

November 14, 2008

10 CFR 52.79

U.S. Nuclear Regulatory Commission ATTN: Document Control Desk Washington, D.C. 20555

In the Matter of ()
Tennessee Valley Authority ()

Docket No. 52-014 and 52-015

BELLEFONTE COMBINED LICENSE APPLICATION – RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION – BASIC GEOLOGIC AND SEISMIC INFORMATION SUPPLEMENTAL RESPONSE

Reference: 1) Letter from Joseph Sebrosky (NRC) to Andrea L. Sterdis (TVA), Request for Additional Information Letter No. 123 Related to SRP Section 02.05.01 for the Bellefonte Units 3 and 4 Combined License Application, dated September 4, 2008

2) Letter from Andrea L. Sterdis (TVA) to Document Control Desk (NRC), Bellefonte Combined License Application – Response to Request for Additional Information – Basic Geologic And Seismic Information, dated October 4, 2008

This letter provides the Tennessee Valley Authority's (TVA) supplemental response to the Nuclear Regulatory Commission's (NRC) request for additional information (RAI) number 02.05.01-02 included in Reference 1.

The original response to NRC RAI number 02.05.01-02 is contained in Reference 2 and is not changed by this supplement. This supplement does not identify any additional associated changes that will be made in a future revision of the BLN application.

If you should have any questions, please contact Phillip Ray at 1101 Market Street, LP5A, Chattanooga, Tennessee 37402-2801, by telephone at (423) 751-7030, or via email at pmray@tva.gov.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this $//\sqrt[4]{n}$ day of $\sqrt[4]{0}$, 2008.

Andrea L. Sterdis

Manager, New Nuclear Licensing and Industry Affairs Nuclear Generation Development & Construction

Enclosure

cc: See Page 2

DOS

Document Control Desk

Page 2

November 14, 2008

cc: (w/ Enclosures)

- J. P. Berger, EDF
- J. M. Sebrosky, NRC/HQ
- E. Cummins, Westinghouse
- S. P. Frantz, Morgan Lewis
- M. W. Gettler, FP&L
- R. Grumbir, NuStart
- P. S. Hastings, NuStart
- P. Hinnenkamp, Entergy
- M. C. Kray, NuStart
- D. Lindgren, Westinghouse
- G. D. Miller, PG&N
- M. C. Nolan, Duke Energy
- N. T. Simms, Duke Energy
- K. N. Slays, NuStart
- G. A. Zinke, NuStart

cc: (w/o Enclosure)

- B. C. Anderson, NRC/HQ
- M. M. Comar, NRC/HQ
- B. Hughes/NRC/HQ
- R. G. Joshi, NRC/HQ
- R. H. Kitchen, PGN
- M. C. Kray, NuStart
- A. M. Monroe, SCE&G
- C. R. Pierce, SNC
- R. Reister, DOE/PM
- L. Reyes, NRC/RII
- T. Simms, NRC/H

Enclosure TVA Letter Dated November 14, 2008 RAI Response

Supplemental response to NRC Request for Additional Information number 02.05.01-02 letter No. 123 dated September 4, 2008 (2 pages, including this list)

Subject: Basic geologic and seismic information in the Final Safety Analysis Report

RAI Number	Date of TVA Response
02.05.01-01	Letter dated October 4, 2008
02.05.01-02	This letter and letter dated October 4, 2008
02.05.01-03	Letter dated October 4, 2008
02.05.01-04	Letter dated October 4, 2008

Associated Additional Attachments / Enclosures	Pages Included
Attachment 02.05.01-02A	21

Enclosure

TVA Letter Dated November 14, 2008

RAI Response

NRC Letter Dated: September 4, 2008

NRC Review of Final Safety Analysis Report

NRC RAI NUMBER: 02.05.01-02

During the Bellefonte site visit during week of 10/27/08, NRC requested a copy of the Coulson 1977 geology report, Reference 400 in the BLN 3 & 4 application and also referenced in the BLN 1 & 2 FSAR. TVA corrected the reference number this report in the original response to this RAI.

BLN RAI ID: 2400

BLN RESPONSE:

During the TVA review to respond to the original NRC RAI, an incorrect reference number was identified in the text of the application. This text was corrected in the original response with the proper number for the reference. During the geology site visit at Bellefonte, the NRC reviewers requested that TVA submit the reference document as a supplement to the original response. The requested reference is enclosed as Attachment 02.05.01-02A

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION REVISIONS:

No additional changes have been identified.

ASSOCIATED ATTACHMENTS/ENCLOSURES:

Attachment 02.05.01-02A

Attachment TVA Letter Dated November 14, 2008 RAI Response

Attachment 02.05.01-02A

(22 pages including cover)

"Investigation to Determine the Significance
of a Sheared Joint in the Foundation of the Unit 1 QA Record Storage Vault,"
Detailed supplementary information,
Bellefonte Nuclear Plant,
TVA Division of Water Management,
Geologic Services Branch

1977

J.H. Coulson

TENNESSEE VALLEY AUTHORITY DIVISION OF WATER MANAGEMENT GEOLOGIC SERVICES BRANCH

BELLEFONTE NUCLEAR PLANT

DETAILED SUPPLEMENTARY INFORMATION

Distribution List:

1 - R. W. Allen

1 - B. W. Brown

1 - M. B. Brazel

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1 - GSB Files

6 - L. M. Mills

1 - A. D. Soderberg

Knoxville, Tennessee

March 1977

Bellefonte Nuclear Plant

Investigation to Determine the Significance of a Sheared Joint in the Foundation of the Unit 1 QA Record Storage Vault

Tennessee Valley Authority
Division of Engineering Design
Civil Engineering and Design Branch

J. H. Coulson January 1977

Introduction

During final cleanup of the Unit 1 QA Record Storage Vault foundation, a feature with 3 inches of vertical offset was discovered. Concern was expressed that the feature might be a significant fault, and the following detailed investigation was made by TVA.

Results of Investigation

Figure 1, geologic drawing 88GE4-822K2321, shows a plan view of the vault foundation. Figure 2 shows a cross section of the feature constructed with data from three vertical and two inclined core holes identified in figure 1 with small hexagons. Core logs for these holes are included at the end of this report.

The feature is calcite filled and ranges in thickness from 1/16 to 1/2 inch. At the section where the core holes were drilled it exhibits a sinuous, rather than planar, character and has an average dip of 64° S. The dip steepens slightly to the west. Approximately 10 feet west of the G line, just outside the limits of the building, the feature is truncated by a vertical joint trending N57°E. At this joint there is no evidence of offset, and the feature cannot be traced farther to the west.

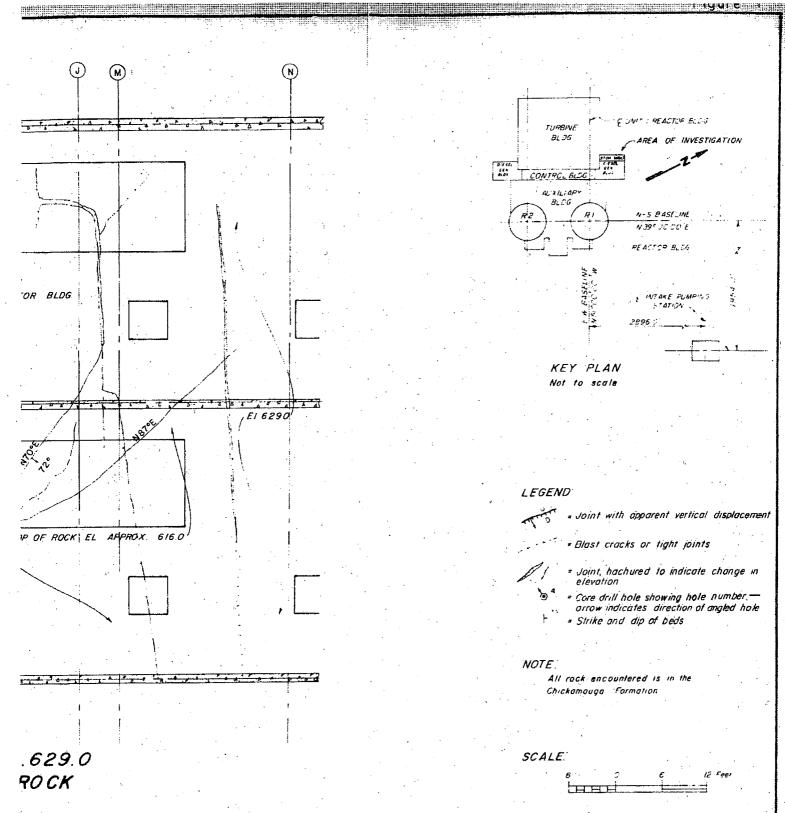
Four other joints striking from N70°E to N87°E with dips similar to that of the feature in question were found within the area of the QA record storage vault foundation. All of these joints are calcite filled, but none exhibits offset. If offset were present it would be readily apparent in the riser of each step where the 17° bedding outcrops at the top of rock.

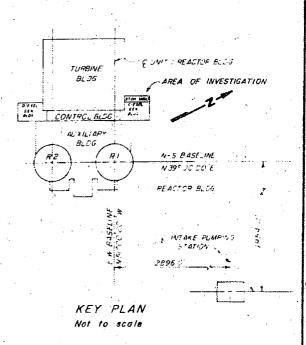
In the adjacent turbine building excavation to the southwest and in the cooling tower excavations farther to the southwest, at least 20 more joints in the same set were identified. Some are calcite filled, but none exhibits offset. All appear to be 50 feet or less in length.

Conclusions

It is TVA's opinion that the feature in question is a member of a joint set which exists throughout the general plant area. It is truncated and terminates at another joint, and no offset was observed at the point of truncation. The maximum observed offset is only 3 inches, and none of the other joints in the set exhibit offset. For these reasons, it can be concluded that the feature is not a significant fault, but is a joint that received minor shear displacement during the process that developed the entire joint set.

On September 22, 1976, a meeting was held at the site with Richard McMullen, a geologist from NRC. At that time he concurred with the conclusions reached by TVA. Shortly after this meeting the nonconformance status of the feature was lifted and construction was resumed.





LEGEND

- . Joint with apparent vertical displacement
- * Blast cracks or tight joints

- * Joint, hachured to indicate change in elevation
- * Core drill hole showing hole number.arrow indicates direction of angled hale
- = Strike and dip of beds

NOTE.

All rock encountered is in the Chickamauga Formation

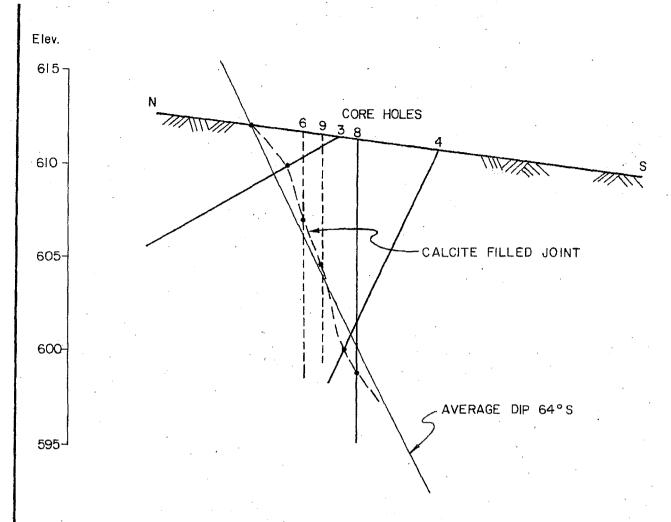
SCALE.



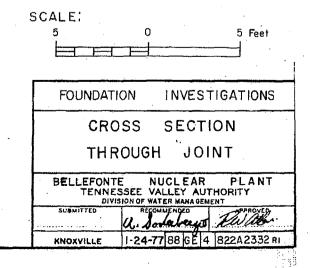
FOUNDATION INVESTIGATIONS Q A RECORD STORAGE VAULT

> GEOLOGIC MAP PLAN VIEW

BELLEFONTE NUCLEAR PLANT TENNESSEE VALLEY AUTHORITY



CROSS SECTION PERPENDICULAR TO CALCITE FILLED JOINT IN Q A RECORD STORAGE VAULT.



PROJECT BELLEFONTE NUCLEAR PLANT

Hole Number 9.25' SOUT	TH OF D-1	Location			Geologic Formation			
#3 3 9' WEST OF		Q. A.	RECORDS	STORAGE	VAULT	CHICKAMAUGA		
Elevation of Surface		`				Elevation of Water L.	OSS	
611.3		Ī				NONE		
Elevation Top of Bedrock		Thickness of Overburden				Elevation of Water G	ained	
611.3		NONE			NONE			
Elevation Bottom of Hole		Size of Cor	e	T		Driller	·	
605.3		(RELINE			HASKEW		
Recommended Foundation	Grade		Weathering E	ncountered		Date Started	Date Completed	
	1					9/17/76	9/20/76	
		√ 28 [℃] f	rom Hori:	zontal				
	Elevation	Depth	Thickness					
) heat and	of	From	of			D	_	
Material	Stratum	Surface	Stratum	Dip	Fin	Description to coarse gra	ined, medium to	
LIMESTONE	611.3	0.0	0.5	17°	1	co coarse gra c gray, argilla	i i	
LIPESTONE	011.3	1 0.0	0.5			siliferous, int		
		}			1	illaceous dark	(
	-	 						
			•		Weathered parting 611.1.			
					ŧ.	ller reported s	oft shale and	
CAVITY	610.8	1.0	0.2		mud.			
	1	,			1	ium to coarse g		
LIMESTONE	610.6	1.5	0.15		to	dark gray, argillaceous.		
CAVITY	610.45	1.8	0.05		Dri	ler reported m	12.6	
CAVILI	010.45		- 0.0				ined, medium to	
LIMESTONE	610.4	2.0	5.1			gray, banded		
							rous, interbedde	
	,]	!			argillaceous		
	1					shale, weathe		
							ity 610.1-610.0;	
		1			poss	sible clay seam	610.0; weathere	
		ļ			part	ing 609.8. Los	s of core	
	<u> </u>				calc	ite filled jci	nt 609.6-609.4;	
1 [l				calc	ite filled nea	r vertical joint	
		1			609.	2-609.1; weath	ered parting	
	1				609.	0; possible cl	ay seam 608.3 -	
]					2; weathered p	arting 607.7,	
		<u> </u>			607	6, 607.4.		
BOTTOM OF HOLE	605.3	12.8					·	
DOLLOW OF HOME	1 000.0		·	<u>م</u> ــــ -،م. ا	<u> </u>	and the second data seems to the second seco		
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REMARKS:

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Elevation

Lorged By M. B. BRAZET

PROJECT BELLEFONTE NUCLEAR PLANT

П	Hole Number 14.0' SOUT	H OF D-1	Location				Geologic Formation		
	#4 4 6.7' WEST	OF H	Q.A. RECORDS STORAGE VAULT				CHICKAMAUGA		
Π	levation of Surface		1				Elevation of Water Loss		
	610.6		1			NONE			
T	Elevation Top of Bedrock		Thickness of Overburden				Elevation of Water Ga	ined	
	610.6		NONE			NONE			
1	Elevation Bottom of Hole		Size of Cor	e .			Driller		
1	598.2		1	RELINE			9-325, 9-700		
	Recommended Foundation G	Bottom of	Weathering E	ncountered		Date Started	Date Completed		
			-				9/21/76	9/21/76	
T			65° F1	om Horiz	ontal				
F			1	1		<u> </u>			
-		Elevation of	Depth	Thickness of			•		
	Material	Stratum	Surface	Stratum	Dip -		Description	n	
+			1			Fin	e to coarse grai	~	
T.	LIMESTONE	610.6	0.0	12.4	17°		e to coarse gra. k gra <u>y, banded</u> ,		
-	HIMESTONE.	0.0.0	1	12.5	<u>-</u>			ty, interbedded	
		f							
-							illaceous to silty dark gray		
							le. Weathered parting 610.4, .3: calcite filled near vertica		
+		<u> </u>	 	 	•		nt 607.3 - 607.2; weathered		
:				1	•		Le parting 605.0, 604.0 calcite		
-							led near vertical joint 603.3 -		
1			į				.2. 603.3-603.1. 602.6 - 602.3.		
- ا.				T			.4 - 600.2; calcite 600.2 -		
				1			.0: possible calcite filled		
-	· · · · · · · · · · · · · · · · · · ·		†		~~~~~		1t 599.7 - 599.2.		
				Ĺ;					
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	BOTTOM OF HOLE	598.2	13.7						
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REMARKS:

Water test:

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PROJECT __BELLEFONTE NUCLEAR PLANT

Hole Number 7.3 SOUTH OF D-1		Location				Geologic Formation			
#6 6 9.7 WEST OF H		O.A.	RECORDS S	TORAGE V	AULT	CHICKAMAUGA			
Elevation of Surface		~				Elevation of Water Lo	\$5		
611.5					NONE				
Elevation Top of Bedrock		Thickness of	of Overburder	n	Elevation of Water Ga	ined			
611.5	i	NONE			NONE				
Elevation Bottom of Hole		Size of Cor	6			Driller			
598.6		•	RELINE			HASKEW			
Recommended Foundation Grade			Weathering E	ncountered		Date Started	Date Completed		
		50110111 01	rrootinoring c			9/21/76	9/21/76		
		Verti	an I			3/21/70	1 3/21/70		
		VELCI	T						
EI	evation	Depth Thickness							
	of	From	of		[
Material St	ratum	Surface	Stratum	Dip		Description	· · · · · · · · · · · · · · · · · · ·		
				17°		to coarse grain			
LIMESTONE 6.	11.5	0.0	12.9	1/		gray, argillace			
		}	1	-	lime	stone, fossilife	erous, banded;		
					inte	rbedded dark gray argillaceous			
		to si				ilty shale. Weathered parting			
					611.	<pre>15, 611.1; shale parting 609.9-</pre>			
					609.	609.8, 609.7, 609.3; cherty 606.65;			
					poss	<u>ible calcite fi</u>	lled fault 606.6		
					606.	2; calcite fille	ed near vertical		
			1		join	t 604.2 - 603.6	core loss		
1) ·	1 . 1		602.	4 - 601.8, weat	hered parting		
			<u> </u>		600.	3; vug 600.1.	······································		
				j'			•		
BOTTOM OF HOLE 59	98.6	12.9				·			
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Wat	er	test:

Elevation

GPM

P.S.I.

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PROJECT BELLEFONTE NUCLEAR PLANT

Hole Number 10.2' SOUT	H OF D-1	Location		` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` `	Geologic Formation				
3 8 8 6 WEST	OF H	Q. A. RECORDS STORAGE VAULT				CHICKAMAUGA			
Elevation of Surface		1 ~			***************************************	Elevation of Water L	OSS		
614.4					NONE				
Elevation Top of Bedrock		Thickness of	of Qverburder	Concre	Elevation of Water Gained				
611.3		3.1			NONE.	¢.			
Elevation Bottom of Hole		Size of Cor	e			Driller			
594.4		NX-WTF	RELINE	•		E. ARNOLD			
Recommended Foundation (Grade	Bottom of	Weathering E	ncountered	j	Date Started	Date Completed		
Į.					9/27/76	9/27/76			
		Vertic	cal						
	Elevation	Depth	Thickness		T				
	of	From	of		1 .		•		
Material	Stratum	Surface	Stratum	Dip		Description	on		
3					†~				
CONCRETE	614.4	0.0	3.1	17°	<u> </u>				
			1		Fine	to coarse grain	ned, medium to		
LIMESTONE	611.3	3.1	16.9				eous to silty,		
		1	[ed, fossiliferous, interbedded			
		<u> </u>	<u> </u>	. ,		rk gray argillaceous to silty			
					shale	. Driller rep	orted clay seam		
					610.9	610.6, 610.4	: weathered		
			1		shale	parting 609.6	, 609.1; possible		
			 			clay seam 606.6; calcite filled			
1-		ĺ				vertical joint 606.4 - 606.2;			
	<u> </u>		 			ug 602.3; shale parting 602.1; calcite filled near vertical joint			
				•.					
			 			- 600.8: poss			
# .	1		}				- 598.7; calcite		
	į		 		<u> </u>	<u>d near vertica</u>	<u> 1 joint 598.7 -</u>		
		,	(6, 596.4 - 596.3		
		 			chert	y 594.5.			
DOMESON OF HOLE	504.4	1.000				* * * * * * * * * * * * * * * * * * *			
BOTTOM OF HOLE	594.4	20.0			 				
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REMARKS:

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PROJECT BELLEFONTE NUCLEAR PLANT

Hole Number 7.7' SOUTH	I OF D-1	Location				Geologic Formation			
#9 9 8.7' WEST	OFH	Q.A. RECORDS STORAGE VAULT				CHICKAMAUGA			
Elevation of Surface	<u> </u>	2			*******	Elevation of Water Lo	SS		
614.4					NONE				
Elevation Top of Bedrock		Thickness c	f Reservation	& Concre	Elevation of Water Ga	NONE Elevation of Water Gained			
611.2		3.2			NONE				
Elevation Bottom of Hole		Size of Core	B			Driller			
599.2		NX-WI	RELINE			E. ARNOLD			
Recommended Foundation G	Brade	Bottom of	Weathering E	ncountered		Date Started	Date Completed		
				·		9/27/76	9/27/76		
# . # .		Verti	cal						
e de la companya de l	Elevation	Depth	T: ckness						
	of	From	of		j		•		
Material	Stratum	Surface	Stratum	Dip		Descriptio	n		
			1						
CONCRETE	614.4	0.0	3.2	17°		<u> </u>			
						to coarse grai			
LIMESTONE	611.2	3.2	12.0			gray argillace			
						iliferous, banded; interbedded			
						llaceous to sil			
		1				e. Possible cl			
	<u></u>	<u> </u>			610.	4; weathered pa	rting 610.2;		
	1			•	weathered shale parting 609.55,				
						0.0; tight near vertical joint			
1 4"]]			.2 - 607.1; possible calcite			
 						led fault 604.9; weathered parti .1; calcite filled near vertical			
		1	}		I .				
iller :	 	 	 			nt 602.0 - 601.8, 602.0 - 601.4, .85 - 599.2.			
			1 1		599.	85 - 599.2.			
難 無点	 	 	 		 				
BOTTOM OF HOLE	599.2	15.2	}		}				
DOTTON OF NOBE	333.2	1 -3.2	 						
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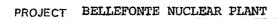
REMARKS:

Water test: Elevation

G.P.M.

P.S.1.

Logged By M. B. BRAZEL





Hole Number 7,71 SOUTH	OF D-1	Location			Geologic Formation				
#9 8,7 WEST	of H	Q.A.	RECORDS S	STORAGE V	VAULT	CHICKAMAUGA			
Elevation of Surface		*="				Elevation of Water Lo	oss ·		
614.4						NONE			
Elevation Top of Bedrock		Thickness o	f Regelessee	R Concre	Elevation of Water Gained				
611.2		3.2			NONE				
Elevation Bottom of Hole	i	Size of Core	2	•	Driller				
599.2		NX-WI	RELINE			E. ARNOLD			
Recommended Foundation G	rade	Bottom of V	Neathering E	ncountered	•	Date Started	Date Completed		
						9/27/76	9/27/76		
		Verti	cal						
	Elevation	Depth	Thickness				•		
	of	From	of .		ĺ	•			
Material	Stratum	Surface	Stratum	Dip		Description	on		
CONCRETE	614.4	0.0	3.2	17°		92081450	469		
						to coarse grai			
LIMESTONE	611.2	3.2	12.0			gray argillace			
						siliferous, banded; interbedde			
						llaceous to sil			
		}				.e. Possible c			
						4; weathered pa			
						thered shale parting 609.55,			
		<u> </u>	ļ		609.	.0; tight near vertical joint .2 - 607.1; possible calcite			
		1							
				<u> </u>		ed fault 604.9			
					1 .	1; calcite fill			
	ļ					nt 602.0 - 601.8 85 - 599.2.	3, 602.0 - 601.		
				,	599.	85 - 599.2.			
BOTTOM OF HOLE	599.2	15.2	·						
DOLLOW OF HOLE	399.2	1. 13.4	 						
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REMARKS:

Water test: Elevation

G.P.M.

P.S.1.

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PROJECT BELLEFONTE NUCLEAR PLANT

Hole Number 10.2' SOUT	Location			Geologic Formation			
#9 9 6 WEST	UER TOFP-T	O. A.	RECORDS	STORAGE	የፖልተነፕ ጥ	CHICKAMAUGA	
#8 8.6 WEST Elevation of Surface		1 ~	10001000	DICITION	4110333	Elevation of Water Lo	SS
614.4					NONE		
Elevation Top of Bedrock		Thickness of	of Qverburde	x Concre	Elevation of Water Ga	ined	
611.3		3.1		0011020	NONE	•	
Elevation Bottom of Hole		Size of Cor	e	······································	Driller		
594.4		NX-WII	RELINE			E. ARNOLD	
Recommended Foundation	Grade		Weathering E	ncountered		Date Started	Date Completed
						9/27/76	9/27/76
•		Vertic	al				
·	Elevation	Depth	Thickness				
	of	From	of			ı	
Material	Stratum	Surface	Stratum	Dip	<u> </u>	Description	1
1						OPPOSE AREA	
CONCRETE	614.4	0.0	3.1	17°		<u>92081450</u> 4	
		1.				to coarse grain	
LIMESTONE	611.3	3.1	16.9			gray, argillace	
						ed, fossiliferou	
	<u> </u>	<u> </u>	}			gray argillaceo	
						e. Driller repo	
	·		ļ -	·		9, 610.6, 610.4:	
		ĺ				e parting 609.6,	
						seam 606.6; cal	
· ·						vertical joint	
	 		_			02.3; shale part	
ł						ite filled near	
	 		 -			2 - 600.8; possi	
.			1			ed fault 599.0 -	
			ļ			ed near vertical	
						9, 598.0 - 597.6	, 596.4 - 596
			 -		cher	ty 594.5.	
DOMMON OF TOTAL	504.4	20.0	İ				
BOTTOM OF HOLE	594.4	20.0					
-			}				
	 		 		 		
	}			j	1	· · · · · · · · · · · · · · · · · · ·	
			 		 		
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REMARKS:

Water test: Elevation

G.P.M.

P.S.1.

M. B. BRAZEL Logged By

PROJECT BELLEFONTE NUCLEAR PLANT



Hole Number 7.3 SOUTH	Hole Number 7.3 SOUTH OF D-1		· · · · · · · · · · · · · · · · · · ·	.~	Geologic Formation				
#6 9.7 WEST O		Q.A.	RECORDS S	STORAGE V	CHICKAMAUGA				
Elevation of Surface		_				Elevation of Water L	.oss		
611.5					NONE	•	• •		
Elevation Top of Bedrock		Thickness c	f Overburde	n			Elevation of Water Gained		
611.5		NONE			NONE				
Elevation Bottom of Hole		Size of Core	9		Driller				
598.6		ì	RELINE			HASKEW			
Recommended Foundation G	rade		Weathering E	ncountered		Date Started	Date Cor	npleted	
					9/21/76	9/21/	•		
7	<u>,</u>	Vertic	cal			/			
	T		T		7				
6	Elevation	Depth	Thickness	}	<i> </i>	9208148	OACH		
Material .	of Stratum	From Surface	of Stratum	- Dia	ļ	•		Same and	
Waterial	Stratum	Surrace	Stratum	Dip	 	Descripti			
				17°		to coarse gra			
LIMESTONE	611.5	0.0	12.9			gray, argillad			
•	1.	1				stone, fossili			
		 	 			rbedded dark g			
1	-					ilty shale. We			
			ļ			15, 611.1; sha			
		İ				8, 609.7, 609.3			
						<u>ible calcite f</u>			
}			1			2; calcite fil.			
		 		ļ	joir	it 604.2 - 603.0	6: core]	loss	
			1			602.4 - 601.8, weathered parting			
	ļ		ļ		600.	3; vug 600.1.			
		1			1				
BOTTOM OF HOLE	598.6	12.9	ļ		<u> </u>				
	İ		1				-		
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REMARKS:

Water test: Elevation

G.P.M.

P.S.1.

Logged By M. B. BRAZEL

GLULUGIC KECUKU OF DRILL HOLE

PROJECT BELLEFONTE NUCLEAR PLANT

P C

Hole Number 16.0' SOUT	H OF D-1	Location				Geologic Formation	
#5 6.5' WEST	Q.A.	RECORDS S	TORAGE V	CHICKAMAUGA			
Elevation of Surface				Elevation of Water Lo	oss		
610.5				•	NONE		
Elevation Top of Bedrock		Thickness o	f Overburde	n		Elevation of Water Ga	ined
610.5		NONE		'.		NONE	•
Elevation Bottom of Hole	•	Size of Core)			Driller	
575.8		NX-WI		4	9-325		
Recommended Foundation G	rade		Weathering E	ncountered		Date Started	Date Completed
	,					9/20/76	9/20/76
,		Vertic	cal				
	Elevation	Depth	Thickness				.//
	of	From	of	• •		920814504	66
Material	Stratum	Surface	Stratum	Dip		Description	
					Fin	e to coarse gra	ined, medium
LIMESTONE	610.5	0.0	34.7			k gray, argilla	
•						estone, fossili	
				· ·		erbedded dark g	
						silty shale. W	
	ł	-				.7. shale parti	
						.5, 600.4; thin	
		1				r vertical join	
·						thered parting	
•						582.0, possibl	
: `						.6, 580.5.	
		<u> </u>					
				,			
BOTTOM OF HOLE	575.8	34.7					
		}	1				
	(·	· ·	, }		1	•	
		4	-				
		1					
_	}	1.			}	•	
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REMARKS:

N/A DID NOT HIT FAULT AREA.

Water test: Elevation

G.P.M.

P.S.I.

M. B. BRAZEL Logged By



PROJECT __BELLEFONTE NUCLEAR PLANT

Hole Number 14.0' SOUT	H OF D-1	Location				Geologic Formation		
		0.A. F	RECORDS S	TORAGE V	AULT	CHICKAMAUGA		
#4 6.7' WEST Elevation of Surface		~				Elevation of Water Los	is	
610.6	l	•				NONE		
Elevation Top of Bedrock		Thickness o	f Overburde	n	· . — · · · · · · · · · · · · · · · · ·	Elevation of Water Gai	ned	
610.6		NONE			4	NONE		
Elevation Bottom of Hole		Size of Core	;			Driller		
598.2		NX-WIF	RELINE		9-325, 9-700			
Recommended Foundation G	rade	Bottom of V	Veathering E	ncountered		Date Started	Date Comple	etec
					9/21/76	9/21/76		
		65° Fr	om Horiz	ontal				
	Elevation	Depth	Thickness		1	00001		
·	of	From	of ·			9208148	S0465	
Material	Stratum	Surface	Stratum	Dip		Description		6
					Fin	e to coarse grai	ned, medi	um
LIMESTONE	610.6	0.0	12.4	17°		k gray, banded,		
						illaceous to sil		
	<u> </u>					illaceous to sil		
						le. Weathered p		
	i	1	i			.3: calcite fill		
		Ţ				nt 607.3 - 607.2		
					sha	le parting 605.0	. 604.0 ca	alc
		1	1		fil	led near vertica	l joint 6	03.:
				· · · · · · · · · · · · · · · · · · ·	603	.2. 603.3-603.1.	602.6 -	502.
•	}	1	1			.4 - 600.2; calc		
		 				.0: possible cal		ed
	}				fau	1t 599.7 - 599.2	: .	
					 			
BOTTOM OF HOLE	598.2	13,7			İ			
BOTTOM OF HOLE	396.2	13./			 			
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	l	1			 	<u> </u>		
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REMARKS:

Water test: Elevation

G.P.M.

P.S.I.

M. B. BRAZEL Logged By

LECTION RECORD OF DRILL HOLE





Hole Number 9.25' SOUT	Location				Geologic Formation		
#3 9' WEST OF H		Q. A.	RECORDS	STORAGE	CHICKAMAUGA		
Elevation of Surface		1		•		Elevation of Water L	oss
611.3						NONE	
Elevation Top of Bedrock		Thickness o	f Overburde	n		Elevation of Water G	ained
611.3		NONE				NONE	•
Elevation Bottom of Hole		Size of Core				Driller	
605.3		NX-WII	RELINE			HASKEW	
Recommended Foundation G	Grade	Bottom of	Weathering E	ncountered		Date Started	Date Complete
	•	1				9/17/76	9/20/76
		₹ 28° f	rom Horiz	contal			
	Elevation	Depth	Thickness		<u> </u>	920814	SOAGA
*	of	From	of	•	1	· OF POPULATION	TO TOTAL
Material	Stratum	Surface	Stratum	Dip		Description	on
					Fin	e to coarse gra	ined, medium
LIMESTONE	611.3	0.0	0.5	17°	dar	k gray, argilla	ceous,
14					fos	siliferous, int	erbedded wit
	1			_	arg	illaceous dark	gray shale.
						thered parting	
		1-			l		
		1			Dri	ller reported s	oft shale an
CAVITY	610.8	1.0	0.2		mud	•	***
					Med	ium to coarse g	rained, medi
LIMESTONE .	610.6	1.5	0.15		to	dark gray, argi	llaceous.
CAVITY	610.45	1.8	0.05		Dri	ller reported m	ud.
					Fin	e to coarse gra	ined, medium
LIMESTONE	610.4	2.0	5.1		dar	k gray, banded	argillaceous
						silty fossilife	
						h argillaceous	
		, ,	. 1			y shale, weathe	
	<u> </u>				610	.1, side of cav	ity 610.1-61
, ,						sible clay seam	
					par	ting 609.8. Los	s of core
						cite filled joi	
					cal	cite filled nea	r vertical j
		_				.2-609.1; weath	
	<u> </u>				609	.0; possible cl	ay seam 608.
,	1	1				.2; weathered p	arting 607.7
•	<u> </u>				607	.6, 607.4.	· .
DARMON AT THE							
BOTTOM OF HOLE	605.3	12.8			ļ		
		1		,			
<u> </u>	l				L		

REMARKS:

Water test: Elevation

G.P.M.

P.S.I.

Logged By M. B. BRAZET.





Hole Number 14.1'SOUTH OF D-1 #2 6.7' WEST OF H Elevation of Surface 610.6 Elevation Top of Bedrock			RECORDS	· · ·	Geologic Formation CHTCKAMAUGA Elevation of Water Loss NONE Elevation of Water Gained	
610.6		i		11		· ·
Elevation Bottom of Hole	·	NONE Size of Core				NONE
1		1				Driller
Recommended Foundation G	rado	NX-WIF	<u>ELINE</u> Weathering E	naaiinta		HASKEW Date Started Date Completed
	nauc .	Bottom or	readlering c	ncountered	ı	1
		₹ 28 ⁰			9/16/76 9/17/76	
~	Elevation of	Depth From	Thickness of			920814S0463
Material	Stratum	Surface	Stratum	Dip		
LIMESTONE	610.6	0.0	1.6			e to coarse grained, medium t k gray, argillaceous to silty
					lime	estone, fossiliferous, banded
						silty shale. Weathered parti. 3, 609.8, 609.2; shale seam
						.1-609.0.
FILLED CAVITY	609.0	3.4	0.3		Dri.	ller reported soft shale and fill.
LIMESTONE	608.7	3.97	5.6		ver	e as above. Clay filled near tical joint 608.5-608.4:
					par	thered parting 608.2; shale tings 607.9, 606.6. Possible
					cal	cite filled fault, 605.6-605.4
BOTTOM OF HOLE	603.1	15.9				
_						
			·			
			,			

REMARKS:

POSSIBLE THAT CORE WASN'T PLACED IN THE BOX RIGHT.

Water test:

N/A

Elevation

G.P.M.

P.S.I.

Logged By M. B. BRAZEL



PROJECT BELLEFONTE NUCLEAR PLANT

							·
Hole Number 11' SOUTH o	of D-1	Location		`	····	Geologic Formatio	n
#1 3' WEST-OF H		O. A.	RECORDS	,		CHICKAMAUGA	
Elevation of Surface		E VAULT	•	Elevation of Water			
610.1					NONE		
Elevation Top of Bedrock	Thickness o	of Overburde	n .		Elevation of Water	Gained	
610.1	·	NONE				NONE	
Elevation Bottom of Hole		Size of Cor	e .	-		Driller	
590.6		Nx-WIR	ELINE				
Recommended Foundation (Brade	Bottom of	Weathering E	ncountered		Date Started	Date Completed
						9/16/76	9/17/76
	1	₹ 58°		,		<u> </u>	
	Elevation	Depth	Thickness		259		
•	of	From	of	7		9208145	0462
Material	Stratum	Surface	Stratum	Dip	<u> </u>	Descrip	
							ained, medium t
LIMESTONE	610.1	0.0	19.5	<u> </u>			aceous to silty
							iferous, banded
							laceous to silt
		1					Possible clay
			1				; vug 603.0, 60
	ļ		1	}			parting 601.9,
	ļ		ļ	}			lled near vertic
		1	1	t.			; possible calc:
	<u> </u>	- 		 -			0-weathered part
					ing	591.1.	
	 	 	 		 -		
BOTTOM OF HOLE	590.6	23.0			1		
TOTTOM OF HOLE	390.0	+ 23.0	<u> </u>		 		
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REMARKS:

Hole drilled not parallel to strike of fault.

Water test: N/A Elevation

G.P.M.

P.S.I.

Logged By



PROJECT BELLEFONT

Hole Number Rock Te	a+ -	Location			Geologic Formation
Hole Number Rock Test Core drill hole #1 Elevation of Surface			0'N 39°	E of	Chickamauga
			line of		
618.0	Center	TIME OF	Reacto) T # T Clevation of Water Coss	
Elevation Top of Bedrock	Thickness	of Overburde	n	Elevation of Water Gained	
· ·	1	5	••	Lievation of Water Gamed	
616.5 Elevation Bottom of Hole		Size of Cor			Driller
· ·		Size of Cor	e -wireli	ne	
567.6 Recommended Foundation G	· vada	1 .	Weathering E		Dave Farr Date Started Date Completed
Necommended Foundation e	naue		• 0 . 3	ncountered	1
	 	ļ			7/73 7/73
		<u> </u>			
	Elevation	Depth	Thickness		
	of	From	of		
Material	Stratum	Surface	Stratum	Dip	Description
			and the same of th		
<u> </u>		0.0	NCRETE		
	618.0	0.0	1.5		92081450348
		ROCK	DRILLIN	G	
Unit 2	l			0.4	Medium-coarse grain, mediu
Limestone&Shale	616.5	1.5	18.5	17° -	dark gray fossiliferous li
		1			stone with lenses of dark
					gray shale. Weathered
-					partings 616.3, 616.0. Pap
					thin gypsum 608.0. Clay se
•					600.3.
				<u> </u>	Fine grain, medium to ligh
Limestone&Shale	598.0	20.0	10.0		gray limestone mottled and
					banded with dark gray shal
			1		M-3 marker 592.6.
					Fine-medium grain, medium-
Limestone&Shale	588.0	30.0	20.4		dark gray, fossiliferous
					limestone, mottled and ban
,					with dark gray shale ;
					shear in shale along
				,	bedding 579.1, calcite hea
					shear on bedding 571.8.
BOTTOM OF HOLE	567.6	50.4			
	l	1	l		

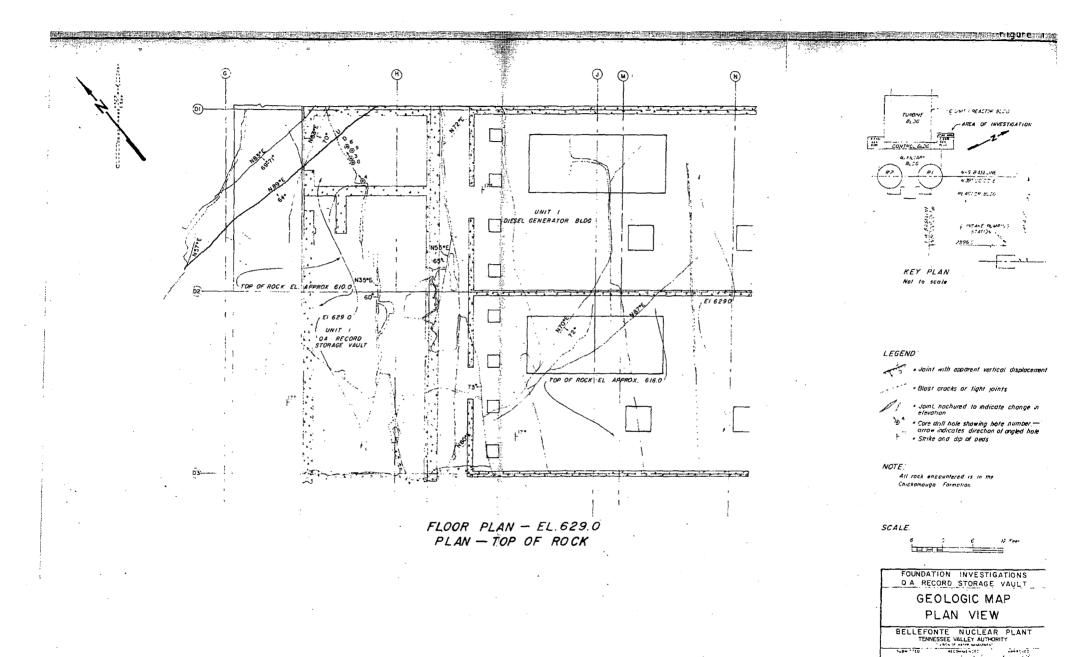
REMARKS:

Water test: Elevation

G.P.M.

P.S.1.

Logged By C. E. Drinnon



NOAVILLE 10-26-76 BB GE 4 822 K2321