Shared Services Group
P.O. Box 3707
Seattle, WA 98124-2207

November 19, 2002
G9704-SSG-012

DOCUMENT CONTROL DESK
UNITED STATES NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

BOEING

Reference: a) Boeing Letter G-1151-RSO-92-365 dated August 31, 1992; R.S. Orr to the NRC Operations Center

b) NRC Letter Docket No. 99901227 dated August 12, 1992; L. J. Norrholm to R. S. Orr; Subject: Response to 10 CFR 21 Inquiry

Dear Sir or Madam:

In accordance with the Reference correspondence and 10 CFR 21, Boeing is sending the NRC the attached error notices received from our former software suppliers. Because of unknown current addresses, the following former customers were not notified:

Reactor Controls, Inc
Echo Energy Consultants
Nuclear Applications and Systems Analysis Company (Japan)
Nuclear Power Services
GPU Nuclear Corporation
Tenera, Inc.
Stone & Webster Engineering

Error notices have been sent to our other former customers.

Very truly yours,

Mark S. Snyder
Nuclear Administrator
Mail Code 7A-43

Enclosures: GT STRUDL Program Report Forms 2002.03 through 2002.05

IE19

GTSTRUDL Program Report Form

GPRF No.: 2002.03

DATE: 7/24/02

FROM: Computer-Aided Structural Engineering Center
Georgia Institute of Technology
Atlanta, Georgia 30332-0355

SEVERITY LEVEL:

X URGENT Problem results in incorrect answers which may not be apparent or job aborts and cannot be recovered within the session or job.

_ SERIOUS Problem results in incorrect answers which are obvious or problem prevents completion of a particular user's task.

_ MINOR Problem can be worked around or problem poses high frustration factor.

_ INFORMATIVE Documentation error, program usage tip, user inconveniences.

Date Problem Confirmed 7/24/02 .

Date Notification Sent 7/24/02

Computers All

Operating System All

Versions All versions prior to and including Version 26

Target Release for Correction Version 27

Kenneth Will — Director ASD

Signature — Title

R & D Division

Kenneth Will — 7/24/02

Typed or Printed Name — Date of Signature

David C Key — Configuration Control Manager

Signature — Title

Professional Services Division

David C. Key — 7/24/02

Typed or Printed Name — Date of Signature

Rev. 2.3

GTSTRUDL Program Report Form
(Continued)

GPRF No.: 2002.03

DATE: 7/24/02

DESCRIPTION:

STIFFNESS ANALYSIS will abort if MEMBER RELEASES and a MEMBER TEMPERATURE LOAD have been specified for a plane or space truss member.

Workaround: Remove the Member Releases for the truss members.

Example:

```
TYPE SPACE TRUSS
MEMBER INCIDENCES
27 10 20
....
MEMBER RELEASES
27 START MOM X Y Z END MOM Y Z
....
LOADING 1
MEMBER TEMPERATURE LOAD
27 AXIAL 100.
```

Applicable Sections of the Documentation:

MEMBER RELEASES	Section 2.1.8.2 of Volume 1 of the GTSTRUDL Reference Manual
MEMBER TEMPERATURE LOAD	Section 2.1.11.4.4 of Volume 1 of the GTSTRUDL Reference Manual
STIFFNESS ANALYSIS	Section 2.1.13.2 of Volume 1 of the GTSTRUDL Reference Manual

GTSTRUDL Program Report Form

GPRF No.: 2002 04

DATE: 9/13/2002

FROM: Computer-Aided Structural Engineering Center
Georgia Institute of Technology
Atlanta, Georgia 30332-0355

SEVERITY LEVEL:

X URGENT — Problem results in incorrect answers which may not be apparent or job aborts and cannot be recovered within the session or job.

_ SERIOUS — Problem results in incorrect answers which are obvious or problem prevents completion of a particular user's task.

_ MINOR — Problem can be worked around or problem poses high frustration factor.

_ INFORMATIVE — Documentation error, program usage tip, user inconveniences.

Date Problem Confirmed September 13, 2002

Date Notification Sent _____

Computers All

Operating System All

Version All

Target Release for Correction Version 26.0

Michael H. Swanger
Signature
R & D Division

Sr. RE
Title

Michael H. Swanger
Typed or Printed Name

9/13/2002
Date of Signature

David C Key
Signature
Professional Services Division

Configuration Control Manager
Title

David C. Key
Typed or Printed Name

9/16/02
Date of Signature

Rev. 2.2

GTSTRUDL Program Report Form
(Continued)

GPRF No.: 2002.04

DATE: 9/13/2002

DESCRIPTION:

The second and later in a sequence of DYNAMIC ANALYSIS EIGENVALUE, ASSEMBLE FOR DYNAMICS, and DYNAMIC ANALYSIS MODE SUPERPOSITION commands will not reassemble the composite modal damping matrix if the only source of damping is joint damping proportionional to joint inertia. The following sequence of commands illustrates this situation:

```
INERTIA OF JOINTS WEIGHT
   1  TRANS X  75917.46   Y  75917.46  ROTATION Z    1209660318  DAMPING   0.04
   2  TRANS X  77064.00   Y  77064.00  ROTATION Z    1287174145  DAMPING   0.04
   3  TRANS X  54917.00   Y  54917.00  ROTATION Z     855341667  DAMPING   0.04
   4  TRANS X  40988.51   Y  40988.51  ROTATION Z     586281275  DAMPING   0.04
   5  TRANS X  50329.18   Y  50329.18  ROTATION Z     716459995  DAMPING   0.04
   6  TRANS X  21339.21   Y  21339.21  ROTATION Z     148471761  DAMPING   0.04

EIGEN PARAMETERS
SOLVE USING GTLANCZOS
NUMBER OF MODES  18
PRINT MAX
END

$$* **
$$* ** First DYNAMIC ANALYSIS EIGENVALUE command causing the first composite
$$* ** modal damping matrix assembly.
$$* **
DYNAMIC ANALYSIS EIGENVALUE

       .
       .
       .

CHANGE
INERTIA OF JOINTS WEIGHT
   1    DAMPING   0.09
   2    DAMPING   0.09
   3    DAMPING   0.09
   4    DAMPING   0.09
   5    DAMPING   0.09
   6    DAMPING   0.09
ADD

$$* **
$$* ** Second DYNAMIC ANALYSIS EIGENVALUE command in which the composite modal
$$* ** damping matrix is erroneously not re-assembled.
$$* **
DYNAMIC ANALYSIS EIGENVALUE
```

The only work-around is to break up the problem into separate jobs, where each job

reflects the different composite modal damping data.

GTSTRUDL User Reference Manual Sections:

Specification of Damping Properties	Section 2..4.3.4, Volume 3, Rev. M, GTSTRUDL Reference Manual

GTSTRUDL Program Report Form

GPRF No.: 2002.05

DATE: 9/18/2002

FROM: Computer-Aided Structural Engineering Center
Georgia Institute of Technology
Atlanta, Georgia 30332-0355

SEVERITY LEVEL:

X URGENT — Problem results in incorrect answers which may not be apparent or job aborts and cannot be recovered within the session or job.

_ SERIOUS — Problem results in incorrect answers which are obvious or problem prevents completion of a particular user's task.

_ MINOR — Problem can be worked around or problem poses high frustration factor.

_ INFORMATIVE — Documentation error, program usage tip, user inconveniences.

Date Problem Confirmed September 18, 2002

Date Notification Sent 9/18/2002

Computers All

Operating System All

Version All

Target Release for Correction Version 27.0

Michael H. Swanger (saw)
Signature
R & D Division

Sr. RE
Title

Michael H. Swanger
Typed or Printed Name

9/18/02
Date of Signature

David C. Key
Signature
Professional Services Division

Configuration Control Manager
Title

David C. Key
Typed or Printed Name

9/18/02
Date of Signature

Rev. 2.2

GTSTRUDL Program Report Form
(Continued)

GPRF No.: 2002.05

DATE: 9/18/2002

DESCRIPTION:

The CREATE RESPONSE SPECTRUM command will abort if the total number of time points needed to perform the integration for a specified acceleration time history file applied to a specified frequency exceeds 1 million, which is the maximum number of allowable time points. The following CREATE RESPONSE SPECTRUM example illustrates such a case:

```
UNITS CYCLES SECONDS
CREATE RESPONSE SPECTRUM ACCELERATION LINEAR VS FREQUENCY LINEAR  -
FILE 'LIN-004X'
  FREQUENCY RANGE FROM 0.1 TO 3.0 AT 0.1 -
    FROM 3.0 TO 3.6 AT 0.15 -
    FROM 3.6 TO 5.0 AT 0.2 -
    FROM 5.0 TO 8.0 AT 0.25 -
    FROM 8.0 TO 15.0 AT 0.5 -
    FROM 15.0 TO 18.0 AT 1.0 -
    FROM 18.0 TO 22.0 AT 2.0 -
    FROM 22.0 TO 55.0 AT 3.0
  DAMPING PERCENTS 1.0 2.0 4.0
  INCLUDE STRUCTURAL NATURAL FREQUENCIES
  USE ACCELERATION TIME HISTORY FILES 'THO-04X'
  INTEGRATE USING WILSON
  DIVISOR 1000.0
END OF CREATE RESPONSE SPECTRUM
```

The integration time increment for each of the frequency points in the specified frequency range is computed as 1/(f*DIVISOR), where f is the natural frequency (Hz) under consideration. For example, if the frequency f = 43 Hz, then for DIVISOR = 1000, the integration time increment is 1/43000 = 2.3255e-5 seconds. If there are 26 seconds in the specified acceleration time history file THO-04X, the total number of time points needed for the integration calculation is 26/2.3255e-5 + 1 = 1.118 million > 1 million. The easiest work-around is to use a smaller DIVISOR value. In this and most cases, DIVISOR = 1000 is far in excess of what is reasonable to produce accurate and consistent results. Note that the default value for DIVISOR is 12.0; therefore in the large majority of cases it should not be necessary to exceed 100.0 for the DIVISOR value.

GTSTRUDL User Reference Manual Sections:

The CREATE RESPONSE SPECTRA Command	Section 2..4.8.2, Volume 3, Rev. R, GTSTRUDL Reference Manual

GTSTRUDL Program Report Form

GPRF No.: 2002.03

DATE: 7/24/02

FROM: Computer-Aided Structural Engineering Center
Georgia Institute of Technology
Atlanta, Georgia 30332-0355

SEVERITY LEVEL:

X URGENT Problem results in incorrect answers which may not be apparent or job aborts and cannot be recovered within the session or job.

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_ INFORMATIVE Documentation error, program usage tip, user inconveniences.

Date Problem Confirmed 7/24/02 .

Date Notification Sent 7/24/02

Computers All

Operating System All

Versions All versions prior to and including Version 26

Target Release for Correction Version 27

Kenneth Will — Director ASD
Signature — Title
R & D Division

Kenneth Will — 7/24/02
Typed or Printed Name — Date of Signature

David C Key — Configuration Control Manager
Signature — Title
Professional Services Division

David C Key — 7/24/02
Typed or Printed Name — Date of Signature

GTSTRUDL Program Report Form
(Continued)

GPRF No.: 2002.03

DATE: 7/24/02

DESCRIPTION:

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Example:

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MEMBER INCIDENCES
27 10 20
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LOADING 1
MEMBER TEMPERATURE LOAD
27 AXIAL 100.
```

Applicable Sections of the Documentation:

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MEMBER TEMPERATURE LOAD	Section 2.1.11.4.4 of Volume 1 of the GTSTRUDL Reference Manual
STIFFNESS ANALYSIS	Section 2.1.13.2 of Volume 1 of the GTSTRUDL Reference Manual

GTSTRUDL Program Report Form

GPRF No.: 2002 04

DATE: 9/13/2002

FROM: Computer-Aided Structural Engineering Center
Georgia Institute of Technology
Atlanta, Georgia 30332-0355

SEVERITY LEVEL:

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_ MINOR — Problem can be worked around or problem poses high frustration factor.

_ INFORMATIVE — Documentation error, program usage tip, user inconveniences.

Date Problem Confirmed September 13, 2002

Date Notification Sent _____

Computers All

Operating System All

Version All

Target Release for Correction Version 26.0

Signature
R & D Division

Sr. RE
Title

Michael H. Swanger
Typed or Printed Name

9/13/2002
Date of Signature

Signature
Professional Services Division

Configuration Control Manager
Title

David C. Key
Typed or Printed Name

9/16/02
Date of Signature

Rev. 2.2

GTSTRUDL Program Report Form
(Continued)

GPRF No.: 2002.04

DATE: 9/13/2002

DESCRIPTION:

The second and later in a sequence of DYNAMIC ANALYSIS EIGENVALUE, ASSEMBLE FOR DYNAMICS, and DYNAMIC ANALYSIS MODE SUPERPOSITION commands will not reassemble the composite modal damping matrix if the only source of damping is joint damping proportionional to joint inertia. The following sequence of commands illustrates this situation:

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EIGEN PARAMETERS
SOLVE USING GTLANCZOS
NUMBER OF MODES  18
PRINT MAX
END

$$* **
$$* ** First DYNAMIC ANALYSIS EIGENVALUE command causing the first composite
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$$* **
DYNAMIC ANALYSIS EIGENVALUE

       .
       .
       .

CHANGE
INERTIA OF JOINTS WEIGHT
   1    DAMPING   0.09
   2    DAMPING   0.09
   3    DAMPING   0.09
   4    DAMPING   0.09
   5    DAMPING   0.09
   6    DAMPING   0.09
ADD

$$* **
$$* ** Second DYNAMIC ANALYSIS EIGENVALUE command in which the composite modal
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The only work-around is to break up the problem into separate jobs, where each job

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GTSTRUDL Program Report Form

GPRF No.: 2002.05

DATE: 9/18/2002

FROM: Computer-Aided Structural Engineering Center
Georgia Institute of Technology
Atlanta, Georgia 30332-0355

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Date Problem Confirmed September 18, 2002

Date Notification Sent 9/18/2002

Computers All

Operating System All

Version All

Target Release for Correction Version 27.0

Michael H. Swanger
Signature
R & D Division

Sr. RE
Title

Michael H. Swanger
Typed or Printed Name

9/18/02
Date of Signature

David C. Key
Signature
Professional Services Division

Configuration Control Manager
Title

David C. Key
Typed or Printed Name

9/18/02
Date of Signature

Rev. 2.2

GTSTRUDL Program Report Form
(Continued)

GPRF No.: 2002.05

DATE: 9/18/2002

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    FROM 3.6 TO 5.0 AT 0.2 -
    FROM 5.0 TO 8.0 AT 0.25 -
    FROM 8.0 TO 15.0 AT 0.5 -
    FROM 15.0 TO 18.0 AT 1.0 -
    FROM 18.0 TO 22.0 AT 2.0 -
    FROM 22.0 TO 55.0 AT 3.0
  DAMPING PERCENTS 1.0 2.0 4.0
  INCLUDE STRUCTURAL NATURAL FREQUENCIES
  USE ACCELERATION TIME HISTORY FILES 'THO-04X'
  INTEGRATE USING WILSON
  DIVISOR 1000.0
END OF CREATE RESPONSE SPECTRUM
```

The integration time increment for each of the frequency points in the specified frequency range is computed as 1/(f*DIVISOR), where f is the natural frequency (Hz) under consideration. For example, if the frequency f = 43 Hz, then for DIVISOR = 1000, the integration time increment is 1/43000 = 2.3255e-5 seconds. If there are 26 seconds in the specified acceleration time history file THO-04X, the total number of time points needed for the integration calculation is 26/2.3255e-5 + 1 = 1.118 million > 1 million. The easiest work-around is to use a smaller DIVISOR value. In this and most cases, DIVISOR = 1000 is far in excess of what is reasonable to produce accurate and consistent results. Note that the default value for DIVISOR is 12.0; therefore in the large majority of cases it should not be necessary to exceed 100.0 for the DIVISOR value.

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