

August 30, 2011

APPLICANT: AREVA NP, Inc.

SUBJECT: SUMMARY OF JUNE 9, 2010, PUBLIC MEETING WITH AREVA NP, INC.,  
TO DISCUSS REVISED RESPONSE SCHEDULE FOR U.S. EPR FINAL  
SAFETY ANALYSIS REPORT SECTIONS 3.7 AND 3.8 REQUESTS FOR  
ADDITIONAL INFORMATION

On June 9, 2010, a Category 1 public meeting was held between the U.S. Nuclear Regulatory Commission (NRC) and representatives of AREVA NP, Inc., (AREVA) at the U.S. NRC office in Rockville, Maryland. The purpose of the meeting was to discuss the revised response schedule for U.S. EPR Final Safety Analysis Report (FSAR) Sections 3.7 and 3.8 requests for additional information (RAIs), as well as NRC staff information needs for completion of the Phase 2 technical reviews of FSAR Sections 3.7 and 3.8 for the U.S.EPR design certification.

The meeting notice can be accessed through the Agencywide Documents Access and Management System (ADAMS) under Accession No. ML101450003. This system provides text and image files of NRC public documents. A meeting agenda is provided as Enclosure 1. A list of attendees is provided as Enclosure 2.

The meeting began at 9:00 a.m. (Eastern Time). After opening remarks and the introduction of attendees, meeting ground rules and logistics were announced. The NRC staff then briefly reviewed the meeting agenda and background. This meeting follows an April 26-30, 2010, NRC staff audit of the U.S.EPR seismic and structural design methodologies and calculations that are associated with AREVA's recent reanalysis and remodeling. A number of issues with the analyses and calculations were identified during this audit. During the audit, a path forward was identified for approximately 40 items where AREVA will need to redo analyses and calculations in order to resolve NRC staff's technical concerns. The goal of this public meeting is for NRC staff to learn about, and discuss with AREVA its revised schedule for FSAR Sections 3.7 and 3.8 RAI responses as a result of subject audit.

AREVA opened the meeting by making a presentation on their revised RAI response schedule, which is included as Enclosure 3. AREVA stated that key changes in the design and analysis were: (1) to split the superstructure and basemat model; (2) change the static model approach; and (3) create a separate analysis for the nuclear auxiliary building (NAB). AREVA then presented a bar chart and a detailed timeline for submitting interim and final RAI response for 47 currently open civil/ structural RAIs. The chart and timeline depict, on a monthly basis, the number of interim and final responses to be submitted for the period June 2010, through April 2011. Interim responses will include methodology and FSAR updates. Final responses will include both of the aforementioned items, plus the final calculation results. This schedule information is also displayed on a Revised RAI Schedule, Enclosure 4.

AREVA then discussed its RAI reconciliation approach with NRC staff. AREVA presented a consolidated list of completed RAI responses that will potentially be impacted by AREVA's remodeling and reanalysis activities, Enclosure 5. AREVA and NRC staff then discussed the path forward activities identified during the April 26-30, 2010, audit to clarify expectations on

how these activities would be performed. AREVA and NRC staff then discussed future interaction opportunities to support expeditiously and effectively accomplishing the NRC staff's review.

The meeting adjourned at 12:00pm

Members of the public were present at the meeting.

Please direct any inquires concerning this meeting to Michael Miernicki at 301-415-2304, or [Michael.Miernicki@nrc.gov](mailto:Michael.Miernicki@nrc.gov).

**/RA/**

Michael J. Miernicki, Senior Project Manager  
EPR Projects Branch  
Division of New Reactor Licensing  
Office of New Reactors

Docket No. 52-020

Enclosures:    1.    Agenda  
                     2.    List of Attendees  
                     3.    AREVA Presentation on Revised FSAR Sections 3.7 and 3.8  
                              RAI Response Schedule.  
                     4.    Revised RAI Schedule  
                     5.    FSAR Sections 3.7 and 3.8 RAI Reconciliation List

cc: See next page

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<b>DATE</b>	08/18/11	08/29/11	08/29/11	08/30/11

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## AGENDA

### PUBLIC MEETING TO DISCUSS REVISED RAI RESPONSE SCHEDULE FOR U.S. EPR FSAR SECTIONS 3.7 AND 3.8 TECHNICAL REVIEW

June 9, 2010

<u>Time</u>	<u>Topic</u>	<u>Led by</u>
9:00 A.M.	Introductory Remarks	NRC/AREVA
9:15 A.M.	Overview of the Civil/ Structural Design RePlan	AREVA
10:15 A.M.	Revised RAI Response Schedule	AREVA
10:30 A.M.	Updated timeline from the December 2009 Public Meeting	AREVA
10:45 A.M.	Revised RAI Reconciliation List (submitted RAI responses impacted by RePlan)	AREVA
11:00 A.M.	Path to Closure, including discussion/identification of potential Open Items	AREVA
11:50 A.M.	Opportunity for Public Comment*	NRC
12:00 P.M.	Adjourn	

*\* The public will be given opportunities to comment at these points in the meeting.*

## Attendance List

## Public Meeting with AREVA NP Regarding Revised RAI Response Schedule for U.S. EPR FSAR Section 3.7 and 3.8 RAI Responses

**June 9, 2010**  
**Rockville, MD**

[illegible]

# **Public Meeting to Discuss Revised Response Schedule for U.S. EPR FSAR Sections 3.7 and 3.8 Requests for Additional Information**



Nawar Alchaar  
Civil Structural Engineering Manager  
Rockville, Maryland  
June 9, 2010



ENCLOSURE 3

# Purpose and Background



## ► Purpose

- ◆ Confirm agreement with the NRC on the path to closure for U.S. EPR FSAR Sections 3.7 and 3.8
- ◆ Present revised schedule for U.S. EPR FSAR Sections 3.7 and 3.8 open Requests for Additional Information (RAIs)
- ◆ Identify future NRC/AREVA interaction opportunities

## ► Background

- ◆ **U.S. EPR NRC audit April 26-30, 2010**
  - Review of NRC high and medium priority open RAIs
  - NRC comment classification
    - Path forward AREVA and/or NRC Action
    - Resolved pending NRC review of final RAI response
    - Resolution path unclear
    - Not discussed – to be discussed in future telecon
- ◆ **NRC/AREVA Bi-weekly telecons**
  - Finalize path to closure



# Summary of Key Changes U.S. EPR Design and Analysis



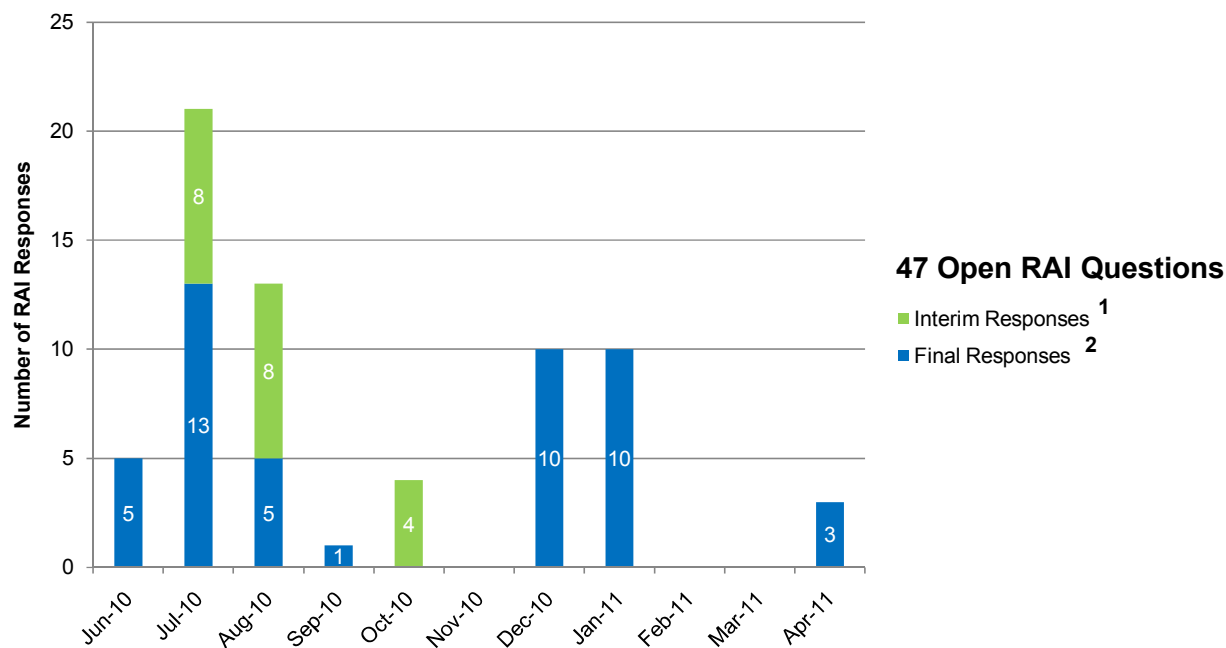
- ▶ **Split of Superstructure and Basemat models**
- ▶ **Static Model**
  - ◆ 100-40-40 to SRSS
  - ◆ Elimination of modification factors
- ▶ **NAB Stability Analysis**

# Summary RAI Schedule

## U.S. EPR FSAR Sections 3.7 and 3.8



**C/S RAI Reponse Schedule -NRC Dates (see handout)**

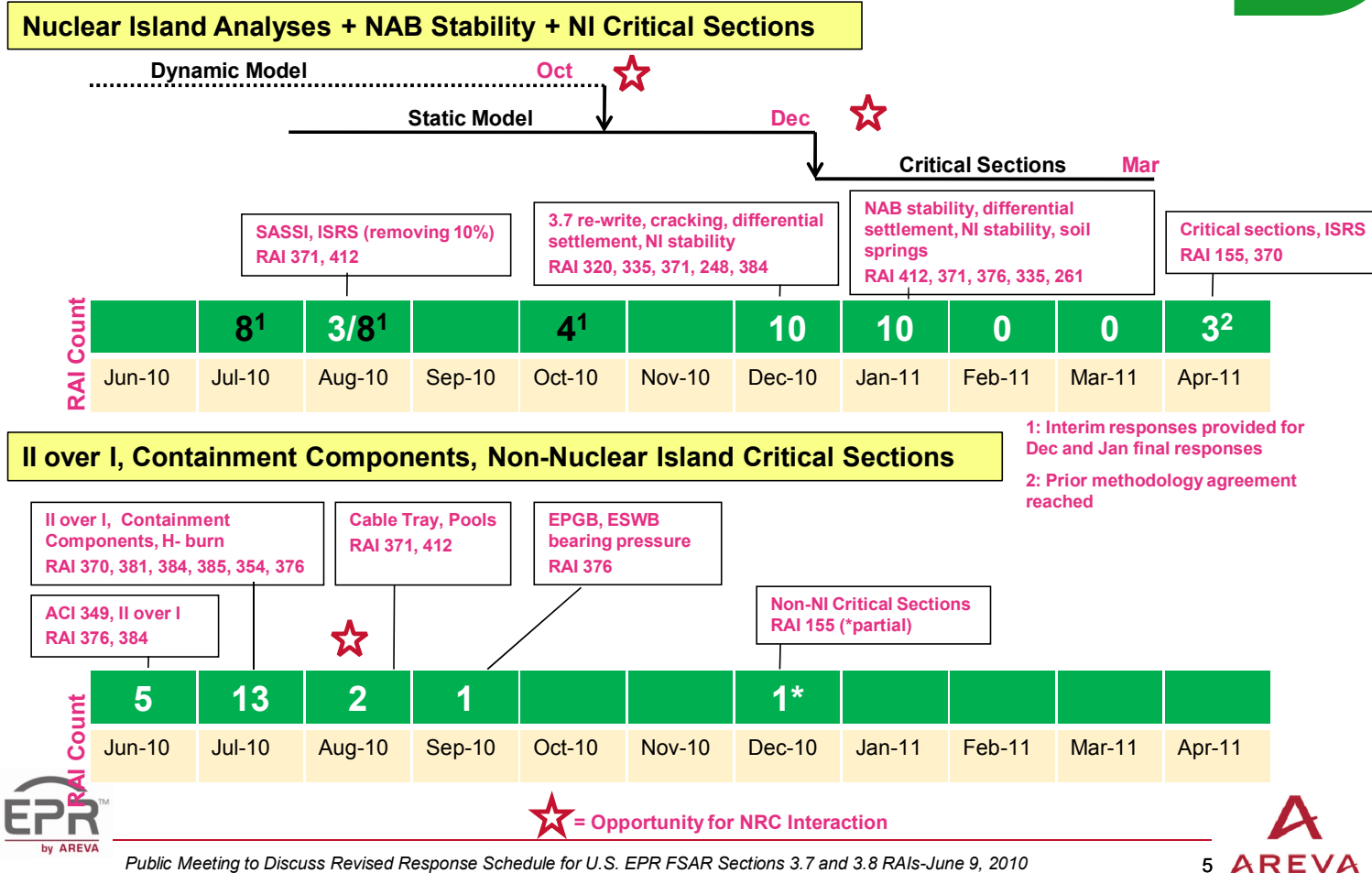


(1) Interim RAI responses include methodology and FSAR updates

(2) Final RAI responses include methodology, results and FSAR updates



# Updated Timeline U.S. EPR FSAR Sections 3.7 and 3.8



# RAI Reconciliation



- ▶ **Consolidated list of RAIs potentially impacted by embedded FEM and Replan activities (see handout)**
- ▶ **RAIs potentially impacted by Replan Activities**

KEY CHANGES	POTENTIALLY IMPACTED COMPLETED RAIs	MAPPED TO OPEN RAIs
Split of Superstructure and Basemat models	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• RAI 371 Question 03.07.02-67</li> </ul>
Static Model <ul style="list-style-type: none"> <li>• 100-40-40 to SRSS</li> </ul>	<ul style="list-style-type: none"> <li>• RAI 155 Question 03.08.03-10</li> <li>• RAI 248 Question 03.07.02-55</li> <li>• RAI 291 Question 03.07.02-62</li> </ul>	<ul style="list-style-type: none"> <li>• RAI 376 Question 03.08.03-24</li> </ul>
Static Model <ul style="list-style-type: none"> <li>• Elimination of modification factors</li> </ul>	<ul style="list-style-type: none"> <li>• RAI 190 Question 03.08.01-28</li> <li>• RAI 222 Question 03.08.03-18</li> <li>• RAI 291 Question 03.07.02-61</li> </ul>	<ul style="list-style-type: none"> <li>• RAI 376 Question 03.08.01-48</li> </ul>
NI Stability Analysis	<ul style="list-style-type: none"> <li>• RAI 130 Question 03.07.02-08</li> <li>• RAI 130 Question 03.07.02-22</li> <li>• RAI 248 Question 03.07.02-53</li> </ul>	<ul style="list-style-type: none"> <li>• RAI 376 Question 03.08.05-24</li> </ul>
NAB Stability Analysis	<ul style="list-style-type: none"> <li>• RAI 130 Question 03.07.02-20</li> <li>• RAI 130 Question 03.07.02-28</li> <li>• RAI 155 Question 03.08.04-01</li> <li>• RAI 248 Question 03.07.02-53</li> </ul>	<ul style="list-style-type: none"> <li>• RAI 376 Question 03.08.04-09</li> </ul>

- ▶ **Impacted RAIs superceded or updated in applicable portions of open RAI responses**

## Path to Closure U.S. EPR FSAR Sections 3.7 and 3.8



- Confirmation of path to closure for high and medium priority RAIs (see handout)

# Path to Closure

## U.S. EPR FSAR Sections 3.7 and 3.8



### ► RAI Response Two-Step Approach

#### ◆ Response submittals

- Schedule dates before August 31, 2010
  - Final Response including analytical results, where applicable
- Schedule dates post August 31, 2010
  - Interim responses with description of methodology and FSAR updates before October 31, 2010
  - Final responses with description of methodology, analytical results and FSAR updates in accordance with RAI response schedule

#### ◆ Sample application of two-step approach (Critical Sections - see handout)

# Path to Closure

## U.S. EPR FSAR Sections 3.7 and 3.8



### ► NRC/AREVA Interaction Opportunities

#### ◆ Telecons

- Status open RAIs
- Discuss emerging issues
- Discuss NRC feedback on interim RAI responses
- Reach agreement on path to closure
  - Audit Items – path to closure unclear (NAB stability, NI tendon gallery, construction sequence/settlement)
  - Audit Items – not discussed (load distribution due to concrete cracking, ISI program, fuel rack loads, concrete durability)

#### ◆ Audits

- NRC review of completed technical work that form the basis of the RAI interim or final responses
- Discuss interim RAI responses

#### ◆ Public Meetings



## Next Step



- ▶ **Submit RAI responses as shown on timeline**
- ▶ **Review details of two-step RAI response schedule, on a question-by-question basis, to support NRC review planning**

**>> Goal is to clearly specify what NRC will get and when, to support a predictable and timely review.**







## Revised RAI Schedule

RAI	Question		NRC Response Date
155	03.08.01-	24	25-Apr-11
155	03.08.04-	6	25-Apr-11
248	03.07.02-	51	12-Dec-10
261	02.05.04-	4	17-Jan-11
320	03.07.02-	63	14-Dec-10
320	03.07.03-	37	14-Dec-10
335	03.08.01-	44	3-Dec-10
335	03.08.04-	9	14-Jan-11
335	03.08.04-	10	14-Dec-10
354	03.08.02-	11	30-Jul-10
354	03.08.02-	12	30-Jul-10
354	03.08.02-	13	30-Jul-10
354	03.08.02-	14	30-Jul-10
354	03.08.02-	15	30-Jul-10
354	03.08.02-	16	30-Jul-10
354	03.08.05-	22	3-Dec-10
354	03.08.05-	23	30-Jul-10
370	03.07.01-	27	18-Apr-11
370	03.07.03-	38	8-Jul-10
371	03.07.01-	28	3-Aug-10
371	03.07.02-	66	17-Jan-11
371	03.07.02-	67	12-Dec-10
371	03.07.02-	68	12-Dec-10
371	03.07.02-	69	13-Dec-10
371	03.07.02-	70	3-Aug-10
371	03.07.02-	71	3-Aug-10
371	03.07.02-	72	3-Aug-10
376	03.08.01-	47	16-Jul-10
376	03.08.01-	48	29-Jun-10
376	03.08.03-	21	24-Jun-10
376	03.08.03-	22	24-Jun-10
376	03.08.03-	24	29-Jun-10
376	03.08.05-	24	17-Jan-11
376	03.08.05-	25	7-Jan-11
376	03.08.05-	26	7-Jan-11
376	03.08.05-	27	7-Jan-11
376	03.08.05-	28	17-Jan-11
376	03.08.05-	29	29-Sep-10
376	03.08.05-	31	17-Jan-11
381	03.07.04-	6	14-Jul-10
384	03.03.02-	5	28-Jun-10
384	03.04.02-	13	10-Dec-10
384	03.04.02-	14	14-Jul-10
385	09.01.05-	22	14-Jul-10
396	19-	337	14-Jul-10
412	03.07.02-	73	17-Jan-11
412	03.07.02-	74	19-Aug-10

NRC AREVA Public Meeting – June 9, 2010

**U.S. EPR FSAR SECTIONS 3.7 and 3.8  
RAI RECONCILIATION LIST**

The following RAI responses are potentially impacted by the civil/structural re-plan activities. Impacted RAIs will be superceded or updated in the applicable portions of open RAI response.			
Batch #	RAI Number	Description of Change	MAPPED TO OPEN RAI
None	NA	Split of Superstructure and Basemat models	RAI 371 Question 03.07.02-67
155	03.08.03-10	Static Model (100-40-40 to SRSS)	RAI 376 Question 03.08.03-24
248	03.07.02-55		
291	03.07.02-62		
190	03.08.01-28	Static Model (Elimination of modification factors)	RAI 376 Question 03.08.01-48
222	03.08.03-18		
291	03.07.02-61		
130	03.07.02-08	NI Stability Analysis	RAI 376 Question 03.08.05-24
130	03.07.02-22		
248	03.07.02-53		
130	03.07.02-20	NAB Stability Analysis	RAI 376 Question 03.08.04-09
130	03.07.02-28		
155	03.08.04-01		
248	03.07.02-53		
The following RAI responses will be affected due to converting the analytical method used to qualify the U.S. EPR from the surface founded stick model to an embedded finite element model. The replacement response will be annotated as part of the response to RAI 320 Question 03.07.02-63. After the response to Question 03.07.02-63 is finalized a second review of the previous responses will be performed to assure coherency and if additional responses are affected they will be identified and annotated with RAI 320 Question 03.07.02-63.			
Batch #	RAI Number	Description of Change	
35	02.05.02-01	Number of generic soil profiles changed. Bell Bend upper bound, best estimate and lower bound soil profiles are added.	
35	02.05.02-02	Number of generic soil profiles changed. Bell Bend upper bound, best estimate and lower bound soil profiles are added.	
35	02.05.04-02	New dynamic bearing pressures will be reported as a result of the embedded FEM SSI analyses.	
130	03.07.01-11	Stresses based on embedded FEM results need to be reevaluated.	
201	03.07.01-19	Embedment will be considered.	
215	03.07.01-21	Number of generic soil profiles changed. Bell Bend upper bound, best estimate and lower bound soil profiles are added.	
215	03.07.01-24	CSDRS will include Bell Bend GMRS.	
248	03.07.01-25	Stresses based on embedded FEM results will be re-evaluated	
130	03.07.02-01	MTR/SASSI is used for the embedded FEM SSI analysis in lieu of SASSI 4.1B	
130	03.07.02-02	Number of generic soil profiles changed. Bell Bend upper bound, best estimate and lower bound soil profiles are added.	
130	03.07.02-03	Surface-founded stick model is replaced with embedded FEM for the SSI analysis.	
130	03.07.02-04	Surface-founded stick model is replaced with embedded FEM for the SSI analysis. (Basemat flexibility).	





**U.S. EPR FSAR SECTIONS 3.7 and 3.8  
RAI RECONCILIATION LIST**

Batch #	RAI Number	Description of Change
130	03.07.02-05	Surface-founded stick model is replaced with embedded FEM for the SSI analysis. (Basemat flexibility).
130	03.07.02-06	Surface-founded stick model is replaced with embedded FEM for the SSI analysis. (Basemat flexibility).
130	03.07.02-08	Non-linear analyses replaced with an embedded finite element model
130	03.07.02-09	Embedded FEM is used (coupled rather than decoupled).
130	03.07.02-13	Surface-founded stick model is replaced with embedded FEM for the SSI analysis.
130	03.07.02-14	NAB is an embedded model.
130	03.07.02-15	Embedment will be considered.
130	03.07.02-16	Plan to crack all slabs in FEM.
130	03.07.02-20	Response to item c is affected to reflect embedded model effects.
130	03.07.02-22	Stability analysis results will be based on embedded FEM.
130	03.07.02-24	Number of generic soil profiles changed. Bell Bend upper bound, best estimate and lower bound soil profiles are added.
130	03.07.02-25	Highest frequency of interest is 50Hz per ISG-1
130	03.07.02-26	Forces and moments may need to be revised.
130	03.07.02-34	Number of generic soil profiles changed. Bell Bend upper bound, best estimate and lower bound soil profiles are added.
201	03.07.02-37	See Q03.07.02-60
215	03.07.02-39	Results will be updated based on FEM.
215	03.07.02-41	Surface-founded stick model is replaced with embedded FEM for the SSI analysis.
248	03.07.02-45	Modeling the basemat in detail.
248	03.07.02-55	Clarify how outputs from FEM will be presented.
108	03.07.03-07	High frequency due to Bell Bend.
155	03.08.01-13	MTR/SASSI is used for the embedded FEM SSI analysis in lieu of SASSI 4.1B
190	03.08.01-28	SSI results will change.
283	03.08.01-38	Soil pressures from SASSI should be used.
155	03.08.05-04	Results will change due to FEM model.
155	03.08.05-08	Minimum factor of safety changes.
155	03.08.05-09	Number of generic soil profiles changed. Bell Bend upper bound, best estimate and lower bound soil profiles are added.
155	03.08.05-10	Bearing pressures change.