February 22, 1994
G-1151-RSO-94-057

Document Control Desk
United States Nuclear Regulatory Commission
Washington, D.C. 20555

BOEING   Reference: a)   Boeing Letter G-1551-RSO-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 notice(s) received from our former
software suppliers. Because of unknown current addresses, the following
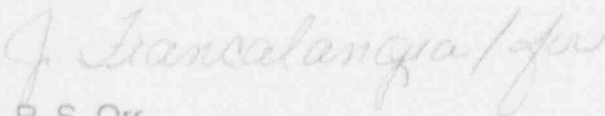former customers were not notified:

Reactor Controls, Inc.

Echo Energy Consultants, Inc.

Nuclear Applications and Systems Analysis Company (Japan)

Nuclear Power Services

Error notices have been sent to our other former customers.

Very truly yours,

J. Francalangia / for

R. S. Orr
Nuclear Administrator
G-1151 M/S 7A-33
(206) 865-6248

Attachment(s):   Class 3 Error Reports 94-02, 93-106 R1 and SCB94-2.

IE20

ANSYS® CLASS3 ERROR REPORT

ERROR NO: 94-02

KEYWORDS: *ALLSEL* *CONDENSED INPUT*

DESCRIPTION OF ERROR:

When condensed command input (using the $ character) is used on the same line as the ALLSEL command, all commands on that line after the ALLSEL command will be ignored and will not be executed.

FIRST INCORRECT VERSION(S):*

Rev. 5.0
Component Products Rev. 5.0

CORRECTED IN:*

Rev. 5.1
Component Products Rev. 5.1

SUGGESTED USER ACTION FOR RUNNING ON UNCORRECTED VERSION:

Start a new input line following the ALLSEL command, containing everything after the first $ character.

COMMENTS:

This error only applies to condensed ($) input on the same line as the ALLSEL command. Condensed input lines other than the line containing the ALLSEL command are not affected.

AUTHOR/CORRECTOR: _C.W. Aiken 7, D.J.D._   DATE: February 11, 1994
Christopher W. Aiken

REVIEWED BY QA: _____   DATE: February 11, 1994
Mark C. Imgrund
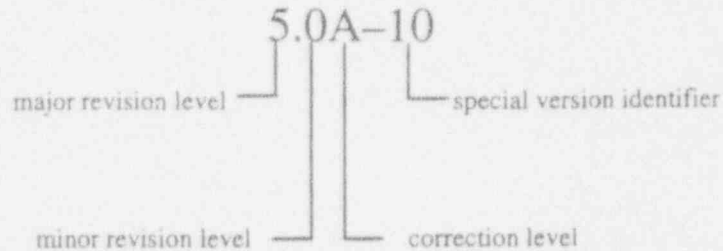
APPROVAL: _____   DATE: February 11, 1994
John A. Swanson

*If a product name is not included in the "first incorrect version", the full ANSYS program is implied. For products not listed, this error does not apply, but see the reverse side for equivalent product designations.

Unless noted otherwise, this error report also applies to all revisions after the first incorrect one and prior to the corrected revision. All revisions after "corrected in" are corrected. Manual corrections are included in on-line documentation as appropriate. Please see the reverse side of this sheet for additional information on ANSYS revision identifiers.

FORM SASI-QA25
DEC 19, 1988

ANSYS Revision Identifier Description

ANSYS revision identifiers consist of a major revision level, a minor revision level, a correction level, and occasionally a special version level. An example of how this is constructed is shown below:

$$5.0A-10$$

major revision level ⎯⎯⎯⎯⎯⎯⎯⎯ ⎯⎯⎯⎯ special version identifier

minor revision level ⎯⎯⎯⎯⎯⎯ ⎯⎯ correction level

Major revision level changes indicate that new features have been added to the program and that some level of program architecture change and/or file structure has occurred. Minor revision level changes also indicate that new features have been added to the program, but files are upwardly compatible. All known error fixes are included in both minor and major revisions. Changes to the correction level indicate that it is primarily an error correction release. Special version identifiers indicate that one or more additional minor changes have been made to the program, normally to circumvent an error. Special versions are not general releases to all ANSYS licensees, since they typically represent errors occurring only on one system, a subset of our customers who have specific graphics devices, etc.

The ANSYS revision identifier(s) shown under "corrected in" on the front side of this Class3 Error Report indicates the first possible revision that could contain the correction. A major program change needed to fix an error can dictate that the next minor or major revision will contain the fix rather than the next correction level. For example, when errors were being reported while Rev. 4.3A was the latest production version, most Class3 error reports indicated that 4.3B was the "corrected in" revision. Others requiring significant code restructuring were reported as fixed in 4.4. Rev. 4.3B was never released, but Rev. 4.4 contained all error corrections noted as fixed in 4.3B.

An identifier indicated under "corrected in" does not guarantee that a general release of that revision of ANSYS will occur. It does indicate that the correction is known and implemented in the coding that would be part of that general release.

Equivalent Product Identifiers

The ANSYS family of component products occasionally undergoes name changes between revisions and/or changes in the functionality of derived products (such as ANSYS-PC/LINEAR). To minimize the potential for confusion in these areas, the important product name equivalences (similar program functionality and error content) are listed below.

ANSYS/ED	contains all errors shown for	the full ANSYS product, starting at Rev. 5.0, and beyond, unless otherwise noted.
PC/LINEAR	is equivalent to	WS/LINEAR at Rev. 4.4A, and ANSYS/LINEAR starting at Rev. 5.0 and ANSYS/LinearPlus starting at Rev. 5.0A
PC/THERMAL	is equivalent to	WS/THERMAL at Rev. 4.4A, and ANSYS/THERMAL starting at Rev. 5.0.
PREPPOST	contains relevant errors shown for	the full ANSYS product, for included pre- and postprocessing functionality
PC/MAGNETIC	is equivalent to	ANSYS/Emag starting at Rev. 5.0A

ANSYS® CLASS3 ERROR REPORT

KEYWORDS: *ELEM13*   *PLANE13*   *PIEZOELECTRIC*   *PLANE STRESS*

DESCRIPTION OF ERROR:

PLANE13 piezoelectric (KEYOPT(1)=7 (UX, UY, and VOLT DOF)) plane stress (KEYOPT(3)=2) analyses are incorrect.

FIRST INCORRECT VERSION(S):*   CORRECTED IN:*
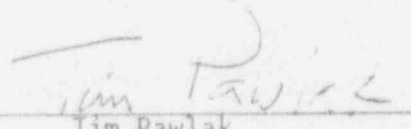
Rev. 4.4A   Rev. 5.1

SUGGESTED USER ACTION FOR RUNNING ON UNCORRECTED VERSION:

Use the 3D element, SOLID5, with unit thickness and appropriate boundary conditions, to model plane stress.
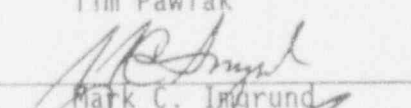
COMMENTS:

PLANE13 was referred to as STIF13 prior to Rev. 5.0.

AUTHOR/CORRECTOR: _____ DATE: February 11, 1994
                  Tim Pawlak

REVIEWED BY QA: _____ DATE: February 11, 1994
                Mark C. Imgrund

APPROVAL: _____ DATE: February 11, 1994
          John A. Swanson

*If a product name is not included in the "first incorrect version", the full ANSYS program is implied. For products not listed, this error does not apply, but see the reverse side for equivalent product designations.

Unless noted otherwise, this error report also applies to all revisions after the first incorrect one and prior to the corrected revision. All revisions after "corrected in" are corrected. Manual corrections are included in on-line documentation as appropriate. Please see the reverse side of this sheet for additional information on ANSYS revision identifiers.

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$$5.0A-10$$

major revision level ———⌐   ⌐——— special version identifier

minor revision level ———⌐   ⌐——— correction level

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PC/LINEAR   is equivalent to   WS/LINEAR at Rev. 4.4A,
and   ANSYS/LINEAR starting at Rev. 5.0
and   ANSYS/LinearPlus starting at Rev. 5.0A.

PC/THERMAL   is equivalent to   WS/THERMAL at Rev. 4.4A,
and   ANSYS/THERMAL starting at Rev. 5.0.

PREPPOST   contains relevant errors shown for   the full ANSYS product, for included pre- and postprocessing functionality

PC/MAGNETIC is equivalent to   ANSYS/Emag starting at Rev. 5.0A

SUBJECTS: *SOLID MODELING   SOLUTION   ELEMENTS   SUBSTRUCTURES   POSTPROCESSING*

This Support Coordinator Bulletin is a grouping of ambiguities and (non-Class3) errors. It is provided to inform ANSYS users prior to them encountering these difficulties, and to provide workarounds where appropriate.

Because this bulletin is a compilation of several topics, it has a different format from the standard QA Notice or Class3 Error Report.

Unless noted otherwise, errors described are corrected in the ANSYS version immediately following the last affected version noted, and any documentation changes will be made in the next available printing.

CATEGORY 1: SOLID MODELING

1. KEYWORDS	*SOLID*	*KMODIFY*

Description

The KMODIF command will corrupt the solid model database.

Affected Version(s)   Rev. 5.0

Workaround

If an input file is being used, correct the input by removing all KMODIF commands. Whatever the reason for using the KMODIF command, alternate methods must be used to achieve the desired results.

If an input file is not being used, use the LGWRITE command to create a log file. Once a log file has been created, remove all KMODIF commands. Whatever the reason for using the KMODIF command, alternate methods must be used to achieve the desired results.

Note: The LGWRITE command is undocumented at Revision 5.0 and is documented in beta form in Revision 5.0A. Because of limited testing, results with this command may vary.

2. KEYWORDS	*MESH*	*LDIV*	*LFILLT*

Description

The LDIV and LFILLT commands, when used on any line that had a Boolean function performed on it, may produce incorrect line direction. This may result in erroneous

plots (keypoint numbers appear to be duplicated),
incorrectly meshed line segments, and invalid solid
model geometries.

Affected Version(s)   Rev. 5.0A

Comments   To verify that the line segments have the correct line
                       directions, either:

                       a) Immediately review the line directions on a line
                           display by activating the line direction symbols with
                           the /PSYMB,LDIR,1 command; or

                       b) List the line segments.

3. KEYWORDS   *SOLID*   *VEXT*   *VROTAT*   *VDRAG*   *VOFFST*

Description   Any operation that takes a meshed 2D
                       area and transforms it into a meshed 3D volume (VDRAG,
                       VROTAT, VEXT, or VOFFST commands) may fail if either:

                       a) the area being transformed does not have its normal
                           vector pointed in the direction of transformation;
                           or

                       b) the 2D element type is not a 3D shell element.

                       When failure occurs, the error message indicates a failure
                       due to distorted elements.

Affected Version(s)   Rev. 5.0A

Workaround   If the area being transformed is NOT part of a volume,
                       then either:

                       a) Change the 2D area element type to a 3D shell and
                           perform the operation again; or

                       b) Redefine the area to have an opposite normal vector;
                           or

                       c) Issue the SHPP,WARN command.

                       If the area being transformed is part of a volume, then
                       either:

                       d) Issue the SHPP,WARN command; or

e) Create an equivalent area that has an opposite
   normal vector. Perform the NUMMRG,KP and NUMMRG,NODE
   commands after the transformation has been performed.
   Obviously, the meshes of both areas must match for this
   to work.

Comments   The failure occurs when the planar elements have
                          geometric normal vectors opposite in direction to the
                          transformation direction.

4. KEYWORDS   SOLID   VEXT   VROTAT   VDRAG   VOFFST

Description   Transformation of degenerate, higher-order, 2D planar
elements
                          (triangles) in a direction opposite to the area normal
                          will not work.

Affected Version(s)   Rev. 5.0A

Workaround   Either:

                          a) Use lower-order 3D shell elements and then add
                             midside nodes with the EMID command; or

                          b) Redefine the area so that its normal is in the
                             direction of extrusion.

5. KEYWORDS   SOLID   VDRAG

Description   VDRAG will extrude 2D elements into 3D elements only if
                          all lines of the drag path have a line direction that is
                          directed away from the area(s) being dragged.

Affected Version(s)   Rev. 5.0A

Workaround   Redefine line(s) so that all line directions point away
                          from the area being dragged.

CATEGORY II   SOLUTION

1. KEYWORDS   *UPGRADING TO ANSYS 5.0*   *ANSYS 4.4A*   *FILE28*

Description   Many ANSYS users have had difficulties in upgrading
nonlinear ANSYS Revision 4.4A models to ANSYS Revision
5.0. This is because, for upward compatibility of
input, the 4.4A ITER command supersedes any Revision 5.0
commands.

Therefore, if the ITER command is input, the Revision
5.0 commands NSUBST, NEQIT, OUTPR, or OUTRES will *not*
have any impact on an analysis at Revision 5.0 or
Revision 5.0A. Use ITER,0 to remove the Revision 4
specifications from a Revision 5.0 database.

For further information, see the "Upgrading to ANSYS
5.0" documentation, which describes this behavior.

Affected Version(s) Rev. 5.0 - 5.0A

Comments   File28s from 4.4A contain ITER commands, causing the
described behavior.

2. KEYWORDS   *SOLUTION*   *LSSOLVE*   *LSWRITE*

Description   The LSSOLVE and LSWRITE method of performing multiple
load steps does not handle NSUBST and AUTOTS commands in
a manner appropriate for multiple load steps. The LSSOLVE
macro also does not handle any spectrum analysis runs
properly.

Affected Version(s) Rev. 5.0 - 5.0A

Workaround   Use multiple SOLVE commands for these types of analyses,
or edit the load step file(s) written by LSWRITE.

CATEGORY III   ELEMENTS

1. KEYWORDS   *CONTACT   CONTAC49*

Description   If the area of the target surface of a CONTAC49 element
                      is of the order of 1E-6 then a warning is issued that a
                      "CONTACT PROJECTION FAILURE" has occurred. As a result,
                      contact may not be established correctly.

Affected Version(s)   Rev. 5.0

Workaround   Model in units that will produce a target surface area
                      much greater than 1E-6 (such as millimeters instead of
                      meters), or scale the model upward using the NSCALE
                      command.

                      Note: All quantities that have dimensions of length,
                              such as modulus of elasticity, density, etc.,
                              must be scaled as well.

2. KEYWORDS   *THERMAL   SURF19   SURF22   KEYOPT(9)>1*

Description   For element SURF19 (the 2-D surface effect element) and
                      SURF22 (the 3-D surface effect element) the
                      sentence "The form factor (cosine effect, See Section
                      14.22 of the Theory Manual for details) may be input as
                      a real constant (defaults to 1.0) or it may be
                      calculated (KEYOPT(9)) from the basic element
                      orientation and the extra node location" could be
                      misleading.

                      Additionally, the explanations of KEYOPT(9)=2 or 3 use
                      the term "form factor" incorrectly.

                      For KEYOPT(9)=2 or 3, the factor calculated by the ANSYS
                      program takes into account only the angle between the
                      element Z-axis at the integration point being processed
                      and the line connecting the integration point and the
                      extra node into account. No additional form factor
                      considerations are taken into account. Hence, this
                      is strictly a single "cosine effect."

Affected Version(s)   Rev. 5.0

Workaround   Adjust other terms in the governing equation, such as
                      the Stefan-Boltzmann Constant, to provide the desired
                      overall equations and results.

Comments   For KEYOPT(9)=1, the real constant FORMF is the
            radiation form factor as it would customarily be used.
            See Section 14.22 of the Theory Manual for details.

            The intended use of this capability (KEYOPT(9)=2 or 3)
            is to model fixed-temperature, very hot sources that are
            far away compared to the model size (such as the sun).
            For example, if the solar flux on a surface normal to
            the sun is known to be 1000 watts/sq. meter, the
            Stefan-Boltzmann constant should be adjusted such that
            when it is multiplied by T^{**4}, it equals 1000.

CATEGORY IV   SUBSTRUCTURES

1. KEYWORDS   *SUBSTR*   *EXPANSION*   *FILE*

Description   The expansion pass of a superelement may fail with the
                    message "REQUESTED ELEMENT # DOES NOT MATCH ELEMENT ON
                    FILE,1."

Affected Version(s) Rev. 5.0

Comments   This error manifests itself in a system-dependent manner,
                    and is more likely to occur on large models. If this error
                    occurs, there is no reliable workaround in Rev. 5.0
                    (Rev. 5.0A is corrected).

CATEGORY V   POSTPROCESSING

1. KEYWORDS   *POST1*   *POST26*

Description   Reaction forces may be available in POST1 and not in
                    POST26 or they may be available in POST26 and not in POST1.
                    It may not be obvious why this can occur. Availability
                    depends on whether OUTRES,RSOL, OUTRES,ESOL or OUTRES,NLOAD
                    has been used in the analysis.

Affected Version(s) Rev. 5.0 - 5.0A

Comments   In POST1, the reaction forces are calculated from the
                    element nodal forces, whereas POST26 reads the reaction
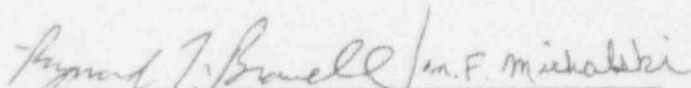   forces from the results file.

For the default setting of OUTRES, reaction forces will be available both in POST1 and POST26.

The commands OUTRES,ESOL and OUTRES,NLOAD only affect POST1 reaction forces and not POST26 reaction forces. For POST1, the reaction forces are available if either of the solution items "ESOL" or "NLOAD" are written to the results file.

The command OUTRES,RSOL only affects POST26 reaction forces and not POST1 reaction forces. For POST26, the reaction forces are available if the solution item "RSOL" is written to the results file.

AUTHORS: _____ DATE: February 11, 1994
Raymond L. Browell/Michael F. Michalski

QA APPROVAL: _____ DATE: February 11, 1994
Mark C. Imgrund

APPROVAL: _____ DATE: February 11, 1994
John A. Swanson