Table 13. Foraminifera recovered from the Continental Oil Company City of Hoquiam No. 1, NW 1/4, sec. 3, T. 18 N., R. 10 W., Grays Harbor County, Washington

[R, rare; F, few; C, Common;, ?, questionable identification]

TAXA (DEPTH IN FEET)	360'-460'	460'-560'	560'-660'	660'-760'	760'-860'	860'-960'	960'-1060'	1060'-1160'	1160'-1260'	1260'-1360'	1360'-1460'	1460'-1560'	1560'-1660'	1660'-1760'	1760'-1860'	1860'-1960'	1960'-2060'	2060'-2160'	2160'-2260'	2260'-2360'	2360'-2460'	2460'-2560'	2560'-2660'	2660'-2760'	2760'-2860'	2860'-2960'	2960'-3060'	3060'-3160'
Florilus halkyardi (Cushman)	F									R								?							?			
Cibicides cf. C. lobatus d'Orbigny	R	R	?					?							?													
Pseudoglandulina spp.	R				R		R								R		R			?	R				?		R	
Elphidium cf. E. californicum Cook	R																											
Valvulineria willapaensis Rau	R									R			R							R							R	
Globigerina spp.	R	F	F	R	R	F	C	F	F	F	F	C	F	R	F	R	F	F	F	F	R	R	F	F	F	R	C	F
Gyroidina soldanii octocamerata Cushman and G. D. Hanna	R		?	R	R	R	R		R	R	R	R	F	R	R	R	R	F	R	R	R	R		R	?		R	
Praeglobobulimina ovata (d'Orbigny)	R	R			R	F		R	R	F			R					R				R	?		R	R	R	R
Uvigerina churchi Cushman and Siegfus	R				R	R		?																				
Valvulineria tumeyensis Cushman and Simonson	?									?	?	C	F									?				?		
Nodosarella (Ellipsonodosaria) sp. A. of Cushman and Siegfus	R	R	?				R		?									?		R								
Dentalina soluta Reuss	R	R	R																									
Dentalina cf. D. jacksonensis (Cushman and Applin)	R	R	?	R					R				?		R		R	R	R					R				?
Chilostomella cylindroides Reuss	R				F			R										R			R		R		R		R	
Plectofrondicularia packardi Cushman and Schenck	R			R						R																		
Eponides kleinpelli Cushman and Frizzell	R							?				?																
Anomalina cf. A. garzaensis Cushman and Siegfus		R	R					R				R	R		R								?					
Alabamina wilcoxensis californica Mallory		R	R	C				R	R											R	?							
Uvigerina garzaensis Cushman and Siegfus		R	F	C	R	R	C	F	C	C	C	F	F				R	F		R	R		R	F	R	R	F	R
Arenaceous spp.		F		F	C	C	F	R	F	R			R	F	R		R			R		R	F	C	C	C	F	
Cibicides cf. C. elmaensis Rau		?		R						?	?		?	?		R	R		R									?
Amphimorphina ignota Cushman and Siegfus		?		?																								
Dentalina(?) sp. (elongate chambers)		R	R		R	R			R		R											?			R			
Globobulimina pacifica Cushman		R		?	?	R		R			?																	
Pleurostomella acuta Hantken		R																						R				
Lenticulina aff. L. inornatus (d'Orbigny)		R			R	F	C	R	F	R		R	C	R			R	F	R	R	R	R	R	R	R	R	C	R
Eponides umbonatus (Reuss)			?		R	R	R	R	R	R	R		R	R			?	R	R	R	?		R		R		R	
Virgulina sp.				R									?															
Dentalina cf. D. delicatula Cushman				R								R			R							R			R			
Epistomina eocenica				R																								
Pullenia eocenica Cushman and Siegfus				R																								
Dentalina cf. D. dusenburyi Beck				R											R													
Cibicides venezuelanus Nuttall					R	R			R		R								R					R	R	R	R	
Cibicides cf. C. spiropunctatus Galloway and Morrey					R	F	F	?				R	R	R	R			R		R				R	R	F	C	R
Cibicides cf. C. pachyderma (Rzehak)					R	C	F	R	?				?	?					R	?	?		?	?			F	
Asterigerina crassaformis Cushman and Siegfus					R	?			R		?	?	R								?	?	R	R			F	
Vaginulinopsis cf. V. mexicana (Cushman)					R	R																						
Ellipsonodosaria spinea Cushman					R	R	R			?	?	R	?									?					?
Valvulineria jacksonensis welcomensis Mallory					?		?			F																		
Globocassidulina globosa (Hantken)					R				R												?	R						
Cibicides haydoni (Cushman and Schenck)						R	?																					
Bulimina (?) cf. B. jacksonensis Cushman								R																				
Tritaxilina colei Cushman and Siegfus								?																				
Cibicides cf. C. pacheocoensis Smith									R						?			F		R								
Vulvulina curta Cushman and Siegfus									R										?									
Gyroidina condoni (Cushman and Schenck)										?																		?
Lenticulina coaledoensis Detling										R		R							R									
Lenticulina welchi (Church)										R																		
Spiroloculina wilcoxensis Cushman and Garrett										R																		
Quinqueloculina cf. Q. weaveri Rau										R	?																	
Dorothia principensis Cushman and Bermudez											R	R			R	R	?	?		R			R	R	R		R	
Vulvulina cf. V. curta Cushman and Siegfus											R																	
Pullenia cf. P. quinqueloba (Reuss) angusta Cushman and Todd											R																	
Cibicides cf. C. martinezensis Cushman and Barksdale															R							?					?	
Karreriella cf. K. chilostoma (Reuss)																R	R							R			R	
Quinqueloculina cf. Q. triangularis d'Orbigny																				R	R			R			R	
Nodosaria deliciae (of Smith, not Martin)																				R								
Marginulina cf. M. subbulata Hantken																					R							
Lagena cf. C. costata (Williamson)																						R						
Dentalina cf. D. colei d'Orbigny																						R						
Amphistegina sp.																						R						
Bulimina microcostata Cushman and Parker																							R					
Vaginulinopsis cf. V. vacavillensis (G.D. Hanna)																							R	R				
Nodosaria latejugata Gumbel																							R					
Bulimina lirata Cushman and Parker																								R				
Plectofrondicularia cf. P. vaughani Cushman																									R			
Involutina incertus d'Orbigny																											R	R
Anomalina dorri aragonensis Nuttall																											R	
Lagena cf. L. acuticosta Reuss																											R	
Uvigerina cf. U. churchi Cushman and Siegfus																											R	

Zone-assemblage: Bulimina cf. B. jacksonensis | Vaginulinopsis cf. V. vacavillensis assemblage | pre-Ulatisian assemblage
Stage: lower Narizian | Ulatisian | pre-Ulatisian
Age: middle EOCENE | early EOCENE
Paleobathymetry: bathyal
Formation: Humptulips Formation | Crescent Formation

Table 14. Foraminifera recovered from the Union Oil Company Bannse No. 1, NW 1/4, sec. 22, T. 15 N., R. 2 W., Thurston County, Washington [x = present]

TAXA (DEPTH IN FEET)	375'	2,110'	2,115'	2,205'	2,342'	2,548'	2,572'	2,791'	2,923'	3,149'	3,364'	3,374'	3,582'	3,810'	3,822'	3,826'
Lenticulina inornatus (d'Orbigny)	X										X	X	X	X	X	X
Bolivina kleinpelli Beck	X															
Quinqueloculina minuta Beck	X															
Elphidium sp.	X															
Melonis cf. M. romeri Cushman	X															
Plectofrondicularia packardi packardi Cushman and Schenck		X	X		X	X	X	X			X					
Globobulimina pupoides (d'Orbigny)		X	X	X	X						X	X				
Lenticulina holcombensis Rau		X	X	X	X	X	X	X	X	X	X	X		X		
Eponides yeguaensis Weinzierl and Applin		X			X				X							
Cibicides haydoni (Cushman and Schenck)		X	X	X												
Cibicides natlandi Beck		X	X	X												
Dentalina colei Cushman and Dusenbury		X		X		X					X	X				
Uvigerina cf. U. yazooensis Cushman		X	X	X	X							X				
Globocassidulina globosa Hantken			X					X								
Lenticulina welchi (Church)			X							X	X			X	X	X
Marginulina subbullata Hantken			X								X	X			X	X
Valvulineria jacksonensis welcomensis Mallory					X	X				X	X	X				X
Dentalina cf. D. consobrina d'Orbigny					X				X		X				X	
Gyroidina simiensis Cushman and McMasters						X	X	X	X							
Gaudryina coalingensis Cushman and GD Hanna						X										
Bulimina corrugata Cushman and Siegfus								X	X						X	
Valvulineria tumeyensis Cushman and Simonson										X	X					
Dentalina adolphina d'Orbigny											X	X				
Cibicides warreni Cushman, Stewart and Stewart											X	X				
Vulvulina sp.											X	X				
Lenticulina sp.											X					
Bulimina cf. B. jacksonensis Cushman											X	X	X	X	X	X
Dentalina jacksonensis Cushman and Applin												X	X			
Cyroidina soldanii octocamerata Cushman and GD Hanna												X				
Amphimorphina californica Cushman and McMasters												X			X	X

Zone: B. Schencki P. cf. P. jenkinsi | Uvigerina cf. U. yazooensis | Bulimina cf. B. jacksonensis
Stage: NARIZIAN
Age: late EOCENE | middle EOCENE
Paleobathymetry: neritic | middle to upper bathyal
Skookumchuck Formation | McIntosh Formation

Table 15. Foraminifera recovered from the Earl F. Siler and J.W. Tanner Kostick No. 1, SE 1/4, sec. 29, T. 14 N., R. 2 W., Lewis County, Washington

[R , rare; X, Present (abundancy not indicated); C, Common; ?, questionable identification; *potentially significant stratigraphically]

TAXA* (from cuttings) (DEPTH IN FEET)	130'-180'	180'-200'	200'-270'	270'-400'	400'-610' Barren	610'-780'	780'-840'	900'-940'	940'-960'	960'-980'	980'-1,000'	1,120'-1,180'	1,180'-1,210'	1,300'-1,330'	1,330'-1,390'	1,480'-1,540'	1,540'-1,600'	1,810'-1,870'	6,190'-6,210'	6,210'-6,230'	6,230'-6,260'	6,260'-6,290'	6,290'-6,330'	7,730'-7,760'	7,760'-7,790'	7,780'-7,800'	8,120'-8,150'	8,150'-8,170'	9,390'-9,430'
Elphidium cf. E. minutum Cushman	C	R																											
Molusk fragments	C	C	C	C		C	R	C	R	R	R	R	R	R	R	R	R	R											
Nonion sp.								R						R															
Bolivina sp.									R														X						
Bulimina schencki Beck									R		R			R	X	X		X		X	X								
Dentalina communis (d'Orbigny)												R																	
Lenticulina sp.												R																	
Cibicides hodgei Cushman and Schenck													R																
Bolivina kleinpelli Beck														R	X			X											
Cibicides baileyi Beck														R															
Cibicides natlandi Beck														?		X						X	X						
Triloculina globosa (Hanna and Hanna)														?															
Lenticulina inornatus (d'Orbigny)														?	X	X	X	X	X	X	X	X	X		X	X	X		
Plectofrondicularia packardi Cushman and Schenck														R															
Quinqueloculina imperialis Hanna and Hanna															X	X		X											
Lenticulina convergens (Bornemann)															X											X			
Florilus cf. F. inflatum (Cushman and Ellisor)															X			X	X	X	X	X	X						
Quinqueloculina goodspeedi Hanna and Hanna															X	X		X											
Cyclammina pacifica Beck																X	X										X		
Eponides yeguaensis Weinzierl and Applin																X	X												
Globobulimina pacifica Cushman																X							X	X	X	X		X	
Lagena cf. L. costata (Williamson)																X													
Quinqueloculina weaveri Rau																		X											
Eponides minimus Cushman																		X											
Bulimina cf. B. pyrula d'Orbigny																			X	X	X	X	X						
Cibicides pseudowuellerstorfi Cole																			X										
Amphimorphina (plectofrondicularia) jenkinsi (Church)																			X		X	X	X						
Angulogerina hannai Beck																			X		X		X						
Bolivina basisenta oregonensis Cushman, Stewart and Stewart																			X	X	X	X	X						
Globocassidulina globosa (Hantken)																			X	X	X	X	X		X	X	X		
Quinqueloculina minuta Beck																				X									
Valvulineria tumeyensis Cushman and Simonson																				X	X		X				X		
Cibicides warreni Cushman, Stewart and Stewart																					X								
Cibicides cf. C. mcmastersi Beck																					X	X							
Uvigerina cf. U. yazooensis Cushman																					X								
Florilus danvillensis (Howe and Wallace)																						X				X			
Plectofrondicularia searsi Cushman, Stewart and Stewart																						X							
?Ceratobulimina sp.																						X							
Plectofrondicularia packadi multilineata Cushman and Simonson																						X	X						
Chilostomelloides cf. C. eocenica Cushman																							X						
Cibicides lobatulus (Walker and Jacob)																							X						
Gyroidina soldanii d'Orbigny																							X						
Vulvulina sp.																							X						
Bulimina ovata cowlitzensis Beck																							X						
Dentalina dusenburyi Beck																							X						
Globigerina cf. G. bulloides d'Orbigny																							X		X				X
Bulimina aff. B. instabilis Cushman and Parker																								X	X		X	X	
Valvulineria jacksonensis welcomensis Mallory																								X	X				
Gyroidina cf. G. scalata Garret																								X					
Allomorphina cf. A macrostoma Karrer																								X					
Chilostomella cf. C. mexicana Nuttall																									X	X	X		
Nodosaria cf. N. longiscata d'Orbigny																									X			X	X
Bulimina corrugata Cushman and Siegfus																									X		X	X	
Saracenaria hantkeni Cushman																									X				
Lenticulina welchi (Church)																											X		
Allomorphina cf. A. paleoeocenica Cushman																											X	X	
Chilostomella oolina Schwager																											X		X
Valvulineria cf. V. allomorphinoides (Reuss)																											X	X	
Amphimorphina californica Cushman and McMasters																											X		
Pseudoglandulina conica (Neugeboren)																													X

*This checklist was compiled from identifications, listed by R.E. Stewart in 1956.

Zone: Bulimina schencki - Plectofrondicularia cf. P. jenkinsi | Uvigerina cf. U. yazooensis | Bulimina cf. B. jacksonensis
Stage: NARIZIAN
Age: late EOCENE | middle EOCENE
Paleobathymetry: littoral to nonmarine | outer to inner neritic | upper bathyal | middle bathyal
Skookumchuck Formation | McIntosh Formation

Table 16. Foraminifera recovered from the Selburn - Washington Oil Corporation Wulz No. 1, NE 1/4, sec. 29, T.13 N., R. 1 W., Lewis County, Washington

[C, Common; F, Few; R , Rare]

TAXA (DEPTH IN FEET)	1,370'-1,410'	1,410'-1,470'	1,470'-1,550'	1,550'-1,600'	1,600'-1,660'	1,660'-1,700'	1,700'-1,750'	1,750'-1,850'	1,850'-1,950'	1,950'-2,060	2,060'-3,840'*	3,840'-3,860'	3,860'-3,920'	3,920'-3,970'	3,970'-4,180'*	4,180'-4,190'	4,190'-5,400'*	5,400'-5,420'	5,420'-5,450'	5,450'-5,550'	5,550'-5,600'	5,600'-5,614'	5,610'-5,670'	5,670'-5,860'*	5,860'-5,910'	5,910'-5,950'	5,960'-5,980'	5,990'-6,050'	6,050'-6,110'	6,110'-6,170'	6,170'-6,200'	6,200'-6,250'	6,250'-6,300'	6,300'-6,350'	6,350'-6,400'	6,400'-6,450'	6,450'-6,500'
Bulimina cf. B. ovata d'Orbigny	R			R	R		C	C	C	R						R				R	R		R		R		F	C	C	C	C	C	C	C	C	C	C
Ceratobulimina washburnei Cushman and Schenck	F				R		R	R	R							R																					
Cibicides cf. C. lobatulus (Walker and Jacob)	C	R	R	F	R	R	R	R	R																	F		R	R						R		
Eponides kleinpelli Cushman and Frizzell	C	C	F	C	R	R	C	R	F	R		R				R										F	C	F		R		R	R		R	R	R
Eponides cf. E. duprei Cushman and Schenck	C	R	R	C	R	R	C	C	F	R						R									R		R	R		R	R	R	R	R		R	R
Nonion cf. N. planatum Cushman and Thomas	C	R		R	R		R	C	F																	R				R							
Cibicides natlandi Beck	R	R					R	C	F			C	C	C				R		R			R		R	R		R	R	R			R				R
Pullenia salisburyi Stewart and Stewart	F			R	R		R	R	R	R										R						R		R	R								
Quinqueloculina imperialis Hanna and Hanna	C	R		R		R	R	C	C	R		R	F	F		R										R		R		R		R		R	R	R	
Lenticulina inornatus (d'Orbigny)	C	C	F	R	F		F	C	C	R		F	R	F		R		R		R			R			R					R						R
Lenticulina hockleyensis (Cushman and Applin)	R	R				R	F	C	R	R						R																					
Sigmomorphina schencki Cushman and Ozawa	F		R	C	F		C	C	F	R						R												R									
Valvulineria willapaensis Rau	R			R			R	R	R	R																											
Guttulina irregularis d'Orbigny	R				R		F	C	F	R																	R										
Florilus applini (Howe and Wallace)	R							R	R														R			R		C	F	F	R	C	R	F	F	C	C
Dentalina communis d'Orbigny		R						R	R							R										R											
Elphidium minutum Cushman		R						R	R																R												
Globocassidulina globosa (Hantken)				R			R	F	R																R	R		R		R				R	R		
Guttulina frankei Cushman and Ozawa					R		R	R	R																												
Dentalina dusenburyi Beck					R			F	F	R						R				R																	
Gyroidina cf. C. planata Cushman							R	R	R	R																		R									
Cibicides hodgei Cushman and Schenck							F	C	R	R								R	C	C	R		F											R			
Lagena sp.							R	F	R			R	R						R															R	R		
Pseudoglandulina cf. P. conica (Neugeboren)							R	F	R				R							R										R							
Eponides yequaensis Weinzierl and Applin							R					C	C	C						R					R	R			R	R	R		R	R	C	F	F
Vaginulinopsis saundersi (Hanna and Hanna)							R	F	F																												
Lenticulina kincaidi Beck								F	F	R						R											R	R									
Pyrgo lupheri Rau								R																													
Globigerina bulloides d'Orbigny									R				R	R														R	R							R	
Quinqueloculina goodspeedi Hanna and Hanna												F	C	C		R				R						R							R				
Eponides minimus Cushman												R	F	C											R	R								R	R		
Elphidium schencki ? Cushman and Dusenbury													R	C																							
Bolivina cf. B. kleinpelli Beck													R									F			R	R			R	F		R	R	F		R	
Comuspira byramensis Cushman													R																								
Lenticulina weaveri Beck													R					F	F	C	F	C	F		F	C	C	C	C	C	C	C	C	C	C	C	C
Valvulineria aff. V. willpaensis Rau														R		R							R			R	R	C	R	C	R	R				R	R
Bulimina schencki Beck														R						R		C						R	R	R	R	R	R			R	
Plectofrondicularia searsi Cushman, Stewart & Stewart																			R	R		C	R		R			R		R						R	
Uvigerina garzaensis Cushman and Siegfus																			R	R		R	R			R						R					
Gyroidina condoni (Cushman and Schenck)																				R		R						R	R	F		R	R	F	F	R	F
Lenticulina welchi (Church)																					R								R	R		R					
Bolivina basisenta Cushman and Stone																									R			C	R	F		C	R	F	F	C	C
Angulogerina hannai Beck																										R				R						R	
Bulimina cf. B. rostrata Brady																																		R			
Nodosaria arundinea Schwager																																		R			

Zone: Sigmomorphina schencki | Bulimina schencki-Plectofrondicularia cf. P. jenkinsi
Foraminifera identified by Harold Billman and James Eke of Union Oil Company (written communication to W.W. Rau, 1954)
Stage: REFUGIAN | NARIZIAN
Age: late EOCENE
Paleobathymetry: aeritic | neritic | upper bathyal
Lincoln Creek Formation | Skookumchuck Formation

Table 17. Foraminifera recovered from the Pleasant Valley Gas and Oil Company Guenther No. 1, SE 1/4, sec. 8, T. 12 N., R. 1 W., Lewis County, Washington

[R, rare; F, few; C, common; ?, questionable identification; *, potentially significant stratigraphically]

TAXA (DEPTH IN FEET)	1,000'	1,020'	1,040'	1,060'-1,100'	1,200'	1,220'	1,240'	1,440'	1,460'	1,594'-1,601' core	1,620'	1,618'-1,629' core	1,633'-1,644' core	1,648'-1,659' core	1,662'-1,672' core	1,719'-1,730' core	1,733'-1,741' core	3,460'	3,480'	3,500'	3,520'-3,560'	3,760'-3,800'	5,860'-5,900'	6,440'-6,480'	6,500'-6,520'
Uvigerina cocoaensis Cushman	C	F	C	C	C	R	F	R	R		R														
Uvigerina atwilli Cushman and Simonson	R																								
Alabamina kernensis Smith	R		R	R	R										?	C	R								
Cibicides elmaensis Rau	R	F	F	F		R																			
Lagena cf. L. costata (Williamson)	R															R									
Gyroidina condoni (Cushman and Schenck)	F		R		R							R													
Gyroidina orbicularis planata Cushman	F	R	C	F											?										
Plectofrondicularia packardi packardi Cushman and Schenck	F		F	R																					
Cassidulina subglobosa Brady	F		F	R																					
Lenticulina cf. L. limbosus hockleyensis (Cushman and Applin)	R			R																					
Guttulina frankei Cushman and Ozawa	R																								
Stilostomella frizzelli Rau	R	R																							
Dentalina cf. D. pauperata d'Orbigny	R	R	R																						
Dentalina sp. A. Rau	R	R	R	R																					
Eponides sp.		R																							
Guttulina irregularis d'Orbigny			F	R	R										R	F								R	
Globocassidulina globosa (Hantken)			R	R	R							R		R		R	R								
Ceratobulimina washburnei Cushman and Schenck									R	R					R	R									
Valvulineria willapaensis Rau									R																
Elphidium californicum Cook									R																
Guttulina problema d'Orbigny										R						R									
Sigmomorphina ? sp. A [of Beck]										R															
Karreriella cf. K. contorta Beck												R													
Cibicides mcmastersi Beck												R	F	F	F	C									
Cibicides cf. C. lobatulus (Walker and Jacob)													R	R											
Lenticulina inornatus d'Orbigny													R	R	R	R			R	R		R	F	F	R
Anomalina cf. A. costiana Weinzierl and Applin													R		R										
Globigerina spp.														R		R							R		
Lagena cf. L. substriata Williamson														R											
Bulimina schencki Beck														R	R					R				R	R
Pullenia cf. P. salisburyi Stewart and Stewart														R	R										
Cibicides cf. C. hodgei Cushman and Schenck														F	R		?						?		
Pseudoglandulina conica (Neugeboren)														R	R										
Cibicides baileyi Beck														R	F	?							?		
Valvulineria aff. V. willapaensis Rau															R										
Melonis halkyardi (Cushman)																R									
Globobulimina pacifica Cushman																?	?							F	
Florilus cf. F. inflatum (Cushman and Ellisor)																R	?						F	F	F
Bulimina ovata cowlitzensis Beck																R							F	F	F
Cibicides natlandi Beck																	R	F	R		R	C	R	R	
Eponides yequaensis Weinzierl and Applin																		R	R		R	R			
Quinqueloculina imperialis Hanna and Hanna																		R	R		R	R	R		
Quinqueloculina goodspeedi Hanna and Hanna																			?	?					
Vaginulinopsis saundersi (Hanna and Hanna)																						R	R		
Gyroidina cf. G. soldanii d'Orbigny																						R			
Bolivina basisenta Cushman and Stone																							F	F	R
Uvigerina cf. U. garzaensis Cushman and Siegfus																							R		
Plectofrondicularia sp.																								R	

Zone: S. schencki | B. schencki - P. cf. P. jenkinsi
Stage: REFUGIAN | NARIZIAN
Age: OLIGOCENE | late EOCENE | middle EOCENE
Lincoln Creek Formation | Skookumchuck Formation
Paleobathymetry: upper bathyal | neritic | non-marine to outer neritic | upper bathyal

Table 18. Foraminifera recovered from the Humble Oil and Refining Company Roscoe B. Perry et ux No. 1, SW 1/4, sec. 12, T. 12 N., R. 1 W., Lewis County, Washington

[R, rare; F, few; C, common; ?, questionable identification; *, potentially significant stratigraphically]

TAXA (DEPTH IN FEET)	660'-750'	930'-1,020'	1,020'-1,110'	1,110'-1,200'	1,470'-1,560'	2,190'-2,280'	5,160'-5,250'	5,790'-5,820'	6,150'-6,270'
Anomalina sp. (cf. B. of Beck)	R					R			
Cibicides cf. C. lobatulus (Walker and Jacob)	R								
Valvulineria willapaensis Rau	F								
Eponides yequaensis Weinzierl and Applin	F								R
Cassidulina cf. C. subglobosa Brady	R		F	F	R				
Lenticulina cf. L. holcombensis Rau		F	C	C					
Guttulina irregularis (d'Orbigny)		R	F	R					
Lagena sp. (sp. A of Beck, fine costae)		R	R						
Plectofrondicularia packardi packardi Cushman and Schenck		R							
Cibicides cf. C. mcmastersi Beck		R	?						
Florilus cf. F. inflatum (Cushman and Ellisor)		R		R	R		R	R	F
Cibicides haydoni (Cushman & Schenck)		F	R						
Cibicides aff. C. elmaensis Rau		R	R	R					
Globobulimina pacifica Cushman		R	R	R	R		C		?
Lenticulina washingtonensis Beck		R							
Marginulina subbullata Hantken		R							
Vaginulinopsis saundersi (Hanna and Hanna)		R		?					
Dentalina dusenburyi Beck		R	R						
Quinqueloculina imperialis Hanna and Hanna		F	R	R			R		
Alabamina cf. A. kernensis Smith		F	F						
Eponides kleinpelli Cushman and Frizzell		R	R						
Sigmomorphina cf. S. schencki Cushman and Ozawa		R				R			
Cibicides hodgei Cushman and Schenck		R	R				F		
?Globorotalia sp.			R						
Ceratobulimina washburnei Cushman and Schenck			R	?					
Cibicides natlandi Beck			?				R		
Nodosaria longiscata (d'Orbigny)			R						
Lenticulina inornatus (d'Orbigny)					F	R	C	?	F
Dentalina communis (d'Orbigny)					R				
?Lenticulina sp. (cf. sp. D of Beck) (large, raised limbate sutures)						R			
Quinqueloculina goodspeedi Hanna and Hanna							R		
Uvigerina sp.							R		
Bolivina cf. B. basisenta Cushman and Stone								R	
Bulimina ovata cowlitzensis Beck									R

Zone: S. schencki | B. schencki P. cf. P. jenkinsi
Stage: REFUGIAN | NARIZIAN
Age: OLIGOCENE | late EOCENE
Paleobathymetry: neritic | outer neritic | upper bathyal to outer neritic
Lincoln Creek Formation | Skookumchuck Formation

Table 19. Foraminifera recovered from the Shell Oil Company Thompson No. 1, SW 1/4, sec. 34, T. 12 N., R. 1 W., Lewis County, Washington

[R, rare; F, few; C, common; ?, questionable identification]

TAXA (DEPTH IN FEET)	3,051'-3,081'	3,142'-3,172'	3,203'-3,233'	3,269'-3,291'	3,323'-3,353'	3,534'-3,564'	3,595'-3,625'	3,686'-3,717'	3,865'-3,899'	3,960'-3,990'	4,020'-4,050	4,110'-4,141'	4,172'-4,202'	4,262'-4,292'	4,318'-4,357'	4,442'-4,472'	4,564'-4,595'	4,656'-4,686'	4,717'-4,747'	4,809'-4,839'	4,899'-4,929'	4,989'-5,021'	5,050'-5,081'	5,113'-5,144'	5,205'-5,236'	5,414'-5,445	5,591'-5,688'	5,714'-5,840'	5,900'-5,930'	5,962'-5,992'	6,023'-6,144'	6,171'-6,236'	6,292'-6,383'	6,409'-6,439'	6,469'-6,500'	6,530'-6,560'	6,591'-6,621'	6,652'-6,683'	6,955'-6,985'	7,802'-7,931
Lenticulina inornatus d'Orbigny	R	R	R		R				R			R			R													R	R	F	F	R	R	R	C	R	R	R		R
Cibicides haydoni (Cushman and Schenck)	R	?																																						
Cibicides natlandi Beck		R	R	R		F	R	R	R	R	R		R		R	R	R	R	R							R							R				R			R
Eponides yeguaensis Weinzierl and Applin		R	R			R			R				R		R															R				R	F	R				
Quinqueloculina imperialis Hanna and Hanna			R												R																									
Guttulina irregularis d'Orbigny			R																																					
Valvulineria aff. V. willapaensis Rau													R																					?	?					
Elphidium cf. E. minutum Cushman													C	C	F	F	R	R	R	R	R	R	R	F	R	R	F	R	R					F	R			R		
Globobulimina pacifica Cushman																													?	R					?	R	R			
Florilus inflatum Cushman and Ellisor																														R						R				
Bulimina schencki Beck																																							R	

Zone: Bulimina schencki-Plectofrondicularia cf. P. jenkinsi
Stage: NARIZIAN
Age: EOCENE
Paleobathymetry: neritic
Skookumchuck Formation | Northcraft Formation

Table 20. Foraminifera recovered from the Shell Oil Company Sturdevant No. 1, NW 1/4, sec. 27, T.12 N., R.2 W., Lewis County, Washington

[R, rare; F, few; C, common; ?, questionable identification; *, potentially significant stratigraphically]

TAXA (DEPTH IN FEET)	666'-757'	757'-845'	1,387'-1,478'	1,478'-1,570'	1,570'-1,660'	2,598'-2,688'	4,625'-4,715'	4,715'-4,806'	4,806'-4,897'	4,897'-4,988'	4,988'-5,079'	5,079'-5,198'	5,198'-5,290'	5,411'-5,533'	5,533'-5,653'	5,653'-5,775'	5,805'-5,926'	5,926'-6,046'	6,100'-6,209'	6,198'-6,348'	6,801'-6,893'	7,134'-7,230'	7,240'-7,340'	7,340'-7,439'	7,439'-7,558'	8,130'-8,253'	8,253'-8,373'	8,373'-8,468'
Lenticulina spp. (mostly cf. L. inornatus)	R	C	F	F		R	C	C	C	F	C	C	F	C	C	C	C	C	C	C	C	C	C	C	C	R	F	F
Eponides kleinpelli Cushman and Frizzell	F	C	F																									
*Elphidium smithi Cushman and Dusenbury	R	F	R																									
Cibicides elmaensis Rau	F																											
*Valvulineria willapaensis Rau	C	C	R																									
Quinqueloculina imperialis Hanna and Hanna	R	C		?		F	R		R		?			R					R	R	R	R	F	R	R			
Guttulina problema d'Orbigny	?	F	R																									
Gyroidina orbicularis planata Cushman	C	C	R																									
Cassidulina galvinensis Cushman and Frizzell	F	R																										
Nonion halkyardi Cushman	F	C																										
Pseudoglandulina inflata (Bornemann)	?	R											?															
Dentalina sp.	R																											
Bulimina sculptilis laciniata Cushman and Parker	R																											
Ceratobulimina washburnei Cushman and Schenck		R						R			R														R			R
Pseudopolymorphina cf. P. ligua (Roemer)		F																										
Lagena cf. L. conscripta Cushman and Barksdale		R					R																					
Bulimina schencki Beck			C		R																							
Cibicides hodgei Cushman and Schenck			F				C	C	C	F	C	C	F	F	R	R	F	R	C	F	F	F	F	F	R		?	
Uvigerina cocoaensis Cushman			R																									
Florilus inflatum Cushman and Ellisor			C	R				R							C	C		F			R							
Globocassidulina globosa (Hantken)			R				R	R									R										R	R
Guttulina irregularis d'Orbigny			R																									
Vaginulinopsis saundersi Beck				?		R															R	?						
?Alabamina sp.				R																								
Plectofrondicularia cf. P. searsi Cushman, Stewart and Stewart					R			R		R	F	R		R	R	R	R	R			R	R		R	R	R	R	R
Eponides yeguaensis Cushman and Siegfus						F	R	R			R	R		R	F		R	R	R	R	R	R	F	F	R			
*Cibicides natlandi Beck						C	F	R	C	R	R	R	R			?	R		R	R	?	C	R	R	R		R	
Uvigerina garzaensis Cushman and Siegfus							C	R	R	R	R	F				R	R	R	R	R	R	R		R	R		R	R
Quinqueloculina goodspeedi Hanna and Hanna							R	R	R				?			?			?	R		R		R				
Globigerina sp.							R																			R	R	R
Nodogenerina (?) cf. N. adolphina (d'Orbigny)							R	R	R		F	R	?			R	?			R		R		R	R	R		R
Lenticulina cf. L. welchi (Church)									R			R		R	R		?	R				?	?	R		?	R	
Marginulina subbullata Hantken									R																			
Pullenia salisburyi Stewart and Stewart														R														
*Bolivina basisenta Cushman and Stone															C	C	F	C	R									
Valvulineria aff. V. willapaensis Rau (small)																R												
Cibicides mcmastersi Beck																?												
Gyroidina condoni (Cushman and Schenck)																R										R		R
Dentalina sp.																					R	R	R					
*Gyroidina simiensis Cushman and McMasters																									R			
*Uvigerina yazooensis Cushman																										F	F	
Plectofrondicularia cf. P. jenkinsi Church																										R	F	F
*Valvulineria tumeyensis Cushman and Simonson																										C	C	C
*Bulimina corrugata Cushman and Siegfus																											R	R
?Globorotalia sp.																											R	

Zone: S. schenki | Bulimina schencki -Plectofrondicularia cf. P. jenkinsi | Uvigerina cf. U. yazooensis
Stage: REFUGIAN | NARIZIAN
Age: EOCENE
Paleobathymetry: neritic | outer neritic grading upward to inner and nonmarine in upper part | upper to upper middle bathyal
basal Lincoln Creek Formation | Cowlitz (Skookumchuck) Formation | McIntosh Formation

Table 21. Foraminifera recovered from the Texas Company Benson Clatskanie No. 1, NE 1/4 sec. 36, T. 7 N., R. 4 W., Columbia County, Oregon

[R, Rare; F, Few; C , Common; ? , Questionable identification; * = Potentially significant stratigraphically;]

TAXA (DEPTH IN FEET)	628'-637'	640'-652'	1,227'-1,247'	1,253'-1,270'	1,275'-1,289'	1,292'-1,307'	1,310'-1,319'	1,322'-1,334'	1,337'-1,352'	1,355'-1,370'	1,374'-1,397'	1,400'-1,448'	1,540'-1,546'	1,550'-1,565'	1,568'-1,574'	1,580'-1,583'	1,684'-1,693'	1,696'-1,720'	2,657'-2,659'	3,385'-3,395'	5,149'-5,155'	5,564'-5,576'	5,576'-5,582'	5,584'-5,592'	5,592'-5,604'	5,606'	5,608'	5,615'-5,621'	5,621'	5,624'	5,644', 5,650'
*Bulimina schencki Beck	F	F																						?							
Lenticulina cf. L. inornatus d'Orbigny	R	F	F	C	C	C	C	F	C	F	F	C	C	C	C	C	R				R	F	F	R	?		F	F	F	C	C
Elphidium sp. (rounded periphery)		R										?																			
*Ceratobulimina washburnei Cushman and Schenck			R	R	R	R	R	R				?		F									R								
*Cibicides natlandi Beck			C	C	C	C	C	C	F	F	F	C	R	?																	
Cibicides cf. C. pseudoungerianus evolutus Cushman and Hobson			F	R	R	R	F	R	?			?	?		R	R															
Dentalina spp. (nondiagnostic)			R	R	R	R					R	R	R	R	R	R	R	?				R						R	R		
Arenaceous spp. (nondiagnostic)			F	C	F	F	C	F		R			F	F	R	F			R		R	R						R	C		
Eponides yeguaensis Weinzerl and Applin			F	R	F	F	F	F		F	F	F	C	F	F	R															
Plectofrondicularia searsi Cushman, Stewart and Stewart			F	F	F	R	F	R	R	F	R	F	F	R	R	R	R					R	?						R		
Pseudoglandulina conica (Neugeboren)			R	R	F	R	R	R	R	R	R	R	R	R	R	R													R		R
Quinqueloculina whitei Beck			?				?	R																							
Quinqueloculina imperialis Hanna and Hanna			R		R		R	R				R		R	R																
Saracenaria cf. S. hantkeni Cushman				R		R		?																							
Globobulimina sp.				R		R				R	?	R					R					?	?		?	R		R	?		
Cibicides hodgei Cushman and Schenck				?		?	?																								
Pullenia salisburyi Stewart and Stewart				?				R																							
Nonion planatum Cushman and Thomas					R		R	?	?				R		?	R															
Globocassidulina globosa (Hantken)						R	R	R	R		R					F															
Guttulina problema d'Orbigny							?	?								?															
Lagena spp.							R	R	R			R																	?		
*Lenticulina welchi (Church)							R		R	?	?						?														
Quinqueloculina goodspeedi Hanna and Hanna							R	?												?											
Robertina washingtonensis Beck								R																							
Nonion cf. N. applini Howe and Wallace								R	R	?	?	R					R	R					R		R						
Virgulina sp.								R	R	R																					
Cornuspira sp.										R					R	R															
Valvulineria cf. V. willapaensis Rau											R						R			?											
Buliminella sp.												R																			
Anomalina sp.												R					R			?											
Cibicides cf. C. natlandi olequaensis Beck												R																			
Angulogerina cf. A. hannai Beck												R					R														
Bolivina cf. B. jacksonensis Cushman and Applin																R															
Vaginulinopsis sp.																	R														
Cibicides cf. C. mcmastersi Beck																				R											
*Gyroidina condoni Cushman and Schenck																						R	F		?			?	R	R	?
Abundant Coal																					C										

Stage: upper NARIZIAN
Age: EOCENE
Paleobathymetry: neritic | bathyal to outer neritic
Cowlitz Formation and Grays River volcanics | Hamlet Formation and Tillamook Volcanics

Table 22. Foraminifera recovered from The Texas Company Clark and Wilson No. 6-1, NE 1/4, Sec. 36, T. 6 N., R. 4 W., Columbia County. Oregon.

[R, rare; F, few; C, common; ?, questionable identification; *, potentially significant stratigraphically;]

TAXA (DEPTH IN FEET)	705'	915', 925'	1,104', 1,110'	1,332', 1,335'	1,549', 1,557'	1,808', 1,813'	2,079', 2,081'	2,347', 2,362'	2,480'	3,002', 3,011'	3,691', 3,694'	4,070'	4,612', 4,616'	6,020'	6,175' ditch	6,245', 6,255' ditch	6,360', 6,370' ditch	6,470', 6,700' ditch	6,690', 6,700' ditch	7,025', 7,055' ditch	7,175', 7,190' ditch	7,675' ditch	7,730', 7,737'	7,820', 7,832'	8,023', 8,060'	8,080', 8,140' ditch	8,207', 8,210'	8,237', 8,271'	8,293', 8,318'	8,335', 8,343'	8,380', 8,395'	8,400', 8,425'	8,432', 8,451'
Angulogerina cf. A. hannai Beck	F		F			R		R					R		R	R		R				R											
Bolivina cf. B. basisenta Cushman and Stone	R		R																														
Cibicides cf. C. mcmastersi Beck	F					?	?	R																									
Globocassidulina globosa (Hantken)	R	R	R	R	F	R	R		R	R					R	R	R	R	R	?		R											
Globobulimina cf. G. pacifica Cushman	R	F	C	R	F	F		R							R	F	F	F		R	R	F	R		F			R		?			
Alabamina wilcoxensis californica Mallory	?																	?	?														
Lagena spp	R			R																													
Gaudryina sp	R																							R									
Nodosaria cf. N. deliciae Martin	R																																
Anomalina cf. A. garzaensis Cushman and Siegfus	R			?																		?											
Plectofrondicularia cf. P. vaughani Cushman	R	R	R	R												R	R	R	R														
Lenticulina inornatus d'Orbigny	?	C	C	F	F	F	R	F	R	F	F	F	F	F	F	F	C	F	F	F	R	F	R	R		F	F	R					
Cassidulina subglobosa Brady		F	F												R	R	R	?	R	R	R	R											
*Cibicides natlandi Beck		R		F	R	F	?	R		R		R	?		R	F	F	R	R	R		R	?			R							
Cibicides haydoni (Cushman and Schenck)		F		?	R																												
Cornuspira sp.		R																															
Guttulina problema d'Orbigny		R																															
Guttulina irregularis d'Orbigny		R	R	R	R					?					R	F	R		R	R		R											
*Plectofrondicularia packardi packardi Cushman and Schenck		?		R	F	R		R							?	R	R	R	?		?	?	?		?								
*Ceratobulimina washburnei Beck		R		F	R			R									R	R	R	?		R											
Robertina washingtonensis Beck		R		R						R																							
Cibicides hodgei Cushman and Schenck		R	F		F	R		F	F						R	R	R	R	R	R	R	R				R							
Cibicides cf. C. coalingensis (Cushman and Hanna)		F	R	F		R										F	R	R	R		R	R				R							
Dentalina dusenburyi Beck		?			?																												
Globigerina spp		R	R	R	R		R	R	R																								
Nonion cf. N. applini Howe and Wallace		F	F	?	F	R	?								R	R	R	R	R	R	R		?		?	?							
Nodosaria cf. N. longiscata (d'Orbigny)		R																															
Pseudoglandulina cf. P. conica (Neugeboren)		R			?										R	R	R	R				?	?			R							
Vaginulinopsis saundersi (Hanna and Hanna)		?		F				R		R					R	F	R	R	R	R		?											
Quinqueloculina cf. Q. minuta Beck		R	R		?			R	R	R					R			R				?											
Quinqueloculina cf. Q. whitei Beck		R	R	?				?												?													
Bolivina cf. B. jacksonensis Cushman and Applin			R																														
*Bulimina schencki Beck			R	R	R		R		R	R							R	R				R								R			
Dentalina spp. (nondiagnostic)			F	R		R									R		R	R	R								R			R		R	
Gyroidina orbicularis planata Cushman			F	R											R			R									R						
Lagena hexagona (Williamson)			R																														
Margirulina sp			R			R											R					R											
Nonion planatum Cushman and Thomas				R	R	R										R	R	R															
Dentalina cf. D. delicatula Cushman				R																													
Quinqueloculina imperialis Hanna and Hanna				R	R		?	R		R					R	R	R	R	R			?											
*Lenticulina welchi (Church)				R	R				?							R		R				R				R	R						
Elphidium sp. (sharp periphery)					F	R							?			R	R	R	R	R	R	R				R							
Elphidium sp. (rounded periphery)						R	?										R					?											
Eponides yeguaensis Weinzierl and Applin							R	R	R	R	R	R	R			R	R	R		R		R	R		R	R		?					
*Bulimina sculptilis laciniata Cushman and Parker								F	F						R		R			?						R							
Plectofrondicularia cf. P. seaisi Cushman, Stewart and Stewart								F	F			R	R	R	R	R		R								?	?			?			
*Gyroidina condoni Cushman and Schenck								?	?									?															
Arenaceous spp. (nondiagnostic)								C	F	F	F		F		R	R	R	R	R	R								R	F	F	F	R	F
*Valvulineria tumeyensis Cushman and Simonson													?			?											?						
Plectofrondicularia packardi multilineata Cushman and Simonson															?	R	R							?									
Planulinaria markleyana Church															?																		
Uvigerina garzaensis Cushman and Seigfus																R			R			R											
*Amphimorphina californica Cushman and McMasters																	?																
Epistomina eocenica (Cushman and Hanna)																			?	?													
Pullenia salisburyi Stewart and Stewart																			R														
Uvigerina yazooensis Cushman																			?	?													
*Bulimina cf. B. jacksonensis Cushman																				?						?	?		?	?	?		
Chilostomella sp																											R						
*Valvulineria jacksonensis welcomensis Mallory																													?	R	R		
*Bulimina corrugata Cushman and Siegfus																														R	R		

Substage: upper ? | ? lower
Stage: NARIZIAN
Age: EOCENE
Paleobathymetry: inner to outer neritic | upper bathyal | middle bathyal
Cowlitz Formation | Hamlet formation and Tillamook volcanics

Table 23. Foraminifera recovered from the Exxon Corporation GPE Federal Community No. 1, SW 1/4, sec. 3, T. 4 N., R. 3 W., Columbia County, Oregon

[R, rare; F, few; C, Common; ?, questionable identification]

DEPTH IN FEET (sample intervals, in order): 160'-190', 190'-220', 220'-250', 250'-280', 280'-310', 310'-340', 340'-370', 370'-400', 400'-430', 430'-460', 460'-490', 490'-520', 520'-550', 550'-580', 580'-610', 610'-640', 640'-670', 670'-700', 700'-730', 730'-760', 760'-790', 790'-820', 820'-850', 850'-880', 880'-910', 910'-940', 940'-970', 970'-1000', 1000'-1030', 1030'-1060', 1060'-1090', 1090'-1120', 1120'-1150', 1150'-1180', 1180'-1210', 1210'-1240', 1240'-1270', 1270'-1300', 1300'-1330', 1330'-1360', 1360'-1390', 1390'-1420', 1420'-1450', 1450'-1480', 1480'-1510', 1510'-1540', 1540'-1570', 1570'-1600', 1600'-1630', 1630'-1660', 1660'-1690', 1690'-1720', 1720'-1750', 1750'-1780', 1810'-1840', 1840'-1870', 1870'-1900', 1900'-1930', 1930'-1960', 1960'-1990', 1990'-2020', 2020'-2050', 2050'-2080', 2080'-2110', 2110'-2140', 2140'-2170', 2170'-2200', 2200'-2230', 2230'-2260', 2260'-2290', 2290'-2320', 2320'-2350', 2350'-2380', 2380'-2410', 2410'-2440', 2440'-2470', 2470'-2500', 2500'-2530', 2530'-2560', 2560'-2590', 2590'-2620', 2620'-2650', 2650'-2680', 2680'-2710', 2710'-2740', 2740'-2770', 2770'-2800', 2800'-2830', 2830'-2860', 2860'-4000', 4030'-4060', 4060'-4090', 4090'-4120', 4120'-8200', 8230'-8260', 8260'-8290', 8290'-8310', 8310'-8340', 8340'-8370', 8370'-8400', 8400'-8430', 8430'-8460', 8460'-8490', 8490'-8520', 8520'-8550', 8550'-8580', 8580'-8610', 8610'-8640', 8640'-8670', 8670'-8700', 8700'-8730', 8730'-8760', 8760'-8790', 8790'-8820', 8820'-8850', 8850'-8880', 8880'-8910', 8910'-8940', 8940'-8970', 8970'-9000', 9000'-9030', 9030'-9060', 9060'-9090', 9090'-9120', 9120'-9150', 9150'-9180', 9180'-9210', 9210'-9240', 9240'-9270', 9300'-9330', 9330'-9360', 9360'-9390', 9390'-9420', 9420'-9450', 9450'-9480', 9480'-9510', 9510'-9540', 9540'-9570', 9570'-9600', 9600'-9630', 9630'-9660', 9660'-9690', 9690'-9710', 9710'-10,250', 10,280'-10,310', 10,310'-10,340', 10,340'-10,370', 10,370'-10,400', 10,400'-10,430', 10,430'-10,460', 10,460'-10,490', 10,490'-10,520', 10,520'-10,550', 10,550'-10,580', 10,580'-10,610', 10,610'-10,640', 10,640'-10,670', 10,670'-10,700', 10,700'-10,730', 10,730'-10,760', 10,760'-10,790', 10,790'-10,820', 10,820'-10,850', 10,850'-10,880', 10,880'-11,010', 11,010'-11,040', 11,040'-11,070', 11,070'-11,270'

TAXA	Occurrences (interval, by top depth in feet: abundance)
*Buccella mansfieldi oregonensis (Cushman, R.E. & K.C. Stewart)	370'-400': R; 400'-430': R
Gyroidina orbicularis planata Cushman	370'-400': R; 400'-430': R; 910'-940': R; 940'-970': R; 1000'-1030': R; 1030'-1060': R
Cibicides cf. C. americanus crassiseptus Cushman and Laiming	370'-400': R
Cibicides sp.	370'-400': R; 400'-430': R
Quinqueloculina sp.	370'-400': R; 1180'-1210': R; 1210'-1240': R
Pseudoglandulina aff. P. inflata (Bornemann)	400'-430': R; 910'-940': R; 940'-970': R; 1030'-1060': R
Cyclammina spp.	910'-940': R; 940'-970': R; 970'-1000': R; 1120'-1150': R; 1240'-1270': R; 9120'-9150': R; 9150'-9180': F; 9180'-9210': F; 9210'-9240': R; 9240'-9270': R; 9300'-9330': F; 9330'-9360': F; 9360'-9390': F; 9390'-9420': F; 9420'-9450': F; 9450'-9480': F; 9480'-9510': R; 9510'-9540': R; 9540'-9570': R; 9570'-9600': R; 9600'-9630': R; 9630'-9660': R; 9660'-9690': R; 9690'-9710': R
Elphidium sp. (small)	910'-940': R; 1030'-1060': R
Cassidulina cf. C. crassipunctata Cushman and Hobson	910'-940': R; 970'-1000': R
Quinqueloculina imperialis Hanna and Hanna	940'-970': R; 1180'-1210': ?; 1660'-1690': R; 1810'-1840': R; 1840'-1870': R; 1870'-1900': R; 1900'-1930': R; 1960'-1990': R; 1990'-2020': R; 2020'-2050': R; 2140'-2170': R; 2230'-2260': R; 2320'-2350': R; 2410'-2440': ?; 8430'-8460': R; 8490'-8520': ?
Lagena becki Sullivan	940'-970': R
Florilus cf. F. incisum (Cushman)	940'-970': R; 10,820'-10,850': R; 10,850'-10,880': R
Guttulina aff. G. frankei Cushman and Ozawa	970'-1000': R
Praeglobobulimina cf. P. pupoides (d'Orbigny)	1030'-1060': R; 1210'-1240': R; 1240'-1270': R; 1510'-1540': R; 1660'-1690': R; 1690'-1720': R; 1810'-1840': R; 1840'-1870': R; 1870'-1900': R; 1900'-1930': R; 1930'-1960': R; 1960'-1990': F; 1990'-2020': R; 2140'-2170': R; 2170'-2200': R; 2200'-2230': R; 2260'-2290': R; 2830'-2860': R
Eponides cf. E. gaviotaensis Wilson	1210'-1240': R; 1270'-1300': R; 1300'-1330': F
Lenticulina inornatus (d'Orbigny)	1210'-1240': R; 1240'-1270': R; 1270'-1300': R; 1960'-1990': R; 1990'-2020': F; 2020'-2050': F; 2050'-2080': F; 2080'-2110': F; 2110'-2140': R; 2170'-2200': R; 2500'-2530': R; 9480'-9510': R; 9510'-9540': R
*Uvigerina cocoaensis Cushman	1210'-1240': F; 1240'-1270': R; 1270'-1300': C; 1300'-1330': C; 1330'-1360': F; 1360'-1390': F; 1390'-1420': R; 1420'-1450': R; 1450'-1480': R; 1480'-1510': R; 1510'-1540': R; 1540'-1570': R; 1570'-1600': R; 1630'-1660': R; 1660'-1690': R; 1690'-1720': C; 1720'-1750': F; 1750'-1780': C; 1810'-1840': F; 1840'-1870': C; 1870'-1900': F; 1900'-1930': F; 1930'-1960': F; 1960'-1990': F; 1990'-2020': F; 2020'-2050': C; 2050'-2080': F; 2080'-2110': F; 2110'-2140': R; 2140'-2170': R; 2170'-2200': R; 2200'-2230': R; 2260'-2290': R; 2290'-2320': R; 2320'-2350': R; 2380'-2410': R; 2500'-2530': R; 2560'-2590': R; 2590'-2620': R
Bulimina cf. B. schencki Beck	1240'-1270': R; 1810'-1840': R; 1930'-1960': R; 1960'-1990': R; 2080'-2110': R; 2110'-2140': ?
*Melonis halkyardi (Cushman)	1270'-1300': R; 1300'-1330': R; 2110'-2140': R; 2230'-2260': F; 2260'-2290': F; 2290'-2320': F; 2380'-2410': R; 2410'-2440': R; 8760'-8790': R
*Cassidulina subglobosa Brady	1270'-1300': R; 1300'-1330': R; 1360'-1390': R; 1630'-1660': R; 1690'-1720': F; 1720'-1750': F; 1750'-1780': F; 1810'-1840': R; 1840'-1870': R; 1870'-1900': R; 1900'-1930': R; 1930'-1960': R; 1960'-1990': R; 1990'-2020': F; 2050'-2080': F; 2110'-2140': R; 2140'-2170': R; 2170'-2200': R; 2290'-2320': R; 2350'-2380': R; 2590'-2620': R; 2860'-4000': R
Cibicides pseudoungerianus evolutus Cushman and Hobson	1270'-1300': R; 1300'-1330': R; 1330'-1360': F; 1360'-1390': R; 1450'-1480': R; 1630'-1660': R; 1660'-1690': R; 1690'-1720': F; 1720'-1750': F; 1750'-1780': F; 1810'-1840': R; 1840'-1870': R; 1900'-1930': R; 1930'-1960': R; 1960'-1990': R; 1990'-2020': R; 2020'-2050': F; 2110'-2140': R; 2170'-2200': R; 2200'-2230': R; 2320'-2350': R; 2380'-2410': R; 4090'-4120': R
Uvigerina cf. U. gardnerae Cushman	1300'-1330': R
Dentalina spp. (fragments)	1300'-1330': R; 1630'-1660': R; 1690'-1720': R; 1720'-1750': R; 1990'-2020': R; 2080'-2110': R; 2170'-2200': R; 2260'-2290': R; 2410'-2440': R
Plectofrondicularia sp. fragment (costate)	1210'-1240': R; 1330'-1360': R
Gyroidina soldanii d'Orbigny	1360'-1390': R; 2170'-2200': R
Guttulina irregularis d'Orbigny	1360'-1390': R; 1450'-1480': R; 1690'-1720': R; 1750'-1780': R; 2050'-2080': R; 2170'-2200': R; 9030'-9060': R
*Ceratobulimina washburnei Cushman and Schenck	1360'-1390': R; 1720'-1750': R; 1810'-1840': R; 1840'-1870': R; 1870'-1900': R; 2080'-2110': R
Bolivina cf. B. kleinpelli Beck	1510'-1540': R; 1720'-1750': R
Uvigerina cf. U. garzaensis Cushman and Siegfus	1540'-1570': R
Melonis pompilioides (Fichtel and Moll)	1570'-1600': R; 1720'-1750': R; 1750'-1780': R; 1900'-1930': R; 1990'-2020': R; 2110'-2140': R; 2260'-2290': R
Lagena sp. (smooth)	1570'-1600': R
Lenticulina cf. L. inornatus d'Orbigny	1660'-1690': R
Anomalina aff. A. californiensis Cushman and Hobson	1690'-1720': R
Quinqueloculina sp. (very long, small)	1690'-1720': R
Eponides kleinpelli Cushman and Frizzell	1690'-1720': F; 1810'-1840': R; 1840'-1870': R; 1870'-1900': R; 1900'-1930': R; 1930'-1960': R; 1960'-1990': F; 1990'-2020': R; 2020'-2050': F; 2050'-2080': F; 2080'-2110': F; 2110'-2140': F; 2170'-2200': R; 2230'-2260': F; 2260'-2290': R; 2290'-2320': F; 2320'-2350': F; 2350'-2380': R; 2380'-2410': R; 2410'-2440': R; 2590'-2620': R
*Plectofrondicularia packardi packardi Cushman and Schenck	1750'-1780': R; 1840'-1870': R; 2080'-2110': ?; 2530'-2560': R; 2860'-4000': R
Cibicides elmaensis Rau	1750'-1780': ?
Guadryina cf. G. alazanensis Cushman	1750'-1780': R; 2170'-2200': R
Pullenia salisburyi R.E. and K.C. Stewart	2110'-2140': R; 8370'-8400': ?; 8400'-8430': ?
Globigerina sp.	1810'-1840': R
Stilostomella sp.	1810'-1840': R; 2260'-2290': R
Lenticulina cf. L. arcuato-striatus carolinianus (Cushman)	1840'-1870': R; 1990'-2020': R; 2050'-2080': R; 2860'-4000': R
Pseudoglandulina cf. P. inflata (Bornemann)	1840'-1870': R; 1870'-1900': R; 1900'-1930': R; 1930'-1960': R; 1960'-1990': R; 2080'-2110': R; 2140'-2170': R; 2170'-2200': R; 2380'-2410': R; 2500'-2530': R; 2860'-4000': R; 9060'-9090': ?
Lenticulina cf. L. propinquus cowlitzensis Beck	1840'-1870': R; 1900'-1930': R; 1960'-1990': R; 8340'-8370': R
Guttulina frankei Cushman and Ozawa	1870'-1900': R; 2020'-2050': R; 2140'-2170': R; 2440'-2470': R
Lenticulina cf. L. coaledoensis (Detling)	1870'-1900': R; 2110'-2140': R
Glandulina cf. G. laevigata d'Orbigny	1900'-1930': R; 1990'-2020': R; 2020'-2050': R; 2800'-2830': R
Triloculina sp. (small, thin)	1900'-1930': R
Globobulimina pacifica Cushman	1960'-1990': R; 1990'-2020': R; 2020'-2050': R; 2050'-2080': R; 2260'-2290': R; 2410'-2440': R; 2440'-2470': R; 2470'-2500': R; 8340'-8370': R; 8700'-8730': ?; 8970'-9000': ?; 9000'-9030': ?; 9030'-9060': R; 9060'-9090': R; 9150'-9180': ?; 9210'-9240': ?; 9330'-9360': R
Lagena hexagona (Williamson)	2080'-2110': R
Uvigerina cf. U. cocoaensis Cushman (dark colored, small)	2080'-2110': C; 2110'-2140': F; 2140'-2170': F; 2170'-2200': F; 2200'-2230': R; 2230'-2260': R; 2260'-2290': R; 2290'-2320': R; 2320'-2350': R; 2350'-2380': R; 2380'-2410': R; 2410'-2440': R; 2440'-2470': R; 2500'-2530': R; 2830'-2860': R; 4030'-4060': R; 4090'-4120': R
Lenticulina cf. L. washingtonensis Beck	2080'-2110': R
*Cibicides haydoni (Cushman and Schenck)	2170'-2200': R; 8310'-8340': ?
*Valvulineria willapaensis Rau	2260'-2290': R; 2290'-2320': ?
Elphidium californicum Cook	2500'-2530': R; 2590'-2620': R
Lenticulina spp. (mostly cf. L. inornatus)	8230'-8260': R; 8340'-8370': R; 8370'-8400': R; 8400'-8430': F; 8430'-8460': R; 8460'-8490': R; 8490'-8520': R; 8580'-8610': R; 8700'-8730': F; 8760'-8790': R; 8940'-8970': R; 8970'-9000': R; 9000'-9030': F; 9030'-9060': R; 9060'-9090': F; 9090'-9120': F; 9120'-9150': R; 9150'-9180': F; 9180'-9210': R; 9210'-9240': R; 9240'-9270': R; 9330'-9360': R; 9360'-9390': R; 9390'-9420': R; 9420'-9450': C; 9450'-9480': F; 9480'-9510': F; 9510'-9540': F; 9540'-9570': R; 9570'-9600': R; 9600'-9630': R; 9630'-9660': R; 9660'-9690': R; 9690'-9710': R; 10,280'-10,310': R; 10,310'-10,340': R; 10,340'-10,370': R; 10,370'-10,400': R; 10,400'-10,430': R; 10,460'-10,490': R; 10,490'-10,520': R; 10,610'-10,640': R; 10,670'-10,700': R; 10,700'-10,730': R; 10,820'-10,850': R; 10,850'-10,880': F; 11,010'-11,040': F; 11,040'-11,070': R
Eponides cf. E. yeguaensis Weinzierl and Applin	8340'-8370': R; 8970'-9000': R; 9000'-9030': ?; 9030'-9060': R; 9060'-9090': R; 9120'-9150': R; 9150'-9180': F; 9360'-9390': R; 9390'-9420': R; 9570'-9600': R; 9600'-9630': R
?Anomalina sp.	8340'-8370': R
Elphidium cf. E. californicum Cook (small)	8370'-8400': R; 8610'-8640': R; 8640'-8670': R; 8670'-8700': R; 8700'-8730': F; 8730'-8760': R; 8760'-8790': R; 8790'-8820': R; 9300'-9330': R
*Bulimina schencki Beck	8400'-8430': R
Quinqueloculina cf. Q. minuta Beck	8400'-8430': R
*Globocassidulina globosa (Hantken)	8400'-8430': ?; 8460'-8490': ?; 8700'-8730': ?
Cibicides mcmastersi Beck	8400'-8430': ?
Uvigerina sp. (costate)	8460'-8490': R; 8700'-8730': R; 10,340'-10,370': R
Cibicides sp.	8460'-8490': R
Haplophragmoides spp.	8940'-8970': R; 9120'-9150': R; 9390'-9420': R
Marginulina (?) sp.	9000'-9030': R
*Cibicides natlandi Beck	9000'-9030': R; 9060'-9090': R; 9150'-9180': R; 9450'-9480': R
Sigmomorphina cf. S. schencki Cushman and Ozawa	9150'-9180': R; 9180'-9210': R
Lenticulina cf. L. washingtonensis Beck	9150'-9180': R
Dentalina sp. (?)	9420'-9450': R
Pseudoglandulina sp.	9420'-9450': R; 10,850'-10,880': R
Lenticulina cf. L. pseudo-vortex (Cole)	9480'-9510': R

Stage: Zemorrian | Zemorrian or Refugian | Refugian | Refugian? | upper Narizian | upper Narizian
Age: OLIGOCENE | EOCENE
Paleobathymetry: non-marine? | inner neritic | upper bathyal | littoral | littoral? | mostly non-marine with rare shallow(?) marine interbeds | inner neritic, occasionally littoral | marine, at least in part; possibly inner neritic to littoral
Columbia River Basalt | Pittsburg Bluff Formation | Keasey Formation | Goble volcanics and Keasey Formation | Cowlitz Formation | Hamlet formation

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1999

WELL STRATIGRAPHY AND CORRELATIONS, WESTERN WASHINGTON AND NORTHWESTERN OREGON

By

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1999

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