of the numerous variations in eddy current signals that can obscure a flaw, including discontinuities, and wobble on the probe (Colvin, Ex. 1104, p.9, ¶24). One purpose of creating such a standardized flaw would have been to test technicians or to test the automated flaw detection system disclosed in Junker ’274 with a standardized flaw signal in the presence of real-world noise.

Thus, Claim 1 is invalid because it would have been obvious at the time of the filing of the ’269 Patent in view of the combination of Holt and Junker ’274.

Claim 1	Obvious over Holt in view of Junker ’274
A method of synthesizing nondestructive examination data to be used for training data analysts and/or testing inspection techniques comprising the steps of:	Holt discloses an inspection technique of “a method for deriving an eddy current signature of a flaw in a tube proximate a contiguous member which is obscured in the composite signature of the flaw and contiguous member by subtracting from the composite signature a reference eddy current signature generated by a facsimile of the tube and the contiguous member” (Ex. 1105, abstract).
generating data collected at a field site of a component from non-destructive examination of the component, which data collected at the field site includes noise;	An in-service tube is scanned to generate data collected at a field site and an eddy current signal is stored (col. 4, lines. 20-25). The in-service tube has interference from support structures, i.e. noise (col. 5, lines. 40-41).

<p>creating a specimen that simulates the component undergoing non-destructive examination with a selected flaw;</p>	<p>A reference eddy current signal is produced by scanning a reference or facsimile tube having a support plate member. (col.3, lines 62-67). Junker '274 (Ex. 1108) shows generating a reference signal with a flaw. See Junker '274 col.6 lines. 4-10.</p>
<p>generating nondestructive examination data at a laboratory site, remote from the field site, from the specimen of the component undergoing non-destructive examination;</p>	<p>Holt shows the reference data may be taken from a site remote from the in-service tube because a "facsimile" is disclosed. "The reference tube and contiguous member may be adjacent to or remote from the service tube and contiguous member" (Ex. 1106, col. 4, lines 9-12).</p>
<p>and combining at least some of the nondestructive examination data collected at the field site with at least some of the nondestructive examination data collected at the laboratory site to establish a combined data train that reflects the nondestructive examination response to the selected flaw in a background representative of data collected at the field site.</p>	<p>Holt shows the reference scan is subtracted from the in-service scan to produce a flaw signal (col. 5, lines 1-2). See also Fig 3, blocks 34 and 36 and col. 4, lines 28-47. The combined data train that reflects the nondestructive examination response to the selective flaw in Holt is the eddy current signature of a flaw that is generated for a plot of the Xf, Yf components at the identified travel point (col. 4, lines 46 – 48) and shown in block 38 of Holt.</p>

Claim 2 is obvious under 35 USC 103(a) over Holt (Ex. 1106) in view of Junker '274. (Ex. 1108).

Claim 2 states: ""separately calibrating the data collected at the field site and the data collected at the laboratory site so that the data collected at the field site and the data collected at the laboratory site have the same relative signal strengths corresponding to a first flaw. Junker '274. discloses the calibration of an eddy current testing system to a calibration standard having a first flaw (Ex. 1108, col.6, lines 1-6): "In order to calibrate the system, a test section of tube . . . is provided with standard flaws." Junker also discloses recalibrating the system "each time the probe is changed . . . and periodically during inspection." (Ex. 1108, col. 6, lines 10-12).

One of ordinary skill in the art would have understood that such a calibration would have been

for signal amplitude and phase (Colvin, Ex. 1104, p. 10, ¶31). Because Claim 2 is broad enough to include the use of separate probes for the field and lab data (see Claim 5), per Junker ‘274, the data generated at the field site and at the laboratory site would each be calibrated to a standard flaw. In addition, “periodic” recalibration per Junker ‘274 would also include recalibration at each of two sites. Thus, Claim 2 is obvious over Holt in view of Junker ‘274.

Claim 2	Obvious over Holt in view of Junker ‘274
The method of claim 1 including the steps of separately calibrating the data collected at the field site and the data collected at the laboratory site so that the data collected at the field site and the data collected at the laboratory site have the same relative signal strengths corresponding to a first flaw.	<p>Junker ‘274 (Ex. 1108, col.6, lines 1-6): “In order to calibrate the system, a test section of tube . . . is provided with standard flaws.”</p> <p>Junker ‘274 also discloses recalibrating the system “each time the probe is changed . . . and periodically during inspection.” (Ex. 1108., col. 6, lines 10-12).</p>

Claim 3 is obvious over Holt (Ex. 1105) in view of Junker ‘274 (Ex. 1108).

Claim 3 depends from Claim 2 and merely adds that the “flaw is provided by a calibration standard.” The use of calibration standard flaws to calibrate an eddy current flaw detection system was well known at the time the ‘269 Patent was filed and, for example, is described in Junker ‘274 (Ex. 1108, col. 6, lines 1-15): “In order to calibrate the system a test section of tube . . . is provided with standard flaws.” Use of a calibration standard thus is an obvious step (Colvin, Ex. 1104, p. 10, ¶32). Thus Claim 3 is invalid as obvious over Holt in view of Junker ‘274.

Claim 3	Obvious over Holt in view of Junker ‘274
The method of claim 2 wherein the first flaw is provided by a calibration standard.	“In order to calibrate the system a test section of tube . . . is provided with standard flaws” (Ex. 1108, Col 6, lines 1-15).

Claim 4 is obvious over Holt (Ex. 1106) in view of Junker (Ex. 1108).

Claim 4 is directed to separately calibrating the data collected at each site based on “signal orientation.” Signal orientation is phase angle as agreed by the patentee (Claim construction chart, *infra*). The need to align phase in two separately acquired signals is disclosed in Holt, which discusses eddy current signals recorded on magnetic tapes and that “the tapes are played back in synchronism and phase” (Ex. 1106, col. 5, lines 18-19). Because signal phase is critical to detecting a flaw, it would have been obvious to one skilled in the art looking to simulate a flaw with field noise that the flaw signal and the field signal had to be calibrated to have the same phase orientation. It would further have been obvious to combine Sullivan with Winslow to produce a consistent combined data stream (Colvin, Ex. 1104, p. 11, ¶33).

Claim 4	Obvious over Holt in View of Junker ‘274
The method of claim 1 including the steps of separately calibrating the data collected at the field site and the data collected at the laboratory site so that the data collected at the field site and the data collected at the laboratory site have the same relative signal orientation.	Alignment by phase in two separately acquired signals is disclosed in Holt: “the tapes are played back in synchronism and phase” (Ex. 1106, col. 5, lines 18-19).

Claim 5 is obvious over Holt (Ex. 1006) in view of Junker ‘274 (Ex. 1108). Claim 5 is directed to a common sense step of using a different eddy current detector at the lab and field sites (Colvin, Ex. 1104, p. 11, ¶34). Common sense may support a finding of obviousness. M.P.E.P. §2143 citing *Perfect Web Technologies, Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1328-29 (Fed. Cir. 2009). In addition to ordinary common sense, there are many reasons for which one of ordinary skill in the art would use two detectors including convenience, time-saving and damage to one of the detectors (Colvin, Ex. 1104, p. 12, ¶34). Further, Junker ‘274 discloses the use of more than one probe in routine testing because recalibration of the system must be

performed “each time the probe is changed” (Ex. 1108, col. 6, lines 10-12). Thus, Claim 5 is obvious over Sullivan in view of common sense, ordinary skill and Junker ‘274.

Claim 5	Obvious over Holt in View of Junker ‘274
The method of claim 1 wherein the data collected at the field site is collected from the step of operating a first eddy current detector and the data collected at the laboratory site is collected from the step of operating a second eddy current detector.	Junker ‘274 discloses the use of more than one eddy current detector (probe) in routine testing because recalibration of the system must be performed “each time the probe is changed” (Ex. 1108, col. 6, lines 10-12).

Claim 6 is obvious over Holt (Ex. 1106) and in view of Junker ‘274 (Ex. 1108).

Claim 6 depends from Claims 1 and 5 and is directed to the step of using the same type of detector in the field and the lab. Claim 6 states “the method of claim 5, wherein the first and second detectors are the same type of detector.”

The use of the same type of eddy current detector would have been an obvious choice to make to one of ordinary skill in the art (Colvin, Ex. 1104, p. 13, ¶ 35). A stated purpose of Claim 1 is to train technicians to recognize flaws in test signals by combining signals into a single data stream. It would have been practical and obvious to one of ordinary skill in the art to use signals from the same type of detector to simulate a realistic flaw signal in the context of background noise. Different types of detectors would have different responses to field-acquired noise and to the laboratory prepared flaw, so a combined signal would be less realistic as coming from a single source if two different detector types were used (Colvin, Ex. 1104, p. 13, ¶36). In addition, Junker ‘274 states that recalibration is necessary whenever a probe (detector) is changed (Ex. 1108, col. 6, lines 10-12). This demonstrates either that a) more than one type of detector is used and recalibration is needed because of the different characteristics of the detectors or b) that where two of the same types of detector are used, the response of those detectors can be

sufficiently different as to require recalibration. In either case, one skilled in the art who is trying to simulate the response to a flaw in noise, would preferably do so with the same type of eddy current detector to achieve the most realistic response, because Junker ‘274 demonstrates that different detectors respond sufficiently differently as to require recalibration and use of different types of detectors would naturally exhibit an even larger difference in response than two of the same type of detector (Colvin, Ex. 1104, p. 13, ¶36). Thus, Claim 6 is invalid because it would have been obvious over Holt in view of Junker ‘274 and as a practical matter recognized by those of ordinary skill in the art at the time the ‘269 patent was filed.

Claim 6	Obvious over Holt in View of Junker ‘274
The method of claim 5 wherein the first and second detectors are the same type of detector.	<p>One of ordinary skill in the art would use the same type of detector to produce a realistic simulated combined signal. (Colvin, Ex. 1104, p. 13, ¶36).</p> <p>Recalibration is necessary whenever a probe is changed (Junker ‘274, Ex. 1108, col. 6, lines 10-12). One of ordinary skill in the art would want to minimize the differences between probes by use of the same type of probe (Colvin, Ex. 1104, p.13, ¶36).</p>

Claim 7 is obvious over Holt (Ex. 1106) in view of Junker ‘274. (Ex. 1108).

Claim 7 depends from Claims 1, 5, and 6 and is directed to the step of operating the detectors at the same operating frequencies. Claim 7 states: “the method of claim 6 wherein the first and second detectors are operated at substantially the same inspection frequencies.” The use of the same inspection frequencies would have been obvious and also necessary at the time of the filing of the ‘269 Patent because the materials under inspection (lab specimen and field tubes) would respond differently at different frequencies (Colvin. Ex. 1104, pp.13-14. ¶37). The stated purpose of Claim 1 is to simulate a response to the laboratory-prepared flaw in a background representative of data collected at a field site. One of skill in the art would use the

same inspection frequencies to accurately simulate a single response. Having two signals acquired at different frequencies would not accurately simulate a realistic response (Colvin, Ex. 1104, pp13-14, ¶37). Holt demonstrates this issue: “these tapes [of two different eddy current signals that are combined] are then played back in synchronism and phase” (Ex. 1106, col. 5, lines 17-18). It would not be possible to do this if the data on the two tapes were acquired at two different frequencies (Colvin, Ex. 1104, pp. 13-14, ¶37) In addition, combining data acquired at different frequencies could result in cancelling out of information as described in Junker’274 (Ex. 1108, col. 12, lines 2-9) and thus would not result in the type of signal stated in Claim 1 or serve the purpose of the method. “Frequency mixing is a means of cancelling or suppressing one of two superimposed signatures which have been produced at the same location. In eddy current inspection, the specific application of mixing is to ‘cancel’ the tube support plate signatures and, thus, expose any superimposed tube defect signatures.” For these reasons, Claim 7 is invalid as obvious over Holt in view of Junker ‘274.

Claim 7	Obvious over Holt in View of Junker ‘274
<p>The method of claim 6 wherein the first and second detectors are operated at substantially the same inspection frequencies</p>	<p>One of ordinary skill in the art would recognize that two signals acquired at different frequencies would not accurately simulate a realistic combined response (Colvin, Ex. 1104, pp13-14, ¶37).</p> <p>“these tapes [of two different eddy current signals that are combined] are then played back in synchronism and phase” (Holt, Ex. 1106, col. 5, lines 17-18). Not possible if recorded at different frequencies (Colvin, Ex. 1104, pp13-14, ¶37).</p> <p>Combining frequencies results in adverse cancellation of signals: “Frequency mixing is a means of cancelling or suppressing one of two superimposed signatures which have been produced at the same location. In eddy current inspection, the specific application of mixing is to ‘cancel’ the tube support plate signatures and, thus, expose any superimposed tube defect signatures.” Junker’274</p>

Claim 8 is obvious over Holt (Ex. 1106) in View of Junker ‘274 (Ex. 1108).

Claim 8 depends from Claims 1, 5, and 6 and is directed to step of operating the detectors at the same data collection rates. Claim 8 states: “The method of claim 6 wherein the first and second detectors are operated at substantially the same data collection rates.” The need for collection data rates to be the same is an obvious limitation in view of the stated purpose of the invention to create combined data signal for training purposes. The combined signal would not serve its intended purpose if the data rates were different for the in-service specimen and the lab specimen because the signal having two different data rates would not correctly show what an actual flaw would look like in an in-service specimen (Colvin, Ex. 1104, pp. 14-15, ¶38). In addition, Holt discloses field and lab data collection “made at identical speeds.” (Ex. 1106, col. 5, lines 17-18). Holt also states “these tapes [of two different eddy current signals that are combined] are then played back in synchronism and phase” (Ex. 1106, col. 5, lines 17-18). It would not be possible to play back the tapes in synchronism and phase if they were made at two different data collection rates (Colvin, Ex. 1104, pp. 14-15, ¶38). Claim 8 is invalid as obvious because it would have been obvious in light of well-known practice at the time of filing of the ‘269 Patent and also in view of Holt.

Claim 8	Obvious over Holt in View of Junker ‘274
The method of claim 6 wherein the first and second detectors are operated at substantially the same data collection rates	Field and lab data collection “made at identical speeds.” (Ex. 1106, col. 5, lines 17-18). “these tapes [of two different eddy current signals that are combined] are then played back in synchronism and phase” (Ex. 1106, col. 5, lines 17-18). Not possible to play back in synchronism and phase if made at different data collection rates (Colvin, Ex.

Claim 9 is obvious over Holt (Ex. 1106) in View of Junker ‘274 (Ex. 1108).

Claim 9 states “The method of claim 1 wherein only a segment of data collected at one of either the field site or the laboratory site is combined with data collected at the other of either the field site or the laboratory site.” The use of only a segment of data in any analysis is well-known in many fields including non-destructive testing with eddy current probes (Colvin, Ex. 1104, p. 15, ¶39). Because steam generators consist of thousands of tubes, and thousands of feet of tubing (Holt, Ex. 1106, col 1, lines 40-45) use of only a segment of data to simulate a flaw for testing technicians is an obvious measure. Use of only a segment of data combined with other data is also disclosed in Junker ‘274, which discusses operating on “segments of elongated signatures” in eddy current data streams (Ex. 1108, col. 3, lines 42-46). Thus, Claim 9 is invalid as obvious over Holt in view of Junker ‘274.

Claim 9	Obvious over Holt in View of Junker ‘274
The method of claim 1 wherein only a segment of data collected at one of either the field site or the laboratory site is combined with data collected at the other of either the field site or the laboratory site.	Junker ‘274, which discusses operating on “segments of elongated signatures” in eddy current data streams (Ex. 1108, col. 3, lines 42-46).

Claim 10 is obvious over Holt (Ex. 1106) in View of Junker ‘274 (Ex. 1108) and Winslow (Ex. 1109).

Claim 10 states “the method of claim 1 wherein the specimen is a mathematical model and the data generated from the specimen is generated by the mathematical model.” The use of mathematical models to simulate eddy current response was well known by those of skill in the art at the time of the filing of the ‘269 Patent (Colvin, Ex. 1104, p. 15, ¶41). In the same field of

endeavor as Holt and Junker ‘274 Winslow discloses the use of a mathematical model: “a theoretical calibration value and a theoretical nominal value may be calculated using the standard eddy current equations and assumed conductivity and permeability values” (Ex. 1109, p.15, paragraph 103). It would have been obvious to combine the teaching of Holt and Junker ‘274 with mathematical modeling of an eddy current value in Winslow as a means for creating consistent flaw sample data without having to resort to preparing physical samples (Colvin, Ex. 1104, p. 15, ¶41). Thus, Claim 10 is invalid as obvious over Holt in view of Junker ‘274 and further in view of the disclosure of the use of mathematical models in Winslow as all three references are directed to detection of flaws with non-destructive testing means.

Claim 10	Obvious over Holt in View of Junker ‘274 and Winslow
The method of claim 1 wherein the specimen is a mathematical model and the data generated from the specimen is generated by the mathematical model.	Winslow: “A theoretical calibration value and a theoretical nominal value may be calculated using the standard eddy current equations.” (p. 15, [0104]).

VI. CONCLUSION

In light of the foregoing, it is respectfully submitted that Petitioner has shown that there is a reasonable likelihood that at least one claim of the ‘269 patent is unpatentable under 37 C.F.R. §42.104(b)(4) and that Petitioner’s request for an *Inter Partes* Review should be granted and that Claims 1-10 be found unpatentable as either anticipated or obvious as set forth above.

Respectfully submitted,

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I hereby certify that the foregoing Amended Petition for *Inter Partes* Review Under 37 C.F.R. §42.100 is being served via Federal Express on this 12th day of December, 2014 in an envelope addressed to:

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