Form 5500

Department of the Treasury
Internal Revenue Service

Department of Labor
Employee Benefits Security Administration

Pension Benefit Guaranty Corporation

Annual Return/Report of Employee Benefit Plan

This form is required to be filed for employee benefit plans under sections 104 and 4065 of the Employee Retirement Income Security Act of 1974 (ERISA) and sections 6057(b) and 6058(a) of the Internal Revenue Code (the Code).

▶ **Complete all entries in accordance with the instructions to the Form 5500.**

OMB Nos. 1210-0110
1210-0089

2021

This Form is Open to Public Inspection

Part I Annual Report Identification Information

For calendar plan year 2021 or fiscal plan year beginning 10/01/2021 and ending 09/30/2022

A This return/report is for:
- [ ] a multiemployer plan
- [ ] a multiple-employer plan (Filers checking this box must attach a list of participating employer information in accordance with the form instructions.)
- [X] a single-employer plan
- [ ] a DFE (specify) ____

B This return/report is:
- [ ] the first return/report
- [ ] the final return/report
- [ ] an amended return/report
- [ ] a short plan year return/report (less than 12 months)

C If the plan is a collectively-bargained plan, check here. . . . . ▶ [ ]

D Check box if filing under:
- [X] Form 5558
- [ ] automatic extension
- [ ] the DFVC program
- [ ] special extension (enter description)

E If this is a retroactively adopted plan permitted by SECURE Act section 201, check here. . . . . ▶ [ ]

Part II Basic Plan Information—enter all requested information

1a Name of plan
ASHLAND HERCULES PENSION PLAN

1b Three-digit plan number (PN) ▶ 001

1c Effective date of plan 01/01/1913

2a Plan sponsor's name (employer, if for a single-employer plan)
Mailing address (include room, apt., suite no. and street, or P.O. Box)
City or town, state or province, country, and ZIP or foreign postal code (if foreign, see instructions)
VALVOLINE LLC

100 VALVOLINE WAY
LEXINGTON, KY 40509-2714

2b Employer Identification Number (EIN)
61-1782197

2c Plan Sponsor's telephone number
859-357-7777

2d Business code (see instructions)
325600

Caution: A penalty for the late or incomplete filing of this return/report will be assessed unless reasonable cause is established.

Under penalties of perjury and other penalties set forth in the instructions, I declare that I have examined this return/report, including accompanying schedules, statements and attachments, as well as the electronic version of this return/report, and to the best of my knowledge and belief, it is true, correct, and complete.

SIGN HERE	Filed with authorized/valid electronic signature.	07/17/2023	EIVIND KOLEMAINEN
	Signature of plan administrator	Date	Enter name of individual signing as plan administrator
SIGN HERE			
	Signature of employer/plan sponsor	Date	Enter name of individual signing as employer or plan sponsor
SIGN HERE			
	Signature of DFE	Date	Enter name of individual signing as DFE

3a Plan administrator's name and address [X] Same as Plan Sponsor	**3b** Administrator's EIN	
	3c Administrator's telephone number	
4 If the name and/or EIN of the plan sponsor or the plan name has changed since the last return/report filed for this plan, enter the plan sponsor's name, EIN, the plan name and the plan number from the last return/report: **a** Sponsor's name **c** Plan Name	**4b** EIN **4d** PN	
5 Total number of participants at the beginning of the plan year	**5**	5313
6 Number of participants as of the end of the plan year unless otherwise stated (welfare plans complete only lines **6a(1), 6a(2), 6b, 6c,** and **6d**).		
a(1) Total number of active participants at the beginning of the plan year	**6a(1)**	347
a(2) Total number of active participants at the end of the plan year	**6a(2)**	317
b Retired or separated participants receiving benefits	**6b**	2428
c Other retired or separated participants entitled to future benefits	**6c**	2120
d Subtotal. Add lines **6a(2)**, **6b**, and **6c**	**6d**	4865
e Deceased participants whose beneficiaries are receiving or are entitled to receive benefits.	**6e**	344
f Total. Add lines **6d** and **6e**	**6f**	5209
g Number of participants with account balances as of the end of the plan year (only defined contribution plans complete this item)	**6g**	
h Number of participants who terminated employment during the plan year with accrued benefits that were less than 100% vested	**6h**	0
7 Enter the total number of employers obligated to contribute to the plan (only multiemployer plans complete this item)	**7**	

8a If the plan provides pension benefits, enter the applicable pension feature codes from the List of Plan Characteristics Codes in the instructions:

1A 3H 1I

b If the plan provides welfare benefits, enter the applicable welfare feature codes from the List of Plan Characteristics Codes in the instructions:

9a Plan funding arrangement (check all that apply)		**9b** Plan benefit arrangement (check all that apply)	
(1)	[ ] Insurance	**(1)**	[X] Insurance
(2)	[ ] Code section 412(e)(3) insurance contracts	**(2)**	[ ] Code section 412(e)(3) insurance contracts
(3)	[X] Trust	**(3)**	[X] Trust
(4)	[ ] General assets of the sponsor	**(4)**	[ ] General assets of the sponsor

10 Check all applicable boxes in 10a and 10b to indicate which schedules are attached, and, where indicated, enter the number attached. (See instructions)

a Pension Schedules

- **(1)** [X] **R** (Retirement Plan Information)
- **(2)** [ ] **MB** (Multiemployer Defined Benefit Plan and Certain Money Purchase Plan Actuarial Information) - signed by the plan actuary
- **(3)** [X] **SB** (Single-Employer Defined Benefit Plan Actuarial Information) - signed by the plan actuary

b General Schedules

- **(1)** [X] **H** (Financial Information)
- **(2)** [ ] **I** (Financial Information – Small Plan)
- **(3)** [ ] 0 **A** (Insurance Information)
- **(4)** [ ] **C** (Service Provider Information)
- **(5)** [X] **D** (DFE/Participating Plan Information)
- **(6)** [ ] **G** (Financial Transaction Schedules)

Part III Form M-1 Compliance Information (to be completed by welfare benefit plans)

11a If the plan provides welfare benefits, was the plan subject to the Form M-1 filing requirements during the plan year? (See instructions and 29 CFR 2520.101-2.) ..... ☐ Yes ☐ No

If "Yes" is checked, complete lines 11b and 11c.

11b Is the plan currently in compliance with the Form M-1 filing requirements? (See instructions and 29 CFR 2520.101-2.) ..... ☐ Yes ☐ No

11c Enter the Receipt Confirmation Code for the 2021 Form M-1 annual report. If the plan was not required to file the 2021 Form M-1 annual report, enter the Receipt Confirmation Code for the most recent Form M-1 that was required to be filed under the Form M-1 filing requirements. (Failure to enter a valid Receipt Confirmation Code will subject the Form 5500 filing to rejection as incomplete.)

Receipt Confirmation Code_____

SCHEDULE SB (Form 5500)

Department of the Treasury
Internal Revenue Service

Department of Labor
Employee Benefits Security Administration

Pension Benefit Guaranty Corporation

Single-Employer Defined Benefit Plan Actuarial Information

This schedule is required to be filed under section 104 of the Employee Retirement Income Security Act of 1974 (ERISA) and section 6059 of the Internal Revenue Code (the Code).

▶ **File as an attachment to Form 5500 or 5500-SF.**

OMB No. 1210-0110

2021

This Form is Open to Public Inspection

For calendar plan year 2021 or fiscal plan year beginning 10/01/2021 and ending 09/30/2022

▶ **Round off amounts to nearest dollar.**

▶ **Caution:** A penalty of $1,000 will be assessed for late filing of this report unless reasonable cause is established.

A Name of plan
ASHLAND HERCULES PENSION PLAN

B Three-digit plan number (PN) ▶ 001

C Plan sponsor's name as shown on line 2a of Form 5500 or 5500-SF
VALVOLINE LLC

D Employer Identification Number (EIN)
61-1782197

E Type of plan: [X] Single [ ] Multiple-A [ ] Multiple-B

F Prior year plan size: [ ] 100 or fewer [ ] 101-500 [X] More than 500

Part I Basic Information

1 Enter the valuation date: Month 10 Day 01 Year 2021

2 Assets:

a Market value	**2a**	1374039601
b Actuarial value	**2b**	1318024526

3 Funding target/participant count breakdown

	(1) Number of participants	(2) Vested Funding Target	(3) Total Funding Target
a For retired participants and beneficiaries receiving payment	2607	870476118	870476118
b For terminated vested participants	2397	207204796	207204796
c For active participants	347	50806085	51168942
d Total	5351	1128486999	1128849856

4 If the plan is in at-risk status, check the box and complete lines (a) and (b) [ ]

a Funding target disregarding prescribed at-risk assumptions	**4a**	
b Funding target reflecting at-risk assumptions, but disregarding transition rule for plans that have been in at-risk status for fewer than five consecutive years and disregarding loading factor	**4b**	

5 Effective interest rate	**5**	5.51 %
6 Target normal cost		
a Present value of current plan year accruals	**6a**	0
b Expected plan-related expenses	**6b**	4335063
c Total (line 6a + line 6b)	**6c**	4335063

Statement by Enrolled Actuary

To the best of my knowledge, the information supplied in this schedule and accompanying schedules, statements and attachments, if any, is complete and accurate. Each prescribed assumption was applied in accordance with applicable law and regulations. In my opinion, each other assumption is reasonable (taking into account the experience of the plan and reasonable expectations) and such other assumptions, in combination, offer my best estimate of anticipated experience under the plan.

SIGN HERE

Signature of actuary

06/08/2023
Date

DENNIS STONE
Type or print name of actuary

23-03271
Most recent enrollment number

MERCER
Firm name

502-561-4500
Telephone number (including area code)

400 WEST MARKET STREET
SUITE 500
LOUISVILLE, KY 40202-3415
Address of the firm

If the actuary has not fully reflected any regulation or ruling promulgated under the statute in completing this schedule, check the box and see instructions [ ]

Part II Beginning of Year Carryover and Prefunding Balances

		(a) Carryover balance	(b) Prefunding balance
7	Balance at beginning of prior year after applicable adjustments (line 13 from prior year)	0	277272051
8	Portion elected for use to offset prior year's funding requirement (line 35 from prior year)	0	20763134
9	Amount remaining (line 7 minus line 8)	0	256508917
10	Interest on line 9 using prior year's actual return of 6.97 %	0	17878672
11	Prior year's excess contributions to be added to prefunding balance:		
	a Present value of excess contributions (line 38a from prior year)		0
	b(1) Interest on the excess, if any, of line 38a over line 38b from prior year Schedule SB, using prior year's effective interest rate of 5.65 %		0
	b(2) Interest on line 38b from prior year Schedule SB, using prior year's actual return		0
	c Total available at beginning of current plan year to add to prefunding balance		0
	d Portion of (c) to be added to prefunding balance		0
12	Other reductions in balances due to elections or deemed elections	0	0
13	Balance at beginning of current year (line 9 + line 10 + line 11d – line 12)	0	274387589

Part III Funding Percentages

14	Funding target attainment percentage	14	92.45 %
15	Adjusted funding target attainment percentage	15	116.75 %
16	Prior year's funding percentage for purposes of determining whether carryover/prefunding balances may be used to reduce current year's funding requirement	16	85.44 %
17	If the current value of the assets of the plan is less than 70 percent of the funding target, enter such percentage	17	%

Part IV Contributions and Liquidity Shortfalls

18 Contributions made to the plan for the plan year by employer(s) and employees:

(a) Date (MM-DD-YYYY)	(b) Amount paid by employer(s)	(c) Amount paid by employees	(a) Date (MM-DD-YYYY)	(b) Amount paid by employer(s)	(c) Amount paid by employees
			Totals ► 18(b)	0	18(c) 0

19	Discounted employer contributions – see instructions for small plan with a valuation date after the beginning of the year:		
	a Contributions allocated toward unpaid minimum required contributions from prior years	19a	0
	b Contributions made to avoid restrictions adjusted to valuation date	19b	0
	c Contributions allocated toward minimum required contribution for current year adjusted to valuation date	19c	0

20 Quarterly contributions and liquidity shortfalls:

a Did the plan have a "funding shortfall" for the prior year? [X] Yes [ ] No

b If line 20a is "Yes," were required quarterly installments for the current year made in a timely manner? [X] Yes [ ] No

c If line 20a is "Yes," see instructions and complete the following table as applicable:

Liquidity shortfall as of end of quarter of this plan year

(1) 1st	(2) 2nd	(3) 3rd	(4) 4th
0	0	0	0

Part V Assumptions Used to Determine Funding Target and Target Normal Cost

21 Discount rate:

a Segment rates:

1st segment:	2nd segment:	3rd segment:	
4.75 %	5.36 %	6.11 %	☐ N/A, full yield curve used

b Applicable month (enter code)	**21b**	4
22 Weighted average retirement age	**22**	62

23 Mortality table(s) (see instructions) ☐ Prescribed - combined ☒ Prescribed - separate ☐ Substitute

Part VI Miscellaneous Items

24 Has a change been made in the non-prescribed actuarial assumptions for the current plan year? If "Yes," see instructions regarding required attachment	☒ Yes	☐ No
25 Has a method change been made for the current plan year? If "Yes," see instructions regarding required attachment	☐ Yes	☒ No
26 Is the plan required to provide a Schedule of Active Participants? If "Yes," see instructions regarding required attachment	☒ Yes	☐ No

27 If the plan is subject to alternative funding rules, enter applicable code and see instructions regarding attachment	**27**	

Part VII Reconciliation of Unpaid Minimum Required Contributions For Prior Years

28 Unpaid minimum required contributions for all prior years	**28**	0
29 Discounted employer contributions allocated toward unpaid minimum required contributions from prior years (line 19a)	**29**	0
30 Remaining amount of unpaid minimum required contributions (line 28 minus line 29)	**30**	0

Part VIII Minimum Required Contribution For Current Year

31 Target normal cost and excess assets (see instructions):

a Target normal cost (line 6c)	**31a**	4335063
b Excess assets, if applicable, but not greater than line 31a	**31b**	0

32 Amortization installments:

	Outstanding Balance	Installment
a Net shortfall amortization installment	85212919	9709185
b Waiver amortization installment	0	0

33 If a waiver has been approved for this plan year, enter the date of the ruling letter granting the approval (Month _____ Day _____ Year _____) and the waived amount	**33**	
34 Total funding requirement before reflecting carryover/prefunding balances (lines 31a - 31b + 32a + 32b - 33)	**34**	14044248

	Carryover balance	Prefunding balance	Total balance
35 Balances elected for use to offset funding requirement		14044248	14044248

36 Additional cash requirement (line 34 minus line 35)	**36**	0
37 Contributions allocated toward minimum required contribution for current year adjusted to valuation date (line 19c)	**37**	0
38 Present value of excess contributions for current year (see instructions)		
a Total (excess, if any, of line 37 over line 36)	**38a**	0
b Portion included in line 38a attributable to use of prefunding and funding standard carryover balances	**38b**	0
39 Unpaid minimum required contribution for current year (excess, if any, of line 36 over line 37)	**39**	0
40 Unpaid minimum required contributions for all years	**40**	0

Part IX Pension Funding Relief Under Pension Relief Act of 2010 (See Instructions)

41 If an election was made to use PRA 2010 funding relief for this plan:

a Schedule elected ☐ 2 plus 7 years ☐ 15 years

b Eligible plan year(s) for which the election in line 41a was made ☐ 2008 ☐ 2009 ☐ 2010 ☐ 2011

SCHEDULE D (Form 5500)

Department of the Treasury
Internal Revenue Service

Department of Labor
Employee Benefits Security Administration

DFE/Participating Plan Information

This schedule is required to be filed under section 104 of the Employee Retirement Income Security Act of 1974 (ERISA).

▶ **File as an attachment to Form 5500.**

OMB No. 1210-0110

2021

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For calendar plan year 2021 or fiscal plan year beginning 10/01/2021 and ending 09/30/2022

A Name of plan
ASHLAND HERCULES PENSION PLAN

B Three-digit plan number (PN) ▶ 001

C Plan or DFE sponsor's name as shown on line 2a of Form 5500
VALVOLINE LLC

D Employer Identification Number (EIN)
61-1782197

Part I **Information on interests in MTIAs, CCTs, PSAs, and 103-12 IEs (to be completed by plans and DFEs)**
(Complete as many entries as needed to report all interests in DFEs)

a Name of MTIA, CCT, PSA, or 103-12 IE: VALVOLINE LLC DEFINED BENEFIT TRUST

b Name of sponsor of entity listed in (a): VALVOLINE LLC

c EIN-PN	**d** Entity code	**e** Dollar value of interest in MTIA, CCT, PSA, or 103-12 IE at end of year (see instructions)
61-1782197-004	M	996911000

a Name of MTIA, CCT, PSA, or 103-12 IE:

b Name of sponsor of entity listed in (a):

c EIN-PN	**d** Entity code	**e** Dollar value of interest in MTIA, CCT, PSA, or 103-12 IE at end of year (see instructions)

a Name of MTIA, CCT, PSA, or 103-12 IE:

b Name of sponsor of entity listed in (a):

c EIN-PN	**d** Entity code	**e** Dollar value of interest in MTIA, CCT, PSA, or 103-12 IE at end of year (see instructions)

a Name of MTIA, CCT, PSA, or 103-12 IE:

b Name of sponsor of entity listed in (a):

c EIN-PN	**d** Entity code	**e** Dollar value of interest in MTIA, CCT, PSA, or 103-12 IE at end of year (see instructions)

a Name of MTIA, CCT, PSA, or 103-12 IE:

b Name of sponsor of entity listed in (a):

c EIN-PN	**d** Entity code	**e** Dollar value of interest in MTIA, CCT, PSA, or 103-12 IE at end of year (see instructions)

a Name of MTIA, CCT, PSA, or 103-12 IE:

b Name of sponsor of entity listed in (a):

c EIN-PN	**d** Entity code	**e** Dollar value of interest in MTIA, CCT, PSA, or 103-12 IE at end of year (see instructions)

a Name of MTIA, CCT, PSA, or 103-12 IE:

b Name of sponsor of entity listed in (a):

c EIN-PN	**d** Entity code	**e** Dollar value of interest in MTIA, CCT, PSA, or 103-12 IE at end of year (see instructions)

a Name of MTIA, CCT, PSA, or 103-12 IE:

b Name of sponsor of entity listed in (a):

c EIN-PN	**d** Entity code	**e** Dollar value of interest in MTIA, CCT, PSA, or 103-12 IE at end of year (see instructions)

a Name of MTIA, CCT, PSA, or 103-12 IE:

b Name of sponsor of entity listed in (a):

c EIN-PN	**d** Entity code	**e** Dollar value of interest in MTIA, CCT, PSA, or 103-12 IE at end of year (see instructions)

a Name of MTIA, CCT, PSA, or 103-12 IE:

b Name of sponsor of entity listed in (a):

c EIN-PN	**d** Entity code	**e** Dollar value of interest in MTIA, CCT, PSA, or 103-12 IE at end of year (see instructions)

a Name of MTIA, CCT, PSA, or 103-12 IE:

b Name of sponsor of entity listed in (a):

c EIN-PN	**d** Entity code	**e** Dollar value of interest in MTIA, CCT, PSA, or 103-12 IE at end of year (see instructions)

a Name of MTIA, CCT, PSA, or 103-12 IE:

b Name of sponsor of entity listed in (a):

c EIN-PN	**d** Entity code	**e** Dollar value of interest in MTIA, CCT, PSA, or 103-12 IE at end of year (see instructions)

a Name of MTIA, CCT, PSA, or 103-12 IE:

b Name of sponsor of entity listed in (a):

c EIN-PN	**d** Entity code	**e** Dollar value of interest in MTIA, CCT, PSA, or 103-12 IE at end of year (see instructions)

a Name of MTIA, CCT, PSA, or 103-12 IE:

b Name of sponsor of entity listed in (a):

c EIN-PN	**d** Entity code	**e** Dollar value of interest in MTIA, CCT, PSA, or 103-12 IE at end of year (see instructions)

a Name of MTIA, CCT, PSA, or 103-12 IE:

b Name of sponsor of entity listed in (a):

c EIN-PN	**d** Entity code	**e** Dollar value of interest in MTIA, CCT, PSA, or 103-12 IE at end of year (see instructions)

a Name of MTIA, CCT, PSA, or 103-12 IE:

b Name of sponsor of entity listed in (a):

c EIN-PN	**d** Entity code	**e** Dollar value of interest in MTIA, CCT, PSA, or 103-12 IE at end of year (see instructions)

a Name of MTIA, CCT, PSA, or 103-12 IE:

b Name of sponsor of entity listed in (a):

c EIN-PN	**d** Entity code	**e** Dollar value of interest in MTIA, CCT, PSA, or 103-12 IE at end of year (see instructions)

Part II **Information on Participating Plans (to be completed by DFEs)**
(Complete as many entries as needed to report all participating plans)

a Plan name	
b Name of plan sponsor	**c** EIN-PN
a Plan name	
b Name of plan sponsor	**c** EIN-PN
a Plan name	
b Name of plan sponsor	**c** EIN-PN
a Plan name	
b Name of plan sponsor	**c** EIN-PN
a Plan name	
b Name of plan sponsor	**c** EIN-PN
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b Name of plan sponsor	**c** EIN-PN
a Plan name	
b Name of plan sponsor	**c** EIN-PN
a Plan name	
b Name of plan sponsor	**c** EIN-PN
a Plan name	
b Name of plan sponsor	**c** EIN-PN

SCHEDULE H (Form 5500)

Department of the Treasury
Internal Revenue Service

Department of Labor
Employee Benefits Security Administration

Pension Benefit Guaranty Corporation

Financial Information

This schedule is required to be filed under section 104 of the Employee Retirement Income Security Act of 1974 (ERISA), and section 6058(a) of the Internal Revenue Code (the Code).

▶ **File as an attachment to Form 5500.**

OMB No. 1210-0110

2021

This Form is Open to Public Inspection

For calendar plan year 2021 or fiscal plan year beginning 10/01/2021 and ending 09/30/2022

A Name of plan
ASHLAND HERCULES PENSION PLAN

B Three-digit plan number (PN) ▶ 001

C Plan sponsor's name as shown on line 2a of Form 5500
VALVOLINE LLC

D Employer Identification Number (EIN)
61-1782197

Part I Asset and Liability Statement

1 Current value of plan assets and liabilities at the beginning and end of the plan year. Combine the value of plan assets held in more than one trust. Report the value of the plan's interest in a commingled fund containing the assets of more than one plan on a line-by-line basis unless the value is reportable on lines 1c(9) through 1c(14). Do not enter the value of that portion of an insurance contract which guarantees, during this plan year, to pay a specific dollar benefit at a future date. **Round off amounts to the nearest dollar.** MTIAs, CCTs, PSAs, and 103-12 IEs do not complete lines 1b(1), 1b(2), 1c(8), 1g, 1h, and 1i. CCTs, PSAs, and 103-12 IEs also do not complete lines 1d and 1e. See instructions.

Assets		(a) Beginning of Year	(b) End of Year
a Total noninterest-bearing cash	1a		
b Receivables (less allowance for doubtful accounts):			
(1) Employer contributions	1b(1)		
(2) Participant contributions	1b(2)		
(3) Other	1b(3)		
c General investments:			
(1) Interest-bearing cash (include money market accounts & certificates of deposit)	1c(1)		
(2) U.S. Government securities	1c(2)		
(3) Corporate debt instruments (other than employer securities):			
(A) Preferred	1c(3)(A)		
(B) All other	1c(3)(B)		
(4) Corporate stocks (other than employer securities):			
(A) Preferred	1c(4)(A)		
(B) Common	1c(4)(B)		
(5) Partnership/joint venture interests	1c(5)		
(6) Real estate (other than employer real property)	1c(6)		
(7) Loans (other than to participants)	1c(7)		
(8) Participant loans	1c(8)		
(9) Value of interest in common/collective trusts	1c(9)		
(10) Value of interest in pooled separate accounts	1c(10)		
(11) Value of interest in master trust investment accounts	1c(11)	1374040000	996911000
(12) Value of interest in 103-12 investment entities	1c(12)		
(13) Value of interest in registered investment companies (e.g., mutual funds)	1c(13)		
(14) Value of funds held in insurance company general account (unallocated contracts)	1c(14)		
(15) Other	1c(15)		

			(a) Beginning of Year	**(b)** End of Year
1d	Employer-related investments:			
	(1) Employer securities	1d(1)		
	(2) Employer real property	1d(2)		
e	Buildings and other property used in plan operation	1e		
f	Total assets (add all amounts in lines 1a through 1e)	1f	1374040000	996911000
	Liabilities			
g	Benefit claims payable	1g		
h	Operating payables	1h		
i	Acquisition indebtedness	1i		
j	Other liabilities	1j		
k	Total liabilities (add all amounts in lines 1g through1j)	1k	0	0
	Net Assets			
l	Net assets (subtract line 1k from line 1f)	1l	1374040000	996911000

Part II Income and Expense Statement

2 Plan income, expenses, and changes in net assets for the year. Include all income and expenses of the plan, including any trust(s) or separately maintained fund(s) and any payments/receipts to/from insurance carriers. Round off amounts to the nearest dollar. MTIAs, CCTs, PSAs, and 103-12 IEs do not complete lines 2a, 2b(1)(E), 2e, 2f, and 2g.

	Income		**(a)** Amount	**(b)** Total
a	**Contributions:**			
	(1) Received or receivable in cash from: **(A)** Employers	2a(1)(A)		
	(B) Participants	2a(1)(B)		
	(C) Others (including rollovers)	2a(1)(C)		
	(2) Noncash contributions	2a(2)		
	(3) Total contributions. Add lines **2a(1)(A), (B), (C),** and line **2a(2)**	2a(3)		0
b	**Earnings on investments:**			
	(1) Interest:			
	(A) Interest-bearing cash (including money market accounts and certificates of deposit)	2b(1)(A)		
	(B) U.S. Government securities	2b(1)(B)		
	(C) Corporate debt instruments	2b(1)(C)		
	(D) Loans (other than to participants)	2b(1)(D)		
	(E) Participant loans	2b(1)(E)		
	(F) Other	2b(1)(F)		
	(G) Total interest. Add lines **2b(1)(A)** through **(F)**	2b(1)(G)		0
	(2) Dividends: **(A)** Preferred stock	2b(2)(A)		
	(B) Common stock	2b(2)(B)		
	(C) Registered investment company shares (e.g. mutual funds)	2b(2)(C)		
	(D) Total dividends. Add lines **2b(2)(A)**, **(B)**, and **(C)**	2b(2)(D)		0
	(3) Rents	2b(3)		
	(4) Net gain (loss) on sale of assets: **(A)** Aggregate proceeds	2b(4)(A)		
	(B) Aggregate carrying amount (see instructions)	2b(4)(B)		
	(C) Subtract line **2b(4)(B)** from line **2b(4)(A)** and enter result	2b(4)(C)		0
	(5) Unrealized appreciation (depreciation) of assets: **(A)** Real estate	2b(5)(A)		
	(B) Other	2b(5)(B)		
	(C) Total unrealized appreciation of assets. Add lines **2b(5)(A)** and **(B)**	2b(5)(C)		0

		(a) Amount	(b) Total
(6) Net investment gain (loss) from common/collective trusts	2b(6)		
(7) Net investment gain (loss) from pooled separate accounts	2b(7)		
(8) Net investment gain (loss) from master trust investment accounts	2b(8)		-294297000
(9) Net investment gain (loss) from 103-12 investment entities	2b(9)		
(10) Net investment gain (loss) from registered investment companies (e.g., mutual funds)	2b(10)		
c Other income	2c		
d Total income. Add all **income** amounts in column (b) and enter total	2d		-294297000
Expenses			
e Benefit payment and payments to provide benefits:			
(1) Directly to participants or beneficiaries, including direct rollovers	2e(1)	79046000	
(2) To insurance carriers for the provision of benefits	2e(2)		
(3) Other	2e(3)		
(4) Total benefit payments. Add lines **2e(1)** through **(3)**	2e(4)		79046000
f Corrective distributions (see instructions)	2f		
g Certain deemed distributions of participant loans (see instructions)	2g		
h Interest expense	2h		
i Administrative expenses: **(1)** Professional fees	2i(1)	905916	
(2) Contract administrator fees	2i(2)		
(3) Investment advisory and management fees	2i(3)		
(4) Other	2i(4)	3549084	
(5) Total administrative expenses. Add lines **2i(1)** through **(4)**	2i(5)		4455000
j Total expenses. Add all **expense** amounts in column (b) and enter total	2j		83501000
Net Income and Reconciliation			
k Net income (loss). Subtract line **2j** from line **2d**	2k		-377798000
l Transfers of assets:			
(1) To this plan	2l(1)		669000
(2) From this plan	2l(2)		

Part III Accountant's Opinion

3 Complete lines 3a through 3c if the opinion of an independent qualified public accountant is attached to this Form 5500. Complete line 3d if an opinion is not attached.

a The attached opinion of an independent qualified public accountant for this plan is (see instructions):

(1) ☐ Unmodified **(2)** ☐ Qualified **(3)** ☒ Disclaimer **(4)** ☐ Adverse

b Check the appropriate box(es) to indicate whether the IQPA performed an ERISA section 103(a)(3)(C) audit. Check both boxes (1) and (2) if the audit was performed pursuant to both 29 CFR 2520.103-8 and 29 CFR 2520.103-12(d). Check box (3) if pursuant to neither.

(1) ☒ DOL Regulation 2520.103-8 **(2)** ☐ DOL Regulation 2520.103-12(d) **(3)** ☐ neither DOL Regulation 2520.103-8 nor DOL Regulation 2520.103-12(d).

c Enter the name and EIN of the accountant (or accounting firm) below:

(1) Name: BLUE AND COMPANY, LLC **(2)** EIN: 35-1178661

d The opinion of an independent qualified public accountant is **not attached** because:

(1) ☐ This form is filed for a CCT, PSA, or MTIA. **(2)** ☐ It will be attached to the next Form 5500 pursuant to 29 CFR 2520.104-50.

Part IV Compliance Questions

4 CCTs and PSAs do not complete Part IV. MTIAs, 103-12 IEs, and GIAs do not complete lines 4a, 4e, 4f, 4g, 4h, 4k, 4m, 4n, or 5. 103-12 IEs also do not complete lines 4j and 4l. MTIAs also do not complete line 4l.

During the plan year:

		Yes	No	Amount
a Was there a failure to transmit to the plan any participant contributions within the time period described in 29 CFR 2510.3-102? Continue to answer "Yes" for any prior year failures until fully corrected. (See instructions and DOL's Voluntary Fiduciary Correction Program.)	4a		X	

			Yes	No	Amount
b	Were any loans by the plan or fixed income obligations due the plan in default as of the close of the plan year or classified during the year as uncollectible? Disregard participant loans secured by participant's account balance. (Attach Schedule G (Form 5500) Part I if "Yes" is checked.)	**4b**		X	
c	Were any leases to which the plan was a party in default or classified during the year as uncollectible? (Attach Schedule G (Form 5500) Part II if "Yes" is checked.)	**4c**		X	
d	Were there any nonexempt transactions with any party-in-interest? (Do not include transactions reported on line 4a. Attach Schedule G (Form 5500) Part III if "Yes" is checked.)	**4d**		X	
e	Was this plan covered by a fidelity bond?	**4e**	X		10000000
f	Did the plan have a loss, whether or not reimbursed by the plan's fidelity bond, that was caused by fraud or dishonesty?	**4f**		X	
g	Did the plan hold any assets whose current value was neither readily determinable on an established market nor set by an independent third party appraiser?	**4g**		X	
h	Did the plan receive any noncash contributions whose value was neither readily determinable on an established market nor set by an independent third party appraiser?	**4h**		X	
i	Did the plan have assets held for investment? (Attach schedule(s) of assets if "Yes" is checked, and see instructions for format requirements.)	**4i**		X	
j	Were any plan transactions or series of transactions in excess of 5% of the current value of plan assets? (Attach schedule of transactions if "Yes" is checked and see instructions for format requirements.)	**4j**		X	
k	Were all the plan assets either distributed to participants or beneficiaries, transferred to another plan, or brought under the control of the PBGC?	**4k**		X	
l	Has the plan failed to provide any benefit when due under the plan?	**4l**		X	
m	If this is an individual account plan, was there a blackout period? (See instructions and 29 CFR 2520.101-3.)	**4m**			
n	If 4m was answered "Yes," check the "Yes" box if you either provided the required notice or one of the exceptions to providing the notice applied under 29 CFR 2520.101-3	**4n**			

5a Has a resolution to terminate the plan been adopted during the plan year or any prior plan year? ☐ Yes ☒ No

If "Yes," enter the amount of any plan assets that reverted to the employer this year _____.

5b If, during this plan year, any assets or liabilities were transferred from this plan to another plan(s), identify the plan(s) to which assets or liabilities were transferred. (See instructions.)

5b(1) Name of plan(s)	**5b(2)** EIN(s)	**5b(3)** PN(s)

5c Was the plan a defined benefit plan covered under the PBGC insurance program at any time during this plan year? (See ERISA section 4021 and instructions.) ☒ Yes ☐ No ☐ Not determined

If "Yes" is checked, enter the My PAA confirmation number from the PBGC premium filing for this plan year 464760.

SCHEDULE R (Form 5500)

Department of the Treasury
Internal Revenue Service

Department of Labor
Employee Benefits Security Administration

Pension Benefit Guaranty Corporation

Retirement Plan Information

This schedule is required to be filed under sections 104 and 4065 of the Employee Retirement Income Security Act of 1974 (ERISA) and section 6058(a) of the Internal Revenue Code (the Code).

▶ **File as an attachment to Form 5500.**

OMB No. 1210-0110

2021

This Form is Open to Public Inspection.

For calendar plan year 2021 or fiscal plan year beginning 10/01/2021 and ending 09/30/2022

A Name of plan
ASHLAND HERCULES PENSION PLAN

B Three-digit plan number (PN) ▶ 001

C Plan sponsor's name as shown on line 2a of Form 5500
VALVOLINE LLC

D Employer Identification Number (EIN)
61-1782197

Part I Distributions

All references to distributions relate only to payments of benefits during the plan year.

1 Total value of distributions paid in property other than in cash or the forms of property specified in the instructions ..... | 1 | 0

2 Enter the EIN(s) of payor(s) who paid benefits on behalf of the plan to participants or beneficiaries during the year (if more than two, enter EINs of the two payors who paid the greatest dollar amounts of benefits):

EIN(s): 13-5160382

Profit-sharing plans, ESOPs, and stock bonus plans, skip line 3.

3 Number of participants (living or deceased) whose benefits were distributed in a single sum, during the plan year ..... | 3 | 39

Part II Funding Information (If the plan is not subject to the minimum funding requirements of section 412 of the Internal Revenue Code or ERISA section 302, skip this Part.)

4 Is the plan administrator making an election under Code section 412(d)(2) or ERISA section 302(d)(2)? ..... ☐ Yes ☒ No ☐ N/A

If the plan is a defined benefit plan, go to line 8.

5 If a waiver of the minimum funding standard for a prior year is being amortized in this plan year, see instructions and enter the date of the ruling letter granting the waiver. **Date:** Month _____ Day _____ Year _____

If you completed line 5, complete lines 3, 9, and 10 of Schedule MB and do not complete the remainder of this schedule.

6	a	Enter the minimum required contribution for this plan year (include any prior year accumulated funding deficiency not waived)	6a	
	b	Enter the amount contributed by the employer to the plan for this plan year	6b	
	c	Subtract the amount in line 6b from the amount in line 6a. Enter the result (enter a minus sign to the left of a negative amount)	6c	

If you completed line 6c, skip lines 8 and 9.

7 Will the minimum funding amount reported on line 6c be met by the funding deadline? ..... ☐ Yes ☐ No ☐ N/A

8 If a change in actuarial cost method was made for this plan year pursuant to a revenue procedure or other authority providing automatic approval for the change or a class ruling letter, does the plan sponsor or plan administrator agree with the change? ..... ☐ Yes ☐ No ☒ N/A

Part III Amendments

9 If this is a defined benefit pension plan, were any amendments adopted during this plan year that increased or decreased the value of benefits? If yes, check the appropriate box. If no, check the "No" box. ..... ☐ Increase ☐ Decrease ☐ Both ☒ No

Part IV ESOPs (see instructions). If this is not a plan described under section 409(a) or 4975(e)(7) of the Internal Revenue Code, skip this Part.

10 Were unallocated employer securities or proceeds from the sale of unallocated securities used to repay any exempt loan? ..... ☐ Yes ☐ No

11 a Does the ESOP hold any preferred stock? ..... ☐ Yes ☐ No

b If the ESOP has an outstanding exempt loan with the employer as lender, is such loan part of a "back-to-back" loan? (See instructions for definition of "back-to-back" loan.) ..... ☐ Yes ☐ No

12 Does the ESOP hold any stock that is not readily tradable on an established securities market? ..... ☐ Yes ☐ No

Part V Additional Information for Multiemployer Defined Benefit Pension Plans

13 Enter the following information for each employer that contributed more than 5% of total contributions to the plan during the plan year (measured in dollars). See instructions. *Complete as many entries as needed to report all applicable employers.*

a Name of contributing employer

b EIN **c** Dollar amount contributed by employer

d Date collective bargaining agreement expires *(If employer contributes under more than one collective bargaining agreement, check box* ☐ *and see instructions regarding required attachment. Otherwise, enter the applicable date.)* Month _____ Day _____ Year _____

e Contribution rate information *(If more than one rate applies, check this box* ☐ *and see instructions regarding required attachment. Otherwise, complete lines 13e(1) and 13e(2).)*
(1) Contribution rate (in dollars and cents) _____
(2) Base unit measure: ☐ Hourly ☐ Weekly ☐ Unit of production ☐ Other (specify):

---

a Name of contributing employer

b EIN **c** Dollar amount contributed by employer

d Date collective bargaining agreement expires *(If employer contributes under more than one collective bargaining agreement, check box* ☐ *and see instructions regarding required attachment. Otherwise, enter the applicable date.)* Month _____ Day _____ Year _____

e Contribution rate information *(If more than one rate applies, check this box* ☐ *and see instructions regarding required attachment. Otherwise, complete lines 13e(1) and 13e(2).)*
(1) Contribution rate (in dollars and cents) _____
(2) Base unit measure: ☐ Hourly ☐ Weekly ☐ Unit of production ☐ Other (specify): _____

---

a Name of contributing employer

b EIN **c** Dollar amount contributed by employer

d Date collective bargaining agreement expires *(If employer contributes under more than one collective bargaining agreement, check box* ☐ *and see instructions regarding required attachment. Otherwise, enter the applicable date.)* Month _____ Day _____ Year _____

e Contribution rate information *(If more than one rate applies, check this box* ☐ *and see instructions regarding required attachment. Otherwise, complete lines 13e(1) and 13e(2).)*
(1) Contribution rate (in dollars and cents) _____
(2) Base unit measure: ☐ Hourly ☐ Weekly ☐ Unit of production ☐ Other (specify): _____

---

a Name of contributing employer

b EIN **c** Dollar amount contributed by employer

d Date collective bargaining agreement expires *(If employer contributes under more than one collective bargaining agreement, check box* ☐ *and see instructions regarding required attachment. Otherwise, enter the applicable date.)* Month _____ Day _____ Year _____

e Contribution rate information *(If more than one rate applies, check this box* ☐ *and see instructions regarding required attachment. Otherwise, complete lines 13e(1) and 13e(2).)*
(1) Contribution rate (in dollars and cents) _____
(2) Base unit measure: ☐ Hourly ☐ Weekly ☐ Unit of production ☐ Other (specify): _____

---

a Name of contributing employer

b EIN **c** Dollar amount contributed by employer

d Date collective bargaining agreement expires *(If employer contributes under more than one collective bargaining agreement, check box* ☐ *and see instructions regarding required attachment. Otherwise, enter the applicable date.)* Month _____ Day _____ Year _____

e Contribution rate information *(If more than one rate applies, check this box* ☐ *and see instructions regarding required attachment. Otherwise, complete lines 13e(1) and 13e(2).)*
(1) Contribution rate (in dollars and cents) _____
(2) Base unit measure: ☐ Hourly ☐ Weekly ☐ Unit of production ☐ Other (specify): _____

---

a Name of contributing employer

b EIN **c** Dollar amount contributed by employer

d Date collective bargaining agreement expires *(If employer contributes under more than one collective bargaining agreement, check box* ☐ *and see instructions regarding required attachment. Otherwise, enter the applicable date.)* Month _____ Day _____ Year _____

e Contribution rate information *(If more than one rate applies, check this box* ☐ *and see instructions regarding required attachment. Otherwise, complete lines 13e(1) and 13e(2).)*
(1) Contribution rate (in dollars and cents) _____
(2) Base unit measure: ☐ Hourly ☐ Weekly ☐ Unit of production ☐ Other (specify): _____

14 Enter the number of deferred vested and retired participants (inactive participants), as of the beginning of the plan year, whose contributing employer is no longer making contributions to the plan for:

a The current plan year. Check the box to indicate the counting method used to determine the number of inactive participants: ☐ last contributing employer ☐ alternative ☐ reasonable approximation (see instructions for required attachment)	**14a**	
b The plan year immediately preceding the current plan year. ☐ Check the box if the number reported is a change from what was previously reported (see instructions for required attachment)	**14b**	
c The second preceding plan year. ☐ Check the box if the number reported is a change from what was previously reported (see instructions for required attachment)	**14c**	

15 Enter the ratio of the number of participants under the plan on whose behalf no employer had an obligation to make an employer contribution during the current plan year to:

a The corresponding number for the plan year immediately preceding the current plan year	**15a**	
b The corresponding number for the second preceding plan year	**15b**	

16 Information with respect to any employers who withdrew from the plan during the preceding plan year:

a Enter the number of employers who withdrew during the preceding plan year	**16a**	
b If line 16a is greater than 0, enter the aggregate amount of withdrawal liability assessed or estimated to be assessed against such withdrawn employers	**16b**	

17 If assets and liabilities from another plan have been transferred to or merged with this plan during the plan year, check box and see instructions regarding supplemental information to be included as an attachment ☐

Part VI Additional Information for Single-Employer and Multiemployer Defined Benefit Pension Plans

18 If any liabilities to participants or their beneficiaries under the plan as of the end of the plan year consist (in whole or in part) of liabilities to such participants and beneficiaries under two or more pension plans as of immediately before such plan year, check box and see instructions regarding supplemental information to be included as an attachment ☐

19 If the total number of participants is 1,000 or more, complete lines (a) through (c)

a Enter the percentage of plan assets held as:
Stock: 12.0 % Investment-Grade Debt: 83.0 % High-Yield Debt: 3.0 % Real Estate: 1.0 % Other: 1.0 %

b Provide the average duration of the combined investment-grade and high-yield debt:
☐ 0-3 years ☐ 3-6 years ☐ 6-9 years ☒ 9-12 years ☐ 12-15 years ☐ 15-18 years ☐ 18-21 years ☐ 21 years or more

c What duration measure was used to calculate line 19(b)?
☐ Effective duration ☐ Macaulay duration ☒ Modified duration ☐ Other (specify):

20 **PBGC missed contribution reporting requirements.** If this is a multiemployer plan or a single-employer plan that is not covered by PBGC, skip line 20.

a Is the amount of unpaid minimum required contributions for all years from Schedule SB (Form 5500) line 40 greater than zero? ☐ Yes ☒ No

b If line 20a is "Yes," has PBGC been notified as required by ERISA sections 4043(c)(5) and/or 303(k)(4)? Check the applicable box:

☐ Yes.

☐ No. Reporting was waived under 29 CFR 4043.25(c)(2) because contributions equal to or exceeding the unpaid minimum required contribution were made by the 30th day after the due date.

☐ No. The 30-day period referenced in 29 CFR 4043.25(c)(2) has not yet ended, and the sponsor intends to make a contribution equal to or exceeding the unpaid minimum required contribution by the 30th day after the due date.

☐ No. Other. Provide explanation _____

ASHLAND HERCULES PENSION PLAN

FINANCIAL STATEMENTS

SEPTEMBER 30, 2022 AND 2021

ASHLAND HERCULES PENSION PLAN

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SEPTEMBER 30, 2022 AND 2021

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Supplemental Schedules*

*Supplemental schedules required by Section 2520.103-10 of the Department of Labor's Rules and Regulations for Reporting and Disclosure under the Employee Retirement Income Security Act of 1974 have been omitted because they are not applicable.

CPAs / ADVISORS

blue

Blue & Co., LLC / 250 West Main Street, Suite 2900 / Lexington, KY 40507
main 859.253.1100 *fax* 859.253.1384 *email* blue@blueandco.com

REPORT OF INDEPENDENT AUDITORS

To the Valvoline Retirement Committee, Valvoline LLC
and Participants of the Ashland Hercules Pension Plan

Scope and Nature of the ERISA Section 103(a)(3)(C) Audit for the 2022 Financial Statements

We have performed an audit of the financial statements of Ashland Hercules Pension Plan (the Plan), an employee benefit plan subject to the Employee Retirement Income Security Act of 1974 (ERISA), as permitted by ERISA Section 103(a)(3)(C) (ERISA Section 103(a)(3)(C) audit). The financial statements comprise the statement of net assets available for benefits as of September 30, 2022, and the related statement of changes in net assets available for benefits for the year then ended, and the related notes to the financial statements (2022 financial statements).

Management, having determined it is permissible in the circumstances, has elected to have the audit of the Plan's financial statements performed in accordance with ERISA Section 103(a)(3)(C) pursuant to 29 CFR 2520.103-8 of the Department of Labor's (DOL) Rules and Regulations for Reporting and Disclosure under ERISA. As permitted by ERISA Section 103(a)(3)(C), our audit need not extend to any statements or information related to assets held for investment of the plan (investment information) by a bank or similar institution or insurance carrier that is regulated, supervised, and subject to periodic examination by a state or federal agency, provided that the statements or information regarding assets so held are prepared and certified to by the bank or similar institution or insurance carrier in accordance with 29 CFR 2520.103-5 of the DOL's Rules and Regulations for Reporting and Disclosure under ERISA (qualified institution).

Management has obtained a certification from a qualified institution as of and for the year ended September 30, 2022, stating that the certified investment information, as described in Note 3 to the financial statements, is complete and accurate.

Opinion on the 2022 Financial Statements

In our opinion, based on our audit and on the procedures performed as described in the Auditor's Responsibilities for the Audit of the 2022 Financial Statements section—

- the amounts and disclosures in the accompanying 2022 financial statements, other than those agreed to or derived from the certified investment information, are presented fairly, in all material respects, in accordance with accounting principles generally accepted in the United States of America.
- the information in the accompanying 2022 financial statements related to assets held by and certified to by a qualified institution agrees to, or is derived from, in all material respects, the information prepared and certified by an institution that management determined meets the requirements of ERISA Section 103(a)(3)(C).

Basis for Opinion on the 2022 Financial Statements

We conducted our audit in accordance with auditing standards generally accepted in the United States of America (GAAS). Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the 2022 Financial Statements section of our report. We are required to be independent of the Plan and to meet our other ethical responsibilities in accordance with the relevant ethical requirements relating to our audit. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our ERISA Section 103(a)(3)(C) audit opinion.

Responsibilities of Management for the 2022 Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America, and for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error. Management's election of the ERISA Section 103(a)(3)(C) audit does not affect management's responsibility for the financial statements.

In preparing the financial statements, management is required to evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about the Plan's ability to continue as a going concern for one year after the date the financial statements are available to be issued.

Management is also responsible for maintaining a current plan instrument, including all plan amendments; administering the Plan; and determining that the Plan's transactions that are presented and disclosed in the financial statements are in conformity with the Plan's provisions, including maintaining sufficient records with respect to each of the participants, to determine the benefits due or which may become due to such participants.

Auditor's Responsibilities for the Audit of the 2022 Financial Statements

Except as described in the Scope and Nature of the ERISA Section 103(a)(3)(C) Audit of the 2022 Financial Statement's section of our report, our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with GAAS will always detect a material misstatement when it exists. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Misstatements are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgement made by a reasonable user based on the financial statements.

In performing an audit in accordance with GAAS, we:

- Exercise professional judgement and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Plan's internal control. Accordingly, no such opinion is expressed.
- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the financial statements.
- Conclude whether, in our judgement, there are conditions or events, considered in the aggregate, that raise substantial doubt about the Plan's ability to continue as a going concern for a reasonable period of time.

Our audit did not extend to the certified investment information, except for obtaining and reading the certification, comparing the certified investment information with the related information presented and disclosed in the 2022 financial statements, and reading the disclosures relating to the certified investment information to assess whether they are in accordance with the presentation and disclosure requirements of accounting principles generally accepted in the United States of America.

Accordingly, the objective of an ERISA Section 103(a)(3)(C) audit is not to express an opinion about whether the financial statements as a whole are presented fairly, in all material respects, in accordance with accounting principles generally accepted in the United States of America.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings, and certain internal control-related matters that we identified during the audit.

Other Matters

Auditor's Report on the 2021 Financial Statements

We were engaged to audit the 2021 financial statements of the Plan. As permitted by 29 CFR 2520.103-8 of the DOL's Rules and Regulations for Reporting and Disclosure under ERISA, the plan administrator instructed us not to perform and we did not perform any auditing procedures with respect to the information certified by a qualified institution. In our report dated July 13, 2022, we indicated that (a) because of the significance of the information that we did not audit, we were not able to obtain sufficient appropriate audit evidence to provide a basis for an audit opinion and accordingly, we did not express an opinion on the 2021 financial statements and supplemental schedules, and (b) the form and content of the information included in the 2021 financial statements and supplemental schedules, other than that derived from the certified information, were presented in compliance with the DOL's Rules and Regulations for Reporting and Disclosure under ERISA.

Blue & Co., LLC

Lexington, Kentucky
July 14, 2023

ASHLAND HERCULES PENSION PLAN

STATEMENTS OF NET ASSETS AVAILABLE FOR BENEFITS
SEPTEMBER 30, 2022 AND 2021

(in thousands)	2022	2021
Assets		
Investments at fair value:		
Particpating units in the Valvoline LLC Defined Benefit Trust	$ 996,911	$ 1,374,040
Net assets available for benefits	$ 996,911	$ 1,374,040

See accompanying notes to financial statements.

ASHLAND HERCULES PENSION PLAN

STATEMENTS OF CHANGES IN NET ASSETS AVAILABLE FOR BENEFITS
YEARS ENDED SEPTEMBER 30, 2022 AND 2021

(in thousands)	2022	2021
Changes in net assets attributed to:		
Investment (loss) income in the Plan's interest in the Valvoline LLC Defined Benefit Trust	$ (294,492)	$ 92,044
Benefits paid to participants	(79,046)	(80,212)
Administrative expenses	(4,455)	(4,241)
Transfers from other benefit plans, net	669	1,497
Other	195	138
(Decrease) increase in net assets	(377,129)	9,227
Net assets available for benefits:		
Beginning of year	1,374,040	1,364,813
End of year	$ 996,911	$ 1,374,040

See accompanying notes to financial statements.

NOTE 1 - DESCRIPTION OF THE PLAN

The following description of the Ashland Hercules Pension Plan (the “Plan”) provides only general information. Participants should refer to the Plan's summary plan description for a more complete description of the Plan's provisions.

General

The Plan is subject to the provisions of the Employee Retirement Income Security Act of 1974, as amended ("ERISA"). This non-contributory, defined benefit pension plan was formed through a merger of the Ashland Pension Plan and the Hercules Pension Plan on September 30, 2009 by its former plan sponsor, Ashland Global Holdings Inc. (which together with its predecessors and consolidated subsidiaries is referred to herein as "Ashland"). The majority of the Plan was closed to new participants effective January 1, 2011, and the accrual of benefits for all participants was frozen effective September 30, 2016. Sponsorship of the Plan transferred from Ashland to Valvoline LLC ("Valvoline" or the "Company") on September 1, 2016.

Effective at 11:59:59 p.m. on September 30, 2019, the Plan was amended to spin-off a portion of its assets, liabilities and approximately 8,100 related participants to a newly established pension plan, the Ashland Hercules Pension Plan II (“Plan II”). The spin-off was completed in accordance with the applicable provisions of ERISA and the Internal Revenue Code of 1986, as amended (the "IRC") and is expected to reduce administrative expenses. There are no significant changes in the provisions of the Plan as a result of the spin-off.

Pension benefits

The Plan currently has approximately 5,400 vested participants as of September 30, 2022, which includes certain active Valvoline employees, retirees, and terminated employees that are current and former employees of Ashland. Plan benefits were earned by qualifying participants who vested after meeting minimum service requirements, generally five or more years of service. Plan benefits are based on length of service and compensation, and certain Plan benefits include a cash balance design. Pursuant to a merger of the Ashland Inc. Leveraged Employee Stock Ownership Plan ("LESOP") with the Valvoline 401(k) Plan, participants who also have LESOP benefits may elect to transfer their LESOP benefits to the Plan. These transfers are included in Transfers with other benefit plans in the Statements of Changes in Net Assets Available for Benefits and were $669 thousand and $1,497 thousand in the years ended September 30, 2022 and 2021, respectively. Terminated participants are entitled to Plan benefits once retirement age is met or a qualifying disability occurs, and certain elections are available for early reduced benefits prior to retirement age. Plan benefits are generally limited to the Social Security earnings base, not to exceed the maximum limits under IRC Section 401(a)(17).

Terminated participants with a present value of benefits of $5,000 or less are subject to the mandatory cash out distribution rules under the Plan. For benefits greater than $5,000, participants may elect to receive a direct rollover to another tax-qualified plan or individual retirement account, or the participant may leave the benefits within the Plan until a distributable event occurs.

Death benefits

A participant may make an election to provide a death benefit to designated beneficiaries in the event of the participant's death prior to retirement. Death benefits to beneficiaries shall be computed based on the participant's service and benefits accrued through the date of death and reduced in accordance with Plan provisions based on the payment option elected.

Administrative expenses

The investments of the Plan are pooled with investments of Plan II in a master trust, the Valvoline LLC Defined Benefit Master Trust (the "Trust"). Fees for administration, investment advice, actuarial and other third-party services are paid by the Trust. The Trust is not charged for administrative services performed on its behalf by Valvoline.

Risks and uncertainties

The Trust invests in various investment securities, which are exposed to various risks, such as interest rate, market fluctuations and credit risks. In addition, while the Plan believes its valuation methods are appropriate and consistent with other market participants, the use of different methodologies or assumptions to determine the fair value of Plan investments could result in a different fair value measurement. Due to the level of risk associated with certain investment securities, it is at least reasonably possible that changes in risk in the near term could materially affect the amounts reported in the Statements of Net Assets Available for Benefits.

The actuarial present value of accumulated plan benefits is reported based on certain assumptions pertaining to interest rates, inflation rates and participant demographics, all of which are subject to change. Due to uncertainties inherent in the estimation and assumptions process, it is at least reasonably possible that changes in these estimates and assumptions in the near term could be material to the financial statements.

NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of accounting and presentation

The accompanying financial statements are prepared on the accrual basis of accounting in accordance with accounting principles generally accepted in the United States of America ("U.S. GAAP"). The preparation of the Plan's financial statements in conformity with U.S. GAAP requires Plan management to make estimates and assumptions that affect the amounts reported in these financial statements and accompanying notes. Actual results could differ from those estimates. Certain prior period amounts within these Notes to Financial Statements have been reclassified to conform to the current year presentation.

Master trust

The investments of the Plan and Plan II are pooled in the Trust pursuant to an amendment to the trust between Northern Trust, the trustee of the Plan, and the Company, effective October 1, 2019. The Plan's interest in the net assets of the trust was 69% for the years ended September 30, 2022 and 2021.

Investment valuation

The Plan's investment in the Trust is reported at fair value. Fair value is defined as an exit price, representing the amount that would be received to sell an asset or the amount paid to transfer a liability in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. As such, fair value is a market-based measurement determined based on assumptions that market participants would use in pricing an asset or liability.

As a basis for considering such assumptions, the accounting guidance prioritizes the inputs used to measure fair value into the following three-tier fair value hierarchy for which an instrument's classification within the hierarchy is based upon the lowest level of input that is significant to the instrument's fair value measurement:

- Level 1 - Observable inputs such as unadjusted quoted prices in active markets for identical assets or liabilities.

- Level 2 - Inputs other than quoted prices included in Level 1, that are observable for the asset or liability, either directly or indirectly. These include quoted prices for similar assets or liabilities in active markets and quoted prices for identical or similar assets or liabilities in markets that are not active.

- Level 3 - Unobservable inputs for the asset or liability for which there is little, if any, market activity at the measurement date.

Certain investments which measure fair value using the net asset value ("NAV") per share practical expedient are not classified within the fair value hierarchy and are separately disclosed.

The Plan generally uses a market approach to measure its investments at fair value using prices and other relevant information generated by market transactions involving identical or comparable assets or liabilities. In certain instances, when observable market data is lacking, the Plan uses valuation techniques consistent with the income approach whereby future cash flows are converted to a single discounted amount based on market expectations.

Purchases and sales of securities are reflected on a trade date basis. Gains or losses on sales of securities are based on average cost. Dividend income is recorded on the ex-dividend date. Returns on investments are recorded as earned on an accrual basis.

Actuarial present value of accumulated plan benefits

Accumulated plan benefits represent estimated future periodic payments, including lump-sum distributions, of Plan benefits expected to be paid to Plan participants or their beneficiaries upon retirement, death, or other distributable event. The actuarial present value of these accumulated plan benefits, as determined by the Plan's actuary, is the result from applying actuarial assumptions to adjust the accumulated plan benefits to reflect the time value of money through discounts for interest and the probability of payment by means of decrements for distributable events such as retirement, death, disability, or withdrawal between the date as of which the benefit information is presented, the valuation date, and the expected date of payment.

For the Plan years ended September 30, 2022 and 2021, the dates as of which the benefit information is presented, the valuation dates were October 1, 2021 and 2020, respectively. The significant actuarial assumptions utilized in the valuations were as follows as of October 1:

Key Assumption	2021	2020
Discount rate	2.75% weighted average split discount rate	2.67% weighted average split discount rate
Mortality	Society of Actuaries PRI-2012 separate employee and retiree tables based on no collar mortality experience, with adjustments for surviving contingent annuitants and with assumed future mortality improvements projected using the Social Security Administration's Annual 2021 Trustees Report as reflected in the MSS-2021 improvement scale	Society of Actuaries PRI-2012 separate employee and retiree tables based on no collar mortality experience, with adjustments for surviving contingent annuitants and with assumed future mortality improvements projected using the Social Security Administration's Annual 2020 Trustees Report as reflected in the MSS-2020 improvement scale

Benefit payments

Benefit payments to participants or their beneficiaries are recognized at the time of distribution.

Date of management's review

The Plan evaluates events occurring subsequent to the date of the financial statements in determining the accounting for and disclosure of transactions and events that affect the financial statements. Subsequent events have been evaluated through July 14, 2023, which is the date the financial statements were available to be issued.

NOTE 3 - INVESTMENTS

The Plan has elected the method of compliance as permitted by 29 CFR 2520.103-8 of the Department of Labor's Rules and Regulations for Reporting and Disclosure under ERISA. Accordingly, Northern Trust, the trustee of the Plan, has certified to the completeness and accuracy of all investments reflected within the accompanying Statements of Net Assets Available for Benefits as of September 30, 2022 and 2021 and the related investment activity reflected within the Statements of Changes in Net Assets Available for Benefits for the years ended September 30, 2022 and 2021.

Trust net assets

The following table presents the Trust assets, including investments and liabilities, as of September 30:

	2022		2021	
(in thousands)	Trust balances	Plan's interest in Trust balances	Trust balances	Plan's interest in Trust balances
Investments at fair value as determined by quoted market prices				
Cash and cash equivalents	$ 9,907	6,868	$ 112,984	$ 78,130
	9,907	6,868	112,984	78,130
Investments at estimated fair value				
Government securities	109,893	76,179	153,839	106,382
Corporate debt instruments	1,066,841	739,545	1,370,715	947,873
Other investments	818	567	9,060	6,265
	1,177,552	816,291	1,533,614	1,060,520
Investments at NAV per share practical expedient				
Collective trust funds	170,525	118,209	289,501	200,195
Common collective trusts	13,781	9,553	12,698	8,781
Private equity and hedge funds	13,339	9,247	10,940	7,565
	197,645	137,009	313,139	216,541
Total investments	1,385,104	960,168	1,959,737	1,355,191
Receivables	63,721	44,172	41,336	28,585
Total assets	1,448,825	1,004,340	2,001,073	1,383,776
Payables	(10,716)	(7,429)	(14,080)	(9,736)
Net assets	$ 1,438,109	$ 996,911	$ 1,986,993	$ 1,374,040

The following table presents the net appreciation (depreciation) in Trust investments for the years ended September 30:

(in thousands)	2022	2021
Net (depreciation) appreciation in the fair value of investments	$ (479,978)	$ 78,726
Investment income:		
Interest	37,324	54,539
Dividends	2,702	3,558
Total net (depreciation) appreciation	$ (439,952)	$ 136,823

The net appreciation (depreciation) presented above is reflective of the performance of the Trust in its entirety, while the Plan's net appreciation is commensurate with its interest in the Trust. Total Trust net appreciation (depreciation) excludes investment-related expenses of $2,890 thousand and $3,608 thousand for the years ended September 30, 2022 and 2021, respectively. The Plan's portion of these investment-related expenses is included within investment income in the Plan's interest in the Trust within the Statements of Changes in Net Assets Available for Benefits.

Trust derivative contracts

The Trust, through the activities of certain of its investment managers, uses derivative financial instruments in connection with its normal trading activities in an effort to improve investment return or control risk. Derivative financial instruments generally are viewed as a more cost effective and efficient means of providing liquidity than owning the underlying security. They can also provide unique risk and return structures for the Trust. The derivative financial instruments used in the Trust include futures contracts, options, as well as interest rate and credit default swaps. The Trust does not take on any leverage at the Trust level, and futures positions are covered by short-term marketable securities.

Futures contracts provide for the delivery or purchase of financial instruments on a specified future date at a specified price or yield. The Trust purchases futures contracts principally for exposure to fixed income securities, which generally are settled in the market prior to delivery of the underlying securities. Additionally, the Trust issues options which obligate the Trust to either buy or sell the underlying fixed income instruments at a specific price if the options are exercised. The Trust receives a premium upon issuance of the options.

The Trust is exposed to risks from changes in interest rates or market values of the securities underlying the futures and option contracts. Changes in interest rates on outstanding futures contracts are settled on a daily basis thereby minimizing the Trust's exposure to credit loss. The Trust is also exposed to credit risk in the event of nonperformance by the counterparties to the futures and options contracts. The Trust does not anticipate nonperformance by the counterparties and generally does not require counterparty collateral.

The fair values of these derivative contracts are included in the Trust assets in the table above, and the following summarizes those open derivative contracts as of September 30:

	2022		2021	
(in thousands)	Contracts	Fair value	Contracts	Fair value
Derivative assets				
Cash and cash equivalents:				
Foreign exchange forwards	5	$ 204	16	$ 446
Government securities:				
Interest rate swaps	22	$ 449	27	$ 1,439
Credit default swaps	4	$ 428	19	$ 578
Corporate debt instruments:				
Credit default swaps	8	$ 635	14	$ 1,519
Other investments:				
Options	3	$ -	7	$ 34
Credit default swaps	2	$ 818	3	$ 9,060
Derivative liabilities				
Cash and cash equivalents:				
Foreign exchange forwards	4	$ 53	3	$ 16
Government securities:				
Interest rate swaps	33	$ 416	32	$ 1,668
Credit default swaps	12	$ 398	2	$ 12
Other investments:				
Options	-	$ -	7	$ 35

The Trust realized a net trading loss on derivative contracts of $1,013 thousand and $9,142 thousand in the years ended September 30, 2022 and 2021, respectively.

Investment strategy

In developing an investment strategy for the Plan, Valvoline considered the following factors: the nature of the Plan's liabilities, the allocation of liabilities between active, terminated and retired plan participants, the funded status of the Plan, the applicable investment horizon, the respective size of the Plan, and historical and expected investment returns. The Plan's assets are managed by outside investment managers, which are monitored against investment return benchmarks and Valvoline's established investment strategy. Investment managers are selected based on an analysis of, among other things, their investment process, historical investment results, frequency of management turnover, cost structure and assets under management. Assets are periodically reallocated between investment managers to maintain an appropriate asset mix, diversification of investments and to optimize returns.

The Valvoline Retirement Committee ("VRC"), which includes members of Valvoline senior management, meets on a quarterly basis and is responsible for making investment policy decisions and reviewing investment performance for the Plan. Certain Trust investments are managed in accordance with the VRC's investment policy guidelines by the Goldman Sachs Group, Inc. ("Goldman Sachs"). In addition, Goldman Sachs acts as the investment advisor for the Trust. Fees paid by the Plan to Goldman Sachs for investment management and advisory services are included in Administrative expenses in the Statements of Changes in Net Assets Available for Benefits.

NOTE 4 - FAIR VALUE

The following table sets forth the Trust's investments at fair value by level within the fair value hierarchy as of September 30, 2022:

(in thousands)	Total fair value	Quoted prices in active markets for identical assets Level 1	Significant other observable inputs Level 2	Significant unobservable inputs Level 3	Assets measured at NAV
Assets					
Cash and cash equivalents	$ 15,273	$ 15,273	$ -	$ -	$ -
Government securities	110,707	-	110,707	-	-
Corporate debt instruments	1,066,841	-	1,066,841	-	-
Collective trust funds	170,525		-	-	170,525
Common collective trusts	13,781	-	-	-	13,781
Private equity and hedge funds	13,339	-	-	-	13,339
Other investments	818	-	818	-	-
Total assets	1,391,284	15,273	1,178,366	-	197,645
Liabilities					
Cash and cash equivalents	(5,365)	(5,365)	-	-	-
Government securities	(814)	-	(814)	-	-
Corporate debt instruments	-	-	-	-	-
Other investments	(1)	-	(1)	-	-
Total liabilities	(6,180)	(5,365)	(815)	-	-
Total assets at fair value	**$ 1,385,104**	**$ 9,908**	**$ 1,177,551**	**$ -**	**$ 197,645**

The following table sets forth the Trust's investments at fair value by level within the fair value hierarchy as of September 30, 2021:

(in thousands)	Total fair value	Quoted prices in active markets for identical assets Level 1	Significant other observable inputs Level 2	Significant unobservable inputs Level 3	Assets measured at NAV
Assets					
Cash and cash equivalents	$ 116,392	$ 116,392	$ -	$ -	$ -
Government securities	155,519	-	155,519	-	-
Corporate debt instruments	1,370,715	-	1,370,715	-	-
Collective trust funds	289,501				289,501
Common collective trusts	12,698	-		-	12,698
Private equity and hedge funds	10,941	-	-	-	10,941
Other investments	9,094	-	9,094	-	-
Total assets	1,964,860	116,392	1,535,328	-	313,140
Liabilities					
Cash and cash equivalents	(3,408)	(3,408)	-	-	-
Government securities	(1,680)	-	(1,680)	-	-
Corporate debt instruments	-	-	-	-	-
Other investments	(35)	-	(35)	-	-
Total liabilities	(5,123)	(3,408)	(1,715)	-	-
Total assets at fair value (a)	**$ 1,959,737**	**$ 112,984**	**$ 1,533,613**	**$ -**	**$ 313,140**

The following is a description of the valuation methodologies used for investments measured at fair value:

Cash and cash equivalents

The carrying value of cash and cash equivalents approximates fair value.

Government securities

Government securities are valued based on Level 2 inputs, which include yields available for comparable securities and issuers with similar credit ratings. Interest rate and credit default swaps are also utilized to manage risk and are valued based on Level 2 inputs that consist of observable yield curves.

Corporate debt instruments

Corporate debt instruments are valued based on Level 2 inputs, which includes quoted market prices in inactive markets and observable market quotations for similar bonds.

Assets measured at NAV

Private equity and hedge funds primarily represent alternative investments that seek to maximize absolute returns using a broad range of strategies to provide diversification. Common collective trust funds and collective trust funds represent diversified investments held in pooled funds across various asset classes, including U.S. and international equities, fixed-income securities, commodities and currencies. These investments are valued based on the NAV per share provided by the funds as a practical expedient to estimate fair value. The NAV is based on the fair value of the underlying net assets held by the funds divided by the number of shares or units outstanding.

Other investments

Other investments are primarily comprised of swaps that are valued using closing market swap curves and market derived inputs.

The following table summarizes redemption restrictions and unfunded commitments on those investments for which fair value is measured using the NAV per share practical expedient as of September 30, 2022:

(in thousands)	Fair Value	Unfunded commitments	Redemption frequency	Redemption notice period
Long/Short Hedge Fund	$ 4,407	$ -	None (a)	None (a)
Relative Value Hedge Fund	3,173	-	None (b)	None (b)
Event Driven Hedge Fund	387	-	None (b)	None (b)
Collective Trust Funds	170,495	-	Daily/Monthly	3 to 5 days
Common collective trust	13,781	-	Daily	Up to 5 days
Private Equity	5,402	1,575	None (c)	None (c)
	$ 197,645	$ 1,575		

(a) These hedge funds are in the process of liquidation.

(b) These hedge funds are in the process of liquidation and the timing of such is unknown.

(c) These private equity instruments are estimated to be liquidated over the next 1 to 5 years.

NOTE 5 - ACTUARIAL PRESENT VALUE OF ACCUMULATED PLAN BENEFITS

For the Plan year ended September 30, 2022, the date as of which the benefit information is presented, the valuation date was October 1, 2021 . The actuarial present value of accumulated plan benefits is shown below as of October 1, 2021:

(in thousands)	
Vested benefits:	
Participants currently receiving benefits	$ 1,111,777
Other participants	375,655
	1,487,432
Nonvested benefits (a)	540
Total actuarial present value of accumulated plan benefits	$ 1,487,972

(a) Represents estimated pre-retirement death benefits, which are nonvested for purposes of the actuarial present value of accumulated plan benefits until the distributable event is expected to occur.

The table below reconciles and details the year-to-year changes in the actuarial present value of accumulated plan benefits:

(in thousands)	
Actuarial present value of accumulated benefits at October 1, 2020	$ 1,540,762
Increase (decrease) during the plan year attributable to:	
Actuarial gains	3,636
Interest due to decrease in discount period	39,978
Benefits paid	(80,212)
Change in actuarial assumptions	(16,192)
Actuarial present value of accumulated plan benefits at October 1, 2021	$ 1,487,972

NOTE 6 - FUNDING POLICY AND PLAN TERMINATION

Funding policy

The Plan meets the ERISA minimum funding requirements. Valvoline seeks a long-run funding level of 100% on a projected benefit obligation basis but recognizes that year-to-year funding levels may vary widely. No contributions were required or made during the Plan years ended September 30, 2022 and 2021.

Plan termination

The Company has the right to discontinue its contributions and to terminate the Plan at any time. In the event of termination, the net assets of the Plan shall be first used to pay expenses of administration and then to provide benefits to participants and their beneficiaries in accordance with Section 4044 of ERISA, generally in the following order:

1. Annuity benefits that former employees or their beneficiaries have been receiving for at least three years or that employees eligible to retire for that three-year period would have been receiving if they had retired with benefits in the normal form of annuity under the Plan. The priority amount is limited to the lowest benefit payable during those three years and is further limited to the lowest benefit that would be payable under Plan provisions in effect at any time during the five years preceding Plan termination.

2. Other vested benefits insured by the Pension Benefit Guaranty Corporation ("PBGC") up to the applicable limitations discussed below.

3. All other vested benefits not insured by the PBGC.

4. All nonvested benefits.

Any residual assets remaining after all liabilities are satisfied would be returned to the Company.

If the Plan's net assets are inadequate, the PBGC generally guarantees the payment of vested normal retirement age benefits, early retirement benefits, and certain disability and beneficiary pensions. However, the PBGC does not guarantee all types of benefits under the Plan, and the amount of benefit protection is subject to certain limitations. Vested benefits under the Plan are guaranteed at the level in effect on the date of plan termination. However, there is a statutory ceiling, which is adjusted periodically, based on the amount of an individual's monthly benefit that the PBGC guarantees. For plan terminations during the years ended September 30, 2022 and 2021, that ceiling was $6,205 and $6,034 per month, respectively. That ceiling applies to those pensioners who elect to receive benefits in the form of a single-life annuity and are at least 65 years old at the time of retirement or plan termination, whichever comes later. For other annuitants or for those who elect to receive benefits in some form other than a single-life annuity, the corresponding ceilings are actuarially adjusted downward.

Whether a particular participant's accumulated plan benefits would be paid should the Plan terminate at some future time will depend on the sufficiency of the Plan's net assets to provide for accumulated benefit obligations at that time and may also depend on the financial condition of the Plan sponsor and the level of benefits guaranteed by the PBGC.

NOTE 7 - PLAN REGULATORY MATTERS

Plan tax status

The Plan received a favorable tax determination letter from the Internal Revenue Service ("IRS") dated February 7, 2017, which states that the Plan is qualified under IRC Section 401(a) and therefore, the related Trust is exempt from federal income taxes. Although the Plan that the IRS reviewed in issuing its most recent determination letter was since amended, the Plan administrator believes that the Plan is designed and being operated in compliance with the applicable requirements of the IRC to maintain its qualified status. Accordingly, income taxes are not provided for in the accompanying financial statements.

U.S. GAAP requires Plan management to evaluate tax positions taken by the Plan and recognize a tax liability (or asset) if the Plan has taken an uncertain position that more likely than not would not be sustained upon examination by the IRS. Plan management has analyzed the tax positions taken by the Plan, and has concluded that as of September 30, 2022 and 2021, there are no uncertain positions taken or expected to be taken that would require recognition of a liability (or asset) or disclosure in the financial statements.

The Plan is subject to routine audits by taxing jurisdictions; however, there are currently no audits for any tax periods in progress. Plan management believes the Plan is no longer subject to income tax examinations for the tax periods prior to 2018.

Schedule SB, line 26 — Schedule of Active Participant Data

DISTRIBUTION OF ACTIVE PARTICIPANTS AS OF OCTOBER 1, 2021

Ashland Hercules – Annuity Benefits

ATTAINED AGE	YEARS OF CREDITED SERVICE										
	UNDER 1	1–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40 & UP	TOTAL
Under 25											
25–29											
30–34											
35–39											
40–44											
45–49			1			1	3				5
50–54							27	12			39
							31,905				
55–59		1					18	29	12		60
								38,923			
60–64							4	10	14		28
65–69								1		3	4
70 & up											
Total		1	1			1	52	52	26	3	136
											35,722

In each cell, the top number is the count of active participants for each age/service combination and the bottom number is the average annual accrued benefit. The average benefit is not shown for cells with fewer than 20 participants.

Schedule SB, line 26 — Schedule of Active Participant Data

DISTRIBUTION OF ACTIVE CASH BALANCE PARTICIPANTS AS OF OCTOBER 1, 2021

Ashland Hercules – RGA Benefits

ATTAINED AGE	YEARS OF CREDITED SERVICE										
	UNDER 1	1–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40 & UP	TOTAL
Under 25											
25–29											
30–34											
35–39											
40–44					31						31
					29,863						
45–49				2	50						52
					43,014						
50–54				3	54						57
					54,048						
55–59					44		1				45
					69,320						
60–64					24						24
					89,796						
65–69					2						2
70 & up											
Total				5	205		1				211
											55,262

In each cell, the top number is the count of active participants for each age/service combination and the bottom number is the average cash balance account. The average cash balance account is not shown for cells with fewer than 20 participants.

Schedule SB, Part V — Statement of Actuarial Assumptions/Methods

Actuarial assumptions for funding valuation

Discount rate sponsor elections		
• Segment rates or full yield curve	Segment	
• Look-back months	4	
	Stabilized	**Nonstabilized**
• First 5 years	4.75%	1.27%
• Next 15 years	5.36%	2.77%
• Over 20 years	6.11%	3.45%
Mortality sponsor elections		
• Healthy participants	Section 430(h)(3) prescribed separate static annuitant and non-annuitant mortality tables. These tables are based on the RP-2006 mortality tables with IRS-developed adjustments and projected with mortality improvement scale MP-2019.	
Other economic assumptions		
• Salary increases	Not applicable	
• Social Security taxable wage base increases	Not applicable	
• Inflation	Not applicable	
• Expected investment return	3.69% per year for years 2020 4.20% per year for years 2019	
• Expenses	Expected expenses equal estimated prior year plan administrative expenses paid from the trust applicable to each plan excluding actual PBGC premiums plus estimated current year PBGC premiums for each plan.	
• Cash Balance Interest Credit	4.25% compounded annually.	
• LESOP Stock Appreciation	Not applicable	
• LESOP Share Price	Not applicable	
• LESOP Conversion rate	5.40% and section 430(h)(3) prescribed mortality	

Schedule SB, Part V — Statement of Actuarial Assumptions/Methods

Demographic assumptions

- Withdrawal-Affiliates

Age at beginning of year	Turnover Rate*
22	0.160
27	0.140
32	0.115
37	0.090
42	0.065
47	0.060
52	0.055
57	0.050
62	0.045

**Rates linearly interpolated between above ages.*

- Withdrawal-Hercules

Experience Rates – sample rates as follows:

Age	Turnover Rate
25	0.100
30	0.100
35	0.100
40	0.100
45	0.100
50	0.070
55	0.050
60	0.050

- Disability incidence

Experience Rates – sample rates as follows

Age	Turnover Rate
20	0.0012
30	0.0012
35	0.0013
40	0.0015
45	0.0020
50	0.0036
55	0.0068

Schedule SB, Part V — Statement of Actuarial Assumptions/Methods

- Retirement age - Affiliates

Age	Active on 6/30/03 with 10+ yrs of service	Active on 6/30/03 under 10 yrs of service	Hired or rehired after 6/30/03
54 and under	0.05*	0.00	0.00
55-59	0.10	0.05	0.15
60	0.20	0.07	0.15
61	0.20	0.07	0.20
62	0.30	0.15	0.35
63-64	0.20	0.15	0.35
65	0.60	0.30	0.70
66-69	0.30	0.30	0.30
70+	1.00	1.00	1.00

**If meets rule of 80 prior to age 55 then 0.05 rate will be applied at each age up to age 55.*

- Retirement age - Hercules

Age	Retirement Rate*
50-54	0.05
55	0.10
56-58	0.15
59-61	0.17
62-63	0.22
64-65	0.25
66-69	0.50
70	1.00

- Benefit commencement age for current and future vested
  - Affiliates: Age 62 with the following exceptions:
    RGA participants: Age 55
  - Hercules: Age 62
- Spouse assumptions

	Male participants	Female participants
Percentage married	80%	80% - Affiliates 50% - Hercules
Spouse age difference	3 years younger	3 years older

Schedule SB, Part V — Statement of Actuarial Assumptions/Methods

• Retirement age - Affiliates	
Form of payment — Males	
• Active retirements	Grandfathered Affiliates participants and Hercules not eligible for 51% lump sum: 55% joint & survivor annuity. RGA participants and Hercules eligible for 51% lump sum: 100% of available lump sum.
• Future disabilities	Grandfathered participants and all Hercules: 100% single life annuity. RGA participants: 100% lump sum.
• Future deaths	Grandfathered participants and all Hercules: 100% single life annuity. RGA participants: 100% lump sum.
• Future vested deferred	Grandfathered participants and all Hercules: 55% joint & survivor annuity. RGA participants: 100% lump sum.
• Current vested deferred	Grandfathered participants and Hercules: 55% joint & survivor annuity. RGA participants: 100% lump sum.
Lump sum conversion	5.40% and 417(e) applicable mortality
Unpredictable contingent event assumptions	Not Applicable
Additional at-risk assumptions	N/A

Schedule SB, Part V — Statement of Actuarial Assumptions/Methods

Asset methods

The asset valuation method is an average of the adjusted market value for each year during the last 2 years preceding the valuation date. The adjusted market value is the market value at each determination date adjusted to the valuation date based on actual cash flows and expected interest at the lesser of the expected rate of return and the third segment rate. This amount is adjusted to be no greater than 110 percent and no less than 90 percent of the fair market value, as defined in IRC Section 430.

A characteristic of this asset method is that, over time, it is slightly more likely to produce an actuarial value of assets that is less than the market value of assets than an actuarial value that is greater than the market value.

Participant methods

Participants or former participants are included or excluded from the valuation as described below:

- **Participants included:** The plan sponsor provides us with data on all employees as of the valuation date.
- **Participants excluded:** No actuarial liability is included for nonvested participants who terminated prior to the valuation date. For this purpose, participants with a break-in-service on the valuation date are treated as terminated participants.
- **Insurance contracts**: The plan does not have any insurance contracts.

Minimum funding methods

The funding target for minimum funding calculations is computed using the traditional unit credit method of funding. The objective under this method is to fund each participant's benefits under the plan as they accrue. Thus, the total pension to which each participant is expected to become entitled at retirement is broken down into units, each associated with a year of past or future credited service.

A detailed description of the calculation follows:

- The plan's valuation date is the beginning of the plan year.
- An individual's **funding target** is the present value of future benefits based on credited service and average pay as of the beginning of the plan year, and an individual's **target normal cost** is the present value of the benefit expected to accrue in the plan year. If multiple decrements are used, the funding target and the target normal cost for an individual are the sum of the component funding targets and target normal costs associated with the various anticipated separation dates.
- The plan's **target normal cost** is the sum of the individual target normal costs, and the plan's **funding target** is the sum of the individual funding targets for all participants under the plan.

SCHEDULE SB (Form 5500)

Department of the Treasury
Internal Revenue Service

Department of Labor
Employee Benefits Security Administration

Pension Benefit Guaranty Corporation

Single-Employer Defined Benefit Plan Actuarial Information

This schedule is required to be filed under section 104 of the Employee Retirement Income Security Act of 1974 (ERISA) and section 6059 of the Internal Revenue Code (the Code).

▶ **File as an attachment to Form 5500 or 5500-SF.**

OMB No. 1210-0110

2021

This Form is Open to Public Inspection

For calendar plan year 2021 or fiscal plan year beginning 10/01/2021 and ending 09/30/2022

▶ **Round off amounts to nearest dollar.**

▶ **Caution:** A penalty of $1,000 will be assessed for late filing of this report unless reasonable cause is established.

A Name of plan
ASHLAND HERCULES PENSION PLAN

B Three-digit plan number (PN) ▶ 001

C Plan sponsor's name as shown on line 2a of Form 5500 or 5500-SF
VALVOLINE LLC

D Employer Identification Number (EIN)
61-1782197

E Type of plan: [X] Single [ ] Multiple-A [ ] Multiple-B

F Prior year plan size: [ ] 100 or fewer [ ] 101-500 [X] More than 500

Part I Basic Information

1 Enter the valuation date: Month 10 Day 01 Year 2021

2 Assets:

a Market value	2a	1,374,039,601
b Actuarial value	2b	1,318,024,526

3 Funding target/participant count breakdown

	(1) Number of participants	(2) Vested Funding Target	(3) Total Funding Target
a For retired participants and beneficiaries receiving payment	2,607	870,476,118	870,476,118
b For terminated vested participants	2,397	207,204,796	207,204,796
c For active participants	347	50,806,085	51,168,942
d Total	5,351	1,128,486,999	1,128,849,856

4 If the plan is in at-risk status, check the box and complete lines (a) and (b) [ ]

a Funding target disregarding prescribed at-risk assumptions	4a	
b Funding target reflecting at-risk assumptions, but disregarding transition rule for plans that have been in at-risk status for fewer than five consecutive years and disregarding loading factor	4b	
5 Effective interest rate	5	5.51%
6 Target normal cost		
a Present value of current plan year accruals	6a	0
b Expected plan-related expenses	6b	4,335,063
c Total (line 6a + line 6b)	6c	4,335,063

Statement by Enrolled Actuary

To the best of my knowledge, the information supplied in this schedule and accompanying schedules, statements and attachments, if any, is complete and accurate. Each prescribed assumption was applied in accordance with applicable law and regulations. In my opinion, each other assumption is reasonable (taking into account the experience of the plan and reasonable expectations) and such other assumptions, in combination, offer my best estimate of anticipated experience under the plan.

SIGN HERE DENNIS STONE DLS — Signature of actuary

06-08-2023 — Date

DENNIS L STONE FSA — Type or print name of actuary

2303271 — Most recent enrollment number

MERCER — Firm name

502-561-4500 — Telephone number (including area code)

400 WEST MARKET STREET
SUITE 500
LOUISVILLE KY 40202-3415
Address of the firm

If the actuary has not fully reflected any regulation or ruling promulgated under the statute in completing this schedule, check the box and see instructions [ ]

Part II Beginning of Year Carryover and Prefunding Balances

		(a) Carryover balance	(b) Prefunding balance
7	Balance at beginning of prior year after applicable adjustments (line 13 from prior year)	0	277,272,051
8	Portion elected for use to offset prior year's funding requirement (line 35 from prior year)	0	20,763,134
9	Amount remaining (line 7 minus line 8)	0	256,508,917
10	Interest on line 9 using prior year's actual return of 6.97%	0	17,878,672
11	Prior year's excess contributions to be added to prefunding balance:		
	a Present value of excess contributions (line 38a from prior year)		0
	b(1) Interest on the excess, if any, of line 38a over line 38b from prior year Schedule SB, using prior year's effective interest rate of 5.65%		0
	b(2) Interest on line 38b from prior year Schedule SB, using prior year's actual return		0
	c Total available at beginning of current plan year to add to prefunding balance		0
	d Portion of (c) to be added to prefunding balance		0
12	Other reductions in balances due to elections or deemed elections	0	0
13	Balance at beginning of current year (line 9 + line 10 + line 11d – line 12)	0	274,387,589

Part III Funding Percentages

14	Funding target attainment percentage	14	92.45%
15	Adjusted funding target attainment percentage	15	116.75%
16	Prior year's funding percentage for purposes of determining whether carryover/prefunding balances may be used to reduce current year's funding requirement	16	85.44%
17	If the current value of the assets of the plan is less than 70 percent of the funding target, enter such percentage	17	%

Part IV Contributions and Liquidity Shortfalls

18 Contributions made to the plan for the plan year by employer(s) and employees:

(a) Date (MM-DD-YYYY)	(b) Amount paid by employer(s)	(c) Amount paid by employees	(a) Date (MM-DD-YYYY)	(b) Amount paid by employer(s)	(c) Amount paid by employees
			Totals ▶ 18(b)	0	18(c) 0

19	Discounted employer contributions – see instructions for small plan with a valuation date after the beginning of the year:		
	a Contributions allocated toward unpaid minimum required contributions from prior years.	19a	0
	b Contributions made to avoid restrictions adjusted to valuation date	19b	0
	c Contributions allocated toward minimum required contribution for current year adjusted to valuation date	19c	0

20 Quarterly contributions and liquidity shortfalls:

a Did the plan have a "funding shortfall" for the prior year? [X] Yes [ ] No

b If line 20a is "Yes," were required quarterly installments for the current year made in a timely manner? [X] Yes [ ] No

c If line 20a is "Yes," see instructions and complete the following table as applicable:

Liquidity shortfall as of end of quarter of this plan year

(1) 1st	(2) 2nd	(3) 3rd	(4) 4th
0	0	0	0

Part V Assumptions Used to Determine Funding Target and Target Normal Cost

21 Discount rate:

a Segment rates:

1st segment:	2nd segment:	3rd segment:	☐ N/A, full yield curve used
4.75 %	5.36 %	6.11%	

b Applicable month (enter code)	21b	4
22 Weighted average retirement age	22	62

23 Mortality table(s) (see instructions) ☐ Prescribed - combined ☒ Prescribed - separate ☐ Substitute

Part VI Miscellaneous Items

24 Has a change been made in the non-prescribed actuarial assumptions for the current plan year? If "Yes," see instructions regarding required attachment ☒ Yes ☐ No

25 Has a method change been made for the current plan year? If "Yes," see instructions regarding required attachment ☐ Yes ☒ No

26 Is the plan required to provide a Schedule of Active Participants? If "Yes," see instructions regarding required attachment ☒ Yes ☐ No

27 If the plan is subject to alternative funding rules, enter applicable code and see instructions regarding attachment	27	

Part VII Reconciliation of Unpaid Minimum Required Contributions For Prior Years

28 Unpaid minimum required contributions for all prior years	28	0
29 Discounted employer contributions allocated toward unpaid minimum required contributions from prior years (line 19a)	29	0
30 Remaining amount of unpaid minimum required contributions (line 28 minus line 29)	30	0

Part VIII Minimum Required Contribution For Current Year

31 Target normal cost and excess assets (see instructions):

a Target normal cost (line 6c)	31a	4,335,063
b Excess assets, if applicable, but not greater than line 31a	31b	0

32 Amortization installments:	Outstanding Balance	Installment
a Net shortfall amortization installment	85,212,919	9,709,185
b Waiver amortization installment	0	0

33 If a waiver has been approved for this plan year, enter the date of the ruling letter granting the approval (Month _____ Day _____ Year _____) and the waived amount	33	
34 Total funding requirement before reflecting carryover/prefunding balances (lines 31a - 31b + 32a + 32b - 33)	34	14,044,248

	Carryover balance	Prefunding balance	Total balance
35 Balances elected for use to offset funding requirement		14,044,248	14,044,248

36 Additional cash requirement (line 34 minus line 35)	36	0
37 Contributions allocated toward minimum required contribution for current year adjusted to valuation date (line 19c)	37	0
38 Present value of excess contributions for current year (see instructions)		
a Total (excess, if any, of line 37 over line 36)	38a	0
b Portion included in line 38a attributable to use of prefunding and funding standard carryover balances	38b	0
39 Unpaid minimum required contribution for current year (excess, if any, of line 36 over line 37)	39	0
40 Unpaid minimum required contributions for all years	40	0

Part IX Pension Funding Relief Under Pension Relief Act of 2010 (See Instructions)

41 If an election was made to use PRA 2010 funding relief for this plan:

a Schedule elected ☐ 2 plus 7 years ☐ 15 years

b Eligible plan year(s) for which the election in line 41a was made ☐ 2008 ☐ 2009 ☐ 2010 ☐ 2011

Schedule SB, line 22 — Description of Weighted Average Retirement Age

Each employee is assumed to retire in accordance with the applicable attached table of retirement rates. The proportion of employees expected to retire at each potential retirement age is shown in each applicable table. The average retirement age for the plan as a whole is 62.

Retirement Rates for Affiliates actives as of 6/30/2003 with 10+ years of service on that date

(1)	(2)	(3)	(4)	(5)
Age	Number of Lives	Probability of Retirement	Expected Number of Retirees	= (1) x (3)
55	1,000,000	10%	100,000	5,500,000
56	900,000	10%	90,000	5,040,000
57	810,000	10%	81,000	4,617,000
58	729,000	10%	72,900	4,228,200
59	656,100	10%	65,610	3,870,990
60	590,490	20%	118,098	7,085,880
61	472,392	20%	94,478	5,763,182
62	377,914	30%	113,374	7,029,193
63	264,540	20%	52,908	3,333,198
64	211,632	20%	42,326	2,708,885
65	169,305	60%	101,583	6,602,906
66	67,722	30%	20,317	1,340,898
67	47,405	30%	14,222	952,850
68	33,184	30%	9,955	676,950
69	23,229	30%	6,969	480,834
70	16,260	100%	16,260	1,138,206
			1,000,000	60,369,172
Wtd. Avg. Retirement Age = sum of column (5) ÷ sum of column (4) =				60.37

Schedule SB, line 22 — Description of Weighted Average Retirement Age

Retirement Rates for Affiliates actives on 6/30/2003 with less than 10 years of service on that date

(1) Age	(2) Number of Lives	(3) Probability of Retirement	(4) Expected Number of Retirees	(5) = (1) x (3)
55	1,000,000	5%	50,000	2,750,000
56	950,000	5%	47,500	2,660,000
57	902,500	5%	45,125	2,572,125
58	857,375	5%	42,869	2,486,388
59	814,506	5%	40,725	2,402,793
60	773,781	7%	54,165	3,249,880
61	719,616	7%	50,373	3,072,761
62	669,243	15%	100,386	6,223,961
63	568,857	15%	85,328	5,375,695
64	483,528	15%	72,529	4,641,870
65	410,999	30%	123,300	8,014,479
66	287,699	30%	86,310	5,696,445
67	201,389	30%	60,417	4,047,929
68	140,973	30%	42,292	2,875,842
69	98,681	30%	29,604	2,042,693
70	69,077	100%	69,077	4,835,361
			1,000,000	62,948,224
Wtd. Avg. Retirement Age = sum of column (5) ÷ sum of column (4) =				62.95

Schedule SB, line 22 — Description of Weighted Average Retirement Age

Retirement Rates for Affiliates members hired after 6/30/2003

(1)	(2)	(3)	(4)	(5)
Age	Number of Lives	Probability of Retirement	Expected Number of Retirees	= (1) x (3)
55	1,000,000	15%	150,000	8,250,000
56	850,000	15%	127,500	7,140,000
57	722,500	15%	108,375	6,177,375
58	614,125	15%	92,119	5,342,888
59	522,006	15%	78,301	4,619,755
60	443,705	15%	66,556	3,993,348
61	377,150	20%	75,430	4,601,224
62	301,720	35%	105,602	6,547,316
63	196,118	35%	68,641	4,324,396
64	127,477	35%	44,617	2,855,474
65	82,860	70%	58,002	3,770,119
66	24,858	30%	7,457	492,187
67	17,401	30%	5,220	349,751
68	12,180	30%	3,654	248,480
69	8,526	30%	2,558	176,494
70	5,968	100%	5,968	417,787
			1,000,000	59,306,593
Wtd. Avg. Retirement Age = sum of column (5) ÷ sum of column (4) =				59.31

Schedule SB, line 22 — Description of Weighted Average Retirement Age

Retirement Rates for Hercules members

(1) Age	(2) Number of Lives	(3) Probability of Retirement	(4) Expected Number of Retirees	(5) = (1) x (3)
50	1,000,000	5%	50,000	2,500,000
51	950,000	5%	47,500	2,422,500
52	902,500	5%	45,125	2,346,500
53	857,375	5%	42,869	2,272,044
54	814,506	5%	40,725	2,199,167
55	773,781	10%	77,378	4,255,795
56	696,403	15%	104,460	5,849,784
57	591,942	15%	88,791	5,061,108
58	503,151	15%	75,473	4,377,414
59	427,678	17%	72,705	4,289,614
60	354,973	17%	60,345	3,620,725
61	294,628	17%	50,087	3,055,289
62	244,541	22%	53,799	3,335,539
63	190,742	22%	41,963	2,643,683
64	148,779	25%	37,195	2,380,459
65	111,584	25%	27,896	1,813,241
66	83,688	50%	41,844	2,761,705
67	41,844	50%	20,922	1,401,774
68	20,922	50%	10,461	711,348
69	10,461	50%	5,231	360,905
70	5,231	100%	5,231	366,135
			1,000,000	58,024,729
Wtd. Avg. Retirement Age = sum of column (5) ÷ sum of column (4) =				58.02

Overall Weighted Average Retirement Age for Entire Plan = 62

Schedule SB, line 24 — Change in Actuarial Assumptions

Actuarial Assumption Changes Since Prior Valuation

- The expected expenses changed from $4,293,396 to $4,335,063.
- The expected investment return assumption changed from 3.69% for the 2020 plan year to 3.48% for the 2021 plan year.

Schedule SB, line 26 — Schedule of Active Participant Data

DISTRIBUTION OF ACTIVE PARTICIPANTS AS OF OCTOBER 1, 2021

Ashland Hercules – Annuity Benefits

ATTAINED AGE	YEARS OF CREDITED SERVICE										
	UNDER 1	1–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40 & UP	TOTAL
Under 25											
25–29											
30–34											
35–39											
40–44											
45–49			1			1	3				5
50–54							27	12			39
							31,905				
55–59		1					18	29	12		60
								38,923			
60–64							4	10	14		28
65–69								1		3	4
70 & up											
Total		1	1			1	52	52	26	3	136
											35,722

In each cell, the top number is the count of active participants for each age/service combination and the bottom number is the average annual accrued benefit. The average benefit is not shown for cells with fewer than 20 participants.

Schedule SB, line 26 — Schedule of Active Participant Data

DISTRIBUTION OF ACTIVE CASH BALANCE PARTICIPANTS AS OF OCTOBER 1, 2021

Ashland Hercules – RGA Benefits

ATTAINED AGE	YEARS OF CREDITED SERVICE										
	UNDER 1	1–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40 & UP	TOTAL
Under 25											
25–29											
30–34											
35–39											
40–44					31						31
					29,863						
45–49				2	50						52
					43,014						
50–54				3	54						57
					54,048						
55–59					44		1				45
					69,320						
60–64					24						24
					89,796						
65–69					2						2
70 & up											
Total				5	205		1				211
											55,262

In each cell, the top number is the count of active participants for each age/service combination and the bottom number is the average cash balance account. The average cash balance account is not shown for cells with fewer than 20 participants.

Schedule SB, Line 32 — Schedule of Amortization Bases

The total shortfall amortization charge is the sum of the individual shortfall amortization installments for each plan year since the IRC Section 430 changes made by the Pension Protection Act of 2006 (PPA) took effect for the plan. Although an individual shortfall amortization installment can be negative, the combined shortfall amortization charge cannot be less than $0.

SHORTFALL BASES					
YEAR ESTABLISHED		OUTSTANDING BALANCE	YEARS REMAINING		2021 INSTALLMENT
2019	$	210,893,275	13	$	21,660,849
2020		(53,174,575)	14		(5,191,111)
2021		(72,505,781)	15		(6,760,553)
Total	$	85,212,919		$	9,709,185

Schedule SB, Part V — Statement of Actuarial Assumptions/Methods

Actuarial assumptions for funding valuation

Discount rate sponsor elections		
• Segment rates or full yield curve	Segment	
• Look-back months	4	
	Stabilized	**Nonstabilized**
• First 5 years	4.75%	1.27%
• Next 15 years	5.36%	2.77%
• Over 20 years	6.11%	3.45%
Mortality sponsor elections		
• Healthy participants	Section 430(h)(3) prescribed separate static annuitant and non-annuitant mortality tables. These tables are based on the RP-2006 mortality tables with IRS-developed adjustments and projected with mortality improvement scale MP-2019.	
Other economic assumptions		
• Salary increases	Not applicable	
• Social Security taxable wage base increases	Not applicable	
• Inflation	Not applicable	
• Expected investment return	3.69% per year for years 2020 4.20% per year for years 2019	
• Expenses	Expected expenses equal estimated prior year plan administrative expenses paid from the trust applicable to each plan excluding actual PBGC premiums plus estimated current year PBGC premiums for each plan.	
• Cash Balance Interest Credit	4.25% compounded annually.	
• LESOP Stock Appreciation	Not applicable	
• LESOP Share Price	Not applicable	
• LESOP Conversion rate	5.40% and section 430(h)(3) prescribed mortality	

Schedule SB, Part V — Statement of Actuarial Assumptions/Methods

Demographic assumptions

- Withdrawal-Affiliates

Age at beginning of year	Turnover Rate*
22	0.160
27	0.140
32	0.115
37	0.090
42	0.065
47	0.060
52	0.055
57	0.050
62	0.045

**Rates linearly interpolated between above ages.*

- Withdrawal-Hercules

Experience Rates – sample rates as follows:

Age	Turnover Rate
25	0.100
30	0.100
35	0.100
40	0.100
45	0.100
50	0.070
55	0.050
60	0.050

- Disability incidence

Experience Rates – sample rates as follows

Age	Turnover Rate
20	0.0012
30	0.0012
35	0.0013
40	0.0015
45	0.0020
50	0.0036
55	0.0068

Schedule SB, Part V — Statement of Actuarial Assumptions/Methods

- Retirement age - Affiliates

Age	Active on 6/30/03 with 10+ yrs of service	Active on 6/30/03 under 10 yrs of service	Hired or rehired after 6/30/03
54 and under	0.05*	0.00	0.00
55-59	0.10	0.05	0.15
60	0.20	0.07	0.15
61	0.20	0.07	0.20
62	0.30	0.15	0.35
63-64	0.20	0.15	0.35
65	0.60	0.30	0.70
66-69	0.30	0.30	0.30
70+	1.00	1.00	1.00

**If meets rule of 80 prior to age 55 then 0.05 rate will be applied at each age up to age 55.*

- Retirement age - Hercules

Age	Retirement Rate*
50-54	0.05
55	0.10
56-58	0.15
59-61	0.17
62-63	0.22
64-65	0.25
66-69	0.50
70	1.00

- Benefit commencement age for current and future vested
  - Affiliates: Age 62 with the following exceptions:
    RGA participants: Age 55
  - Hercules: Age 62
- Spouse assumptions

	Male participants	Female participants
Percentage married	80%	80% - Affiliates 50% - Hercules
Spouse age difference	3 years younger	3 years older

Schedule SB, Part V — Statement of Actuarial Assumptions/Methods

• Retirement age - Affiliates	
Form of payment — Males	
• Active retirements	Grandfathered Affiliates participants and Hercules not eligible for 51% lump sum: 55% joint & survivor annuity. RGA participants and Hercules eligible for 51% lump sum: 100% of available lump sum.
• Future disabilities	Grandfathered participants and all Hercules: 100% single life annuity. RGA participants: 100% lump sum.
• Future deaths	Grandfathered participants and all Hercules: 100% single life annuity. RGA participants: 100% lump sum.
• Future vested deferred	Grandfathered participants and all Hercules: 55% joint & survivor annuity. RGA participants: 100% lump sum.
• Current vested deferred	Grandfathered participants and Hercules: 55% joint & survivor annuity. RGA participants: 100% lump sum.
Lump sum conversion	5.40% and 417(e) applicable mortality
Unpredictable contingent event assumptions	Not Applicable
Additional at-risk assumptions	N/A

Schedule SB, Part V — Statement of Actuarial Assumptions/Methods

Asset methods

The asset valuation method is an average of the adjusted market value for each year during the last 2 years preceding the valuation date. The adjusted market value is the market value at each determination date adjusted to the valuation date based on actual cash flows and expected interest at the lesser of the expected rate of return and the third segment rate. This amount is adjusted to be no greater than 110 percent and no less than 90 percent of the fair market value, as defined in IRC Section 430.

A characteristic of this asset method is that, over time, it is slightly more likely to produce an actuarial value of assets that is less than the market value of assets than an actuarial value that is greater than the market value.

Participant methods

Participants or former participants are included or excluded from the valuation as described below:

- **Participants included:** The plan sponsor provides us with data on all employees as of the valuation date.
- **Participants excluded:** No actuarial liability is included for nonvested participants who terminated prior to the valuation date. For this purpose, participants with a break-in-service on the valuation date are treated as terminated participants.
- **Insurance contracts**: The plan does not have any insurance contracts.

Minimum funding methods

The funding target for minimum funding calculations is computed using the traditional unit credit method of funding. The objective under this method is to fund each participant's benefits under the plan as they accrue. Thus, the total pension to which each participant is expected to become entitled at retirement is broken down into units, each associated with a year of past or future credited service.

A detailed description of the calculation follows:

- The plan's valuation date is the beginning of the plan year.
- An individual's **funding target** is the present value of future benefits based on credited service and average pay as of the beginning of the plan year, and an individual's **target normal cost** is the present value of the benefit expected to accrue in the plan year. If multiple decrements are used, the funding target and the target normal cost for an individual are the sum of the component funding targets and target normal costs associated with the various anticipated separation dates.
- The plan's **target normal cost** is the sum of the individual target normal costs, and the plan's **funding target** is the sum of the individual funding targets for all participants under the plan.

Schedule SB, Part V — Summary of Plan Provisions

Summary of major plan provisions

Affiliates Members

Effective date and plan year	Original plan: March 1, 1951 Restated plan: July 1, 2003
Status of the plan	The plan has no future benefit accruals. Effective January 1, 2011 no new entrants are allowed into the plan and RGA cash balance accruals have been frozen.
Significant events that occurred during the year	None
Definitions	
• Participation	One year of service and age 21. Effective January 1, 2011 no new entrants are allowed into the plan.
• Employee contributions	None
• Employer contributions	Entire cost of the Plan
• Credited service	Continuous service from most recent date of hire

Schedule SB, Part V — Summary of Plan Provisions

• Final average Compensation	Average of highest 3 years earnings during last 10 years of service, limited as required by the Tax Reform Act of 1986. Effective January 1, 2011, the final average compensation began transitioning from a 3-year average to a 4-year average, and effective January 1, 2016, the final average compensation begins transitioning from a 4-year average to a 5-year average for grandfathered annuity participants.
Normal retirement	
• Eligibility	Age 65
• Benefit	**For members with 10 or more years of service on July 1, 2003 (referred to as Annuity Participants):** Greatest of (1) and (2) offset by annuity purchased as of October 1, 1986 and the benefit attributable to 50% of the LESOP balance 1. A. Prior to 4/1/1976 – Benefit accrued to 3/31/1976 in accordance with terms of plan in effect on that date B. Beginning 4/1/1976 through 9/30/1989 - 1.50% of annual compensation under $12,000 plus 2.25% of annual compensation over $12,000. C. Beginning 10/1/1989 – no further accruals under this formula. 2. 1.08% of final average compensation up to $10,700 plus 1.50% of such average compensation in excess of $10,700 multiplied by years of credited service (maximum of 35). Effective September 30, 2016, accrued benefits were frozen.

Schedule SB, Part V — Summary of Plan Provisions

For members with less than 10 years of service on July 1, 2003 (referred to as RGA Participants), cash balance benefit formula defined as follows:

1. Opening Balance - Present value of accrued benefit as of 6/30/2003 (present value based on 5.5% interest and GATT 2003 mortality).
2. Interest Credits – Average of United States 1 year Treasury Constant Maturity Rates for August preceding the beginning of the plan year plus 1%, the rate shall never be less than 4% or more than 7%.
3. Contribution Credits – As determined from the following table:

Age + continuous service at end of plan year	Contribution credit
Less than 30	3%
30 – 39	4%
40 – 49	5%
50 – 59	6%
60 – 69	7%
70 – 79	9%
80 or more	11%

4. Additional transition credits for those age 45 or older on 6/30/2003 in accordance with the following table:

Age on June 30, 2003	Transition credit percentage
45 to 49	3%
50 to 54	4%
55 and Over	5%

The account balance is reduced for any applicable LESOP offset.

Effective January, 2011, both contribution credits and transition credits are frozen, and only interest credits continue to accrue on cash balance accounts going forward for RGA participants.

Early retirement

- Eligibility

Eligible for early retirement if either:

1. Age 55 and 3 years of vesting service.
2. Age plus years of vesting service equal to 80 or more.

Schedule SB, Part V — Summary of Plan Provisions

- Benefit

Annuity Participants receive a percentage of their accrued benefit as specified in the following table:

Retirement Age	Percentage of accrued benefit
50	46%
51	51%
52	56%
53	62%
54	68%
55	75%
56	80%
57	84%
58	88%
59	91%
60	94%
61	97%
62 or older	100%

RGA Participants receive an early retirement benefit equal to the value of their RGA account less any LESOP offset.

Deferred retirement Benefit

- Benefit

Participants working past their Normal Retirement Date shall continue to accrue benefits up to their actual date of retirement.

Schedule SB, Part V — Summary of Plan Provisions

Deferred vested

- Eligibility: Three or more years of vesting service
- Benefit: 100% vested, reduced based on the following table:

Retirement Age	Percentage of accrued benefit
55	50%
56	54%
57	58%
58	62%
59	66%
60	70%
61	76%
62	82%
63	88%
64	94%
65	100%

For terminations after September 30, 2016, reductions are the same as for Early Retirement.

Disability

- Eligibility: Total and permanent disability
- Benefit: Benefits continue to accrue until Normal Retirement Date. Future service benefits after disability will accrue based on the member's compensation rate on October 1 of the year prior to his disability.

Pre-retirement death

- Eligibility: Annuity Participants – A member is eligible if vested and survived by a spouse. His spouse will receive a survivor annuity equal to 50% of the pension the Member would have received had he retired under the qualified Joint and Survivor option on his date of death.
  RGA Participants – Value of RGA account reduced by any LESOP offset

Post-retirement death

- Benefit: In accordance with annuity form elected by Member.

Form of benefits

- Automatic form for unmarried participants: Life annuity

Schedule SB, Part V — Summary of Plan Provisions

• Automatic form for married participants	Joint and 50% Survivor annuity in amount actuarially equivalent to single life annuity.

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• Optional forms	50%, 66-2/3%, 75% and 100% contingent annuities, life with 10 years guaranteed, and single life annuity with no guarantee. A lump sum option is also available for RGA participants.
• Optional form conversion factors	6% and GAM 1971 Male mortality, set back 5 years for the spouse
Miscellaneous	
• Maximum compensation	The plan was frozen as of September 30, 2016.
• Maximum benefits	The plan was frozen as of September 30, 2016.

Schedule SB, Part V — Summary of Plan Provisions

Hercules Members
Represented Employees of Heritage Hercules

Effective date and plan year	Original plan: 1913 Restated plan: July 1, 2005
Status of the plan	The plan has no future benefit accruals and new employees are eligible to participate in the plan once they satisfy the participation requirements.
Significant events that occurred during the year	None
Definitions	
• Participation	All regular full-time represented employees.
• Employee contributions	None
• Credited service	Continuous service from most recent date of hire
• Pensionable earnings	Salary and wages including overtime, holidays, vacations, commissions and non-occupational and temporary occupational disability benefits.
• Final average earnings	Average of highest 3 years earnings during last 10 years of service, limited as required by the Tax Reform Act of 1986.
• Social security earnings base	Twelve times the 35-year average monthly compensation used under the Social Security Act to calculate a maximum unreduced primary Social Security benefit in the calendar year prior to the year in which retirement or termination occurs.

Schedule SB, Part V — Summary of Plan Provisions

Normal retirement

- Eligibility: Age 65
- Benefit:
  1. Except as noted below: 1.15% of final average earnings up to the Social Security earnings base plus 1.35% of final average earnings in excess of such base multiplied by years of service.
  2. Bacchus wage employees:

     From June 1, 1996 - $33.75 per month for each year of service.

     At no time shall the benefit be less than the benefit as described in (1) above, with earnings frozen as of

     October 31, 1986
  3. McGregor wage employees:

     From September 15, 1994 - $23.00 per month for each year of service.

     At no time shall the benefit be less than the benefit as described in (1) above, with both earnings and service frozen as of June 30, 1989.

     McGregor employees age 55 and older as of July 1, 1989 will receive the benefit as described in (1) above.
  4. Hattiesburg, Jefferson, MCW, Gibbstown, Savannah, Parlin Powerhouse, and Milwaukee employees:

     The benefits available to non-represented participants covered by this plan. All employees who were represented participants in this plan on the effective date maintain rights to the benefits determined in accordance with their representation immediately preceding the effective date.

Location	Effective Date
Hattiesburg	January 1, 1995
Jefferson	January 1, 1995
MCW	July 1, 1996
Gibbstown	October 1, 1996
Savannah	July 1, 1998
Parlin Powerhouse	July 1, 1998
Milwaukee	November 11, 2000

Schedule SB, Part V — Summary of Plan Provisions

Early retirement

- Eligibility

Unreduced Benefits: Eligibility for unreduced early retirement is as follows:

Age	Service
55	35
56	32
57	29
58	26
59	23
60	20
61	18
62	16
63	14
64	12

Reduced Benefits: Eligibility for reduced early retirement benefits is age 50 and 10 years of service (except in cases of dishonesty, misconduct, etc.).

- Benefit

Unreduced Benefits: As described in normal retirement benefits.
Reduced Benefits: Actuarial reduction (6% and 1971 TPF&C) from the earliest date that the employee would have been eligible for unreduced benefits.

Deferred vested

- Eligibility

1. Five years of service where one year of vesting service is granted by any anniversary computation period in which an employee receives compensation for any six months.
2. Prior disability pensioner whose disability has terminated and who has not been offered suitable work.
3. Attainment of age 65.

- Benefit

Same as early retirement benefit

Disability

- Eligibility

Ten years of service and unable to perform the employee's normal work.

- Benefit

1. For employees receiving Social Security disability benefits, benefit as described in normal retirement benefits.
2. For employees who fail to qualify or remain qualified for Social Security disability benefits, 1.15% of final average earnings multiplied by years of service or any other pension payable under this plan.

Schedule SB, Part V — Summary of Plan Provisions

Pre-retirement death	
• Eligibility	Spousal or nonspousal beneficiaries of active participants who are vested and who have elected this coverage; also, spousal beneficiaries of vested terminated participants who have elected this coverage.

Schedule SB, Part V — Summary of Plan Provisions

• Benefit	Benefit that would have been payable to beneficiary under the 50% contingent annuity option if the participant had elected retirement on his date of death (or if the participant had terminated employment on his date of death and commenced benefits on the earliest possible date). In addition, active employees who are eligible for retirement benefit may elect the 100% contingent annuity option.
• Cost of benefit	Eliminated as of September 15th, 2015
Post-retirement death	None except as elected by optional forms of benefits.
Postponed retirement	
• Eligibility	Employee option.
• Benefit	Benefit as described in normal retirement benefits based on earnings and service at actual retirement date.
Form of benefits	
• Automatic form for unmarried participants	Life annuity
• Automatic form for married participants	50% joint and survivor annuity actuarially reduced.
• Optional forms	50%, 75% and 100% contingent annuities; also, Bacchus wage, Jefferson, Hattiesburg, Gibbstown, Milwaukee, Savannah, Parlin Powerhouse, and MCW employees and employees at the Parlin location may select a 51% lump sum combined with a 49% annuity.
• Optional form conversion factors	5% and 417(e) applicable mortality
Miscellaneous	
• Maximum compensation	The plan was frozen as of September 30, 2016.
• Maximum benefits	The plan was frozen as of September 30, 2016.

Schedule SB, Part V — Summary of Plan Provisions

Hercules Members
Non-Represented Employees of Heritage Hercules

Effective date and plan year	Original plan: January 1, 2005
Status of the plan	The plan has no future benefit accruals and new employees are eligible to participate in the plan once they satisfy the participation requirements.
Significant events that occurred during the year	None
Definitions	
• Participation	Any person not represented by a union, who is employed either at a location at which the Predecessor Plan was in effect or at a location to which this Plan has been extended by the Board. For represented employees participating in Schedule D (the career average pay formula) and for all non-represented employees, individuals hired on or after January 1, 2005 will not become participants in this plan.
• Employee contributions	None
• Vesting Service	At least six months of Earnings are required for one year of vesting service. Prior service under Hercules Incorporated's Pension Plan is included.
• Credited service	Each month in which Earnings are accrued. The total months of Credited Service divided by 12 are the years of Credited Service, whether or not consecutive. Prior service under Hercules Incorporated's Pension Plan is included. For former employees of SP Microwave, Inc., no Credited Service is granted prior to January 1, 1968.
• Pensionable earnings	Salary or wages including overtime, holidays, vacations, commissions, sales incentives, MICP bonuses and non-occupational and temporary occupational disability benefits paid to an employee up to the first day of the calendar month following date of retirement or termination. Effective January 1, 2011, variable pay is added and overtime is excluded going forward.
• Final average earnings	Average monthly earnings for the highest five consecutive years during the last ten years of service, limited as required by the Tax Reform Act of 1986. Effective January 1, 2005, the averaging period of five years extends one additional month for each month that the individual is employed beyond January 1, 2005. (Note that the extended averaging period does not apply to the represented employees at MCW).
• Social security earnings base	One-half of the Social Security tax base in effect for 12 months immediately prior to the effective date of retirement or termination month.

Schedule SB, Part V — Summary of Plan Provisions

Normal retirement	
• Eligibility	Age 65
• Benefit	Prospective Monthly Benefit: 1.20% of Final Average Earnings up to the Social Security Integration Point plus 1.60% of Final Average Earnings in excess of such integration point multiplied by years and months of Credited Service. Predecessor Plan: All participants who participated in the Predecessor Plan in effect on December 31, 1984 maintain rights to the benefits determined in accordance with such Plan. Former Employees of SP Microwave, Inc.: The minimum benefit under this plan is the benefit accrued as of June 30, 1987 under the SP Microwave, Inc. Plan. Former Employees of Aqualon Company Pension Plan (Kenedy): The minimum benefit under this plan is the accrued benefit as of December 31, 1992 under the Aqualon Company Pension Plan (Kenedy). Effective September 30, 2016, accrued benefits were frozen
Early retirement	
• Eligibility	Unreduced Benefits: Eligibility: Attainment of age 62. Reduced Benefits: Attainment of age 55 and completion of ten years of Service.

Schedule SB, Part V — Summary of Plan Provisions

- Benefit

Unreduced Benefits: As described in normal retirement benefits.

Reduced Benefits: As described in normal retirement benefits (Prospective Monthly Benefit), but reduced for each month by which the date of retirement precedes age 60, minimum of benefit based on Predecessor Plan. The reduction is equal to 150% divided by an individual's Service for each year prior to age 60. The maximum annual reduction is 5%. Effective January 1, 2011, the early retirement factors described above are replaced with the following early retirement factors:

Retirement Age	Percentage of accrued benefit
55	75%
56	80%
57	84%
58	88%
59	91%
60	94%
61	97%
62 or older	100%

This change in early retirement factors is being made using a “wear-away” approach, whereby the early retirement benefit determined after this change in reduction factors cannot be less than the early retirement benefit determined using the December 31, 2010 accrued benefit and the early retirement factors in effect prior to 2011.

Schedule SB, Part V — Summary of Plan Provisions

Deferred vested

- Eligibility: Five years of vesting service.
- Benefit: As described in normal retirement. A participant may elect to receive payment of a vested benefit as early as age 55 by proper application. The benefit that would have been payable at age 65 will be actuarially reduced as described in the following table:

Retirement Age	Percentage of accrued benefit
55	50%
56	54%
57	58%
58	62%
59	66%
60	70%
61	76%
62	82%
63	88%
64	94%
65 or older	100%

For terminations after September 30, 2016, reductions are the same as for Early Retirement.

Disability

- Eligibility: Not applicable

None (continued service credit while receiving benefits under Company long-term disability plan).

Pre-retirement death

- Eligibility: Spousal or non-spousal beneficiaries of active participants who are vested and who have elected this coverage; also, spousal beneficiaries of vested terminated participants who have elected this coverage.
- Benefit: Benefit that would have been payable to beneficiary under the 50% contingent annuity option if the participant had elected retirement on his date of death (or if the participant had terminated employment on his date of death and commenced benefits on the earliest possible date). In addition, active employees who are eligible for retirement benefit may elect the 100% contingent annuity option.
- Cost of benefit: Eliminated as of September 15th, 2015

Schedule SB, Part V — Summary of Plan Provisions

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Post-retirement death	None except as elected by optional forms of benefits.
Postponed retirement	
• Eligibility	Employee option.
• Benefit	Benefit as described in normal retirement benefits based on earnings and service at actual retirement date.
Form of benefits	
• Automatic form for unmarried participants	Life annuity
• Automatic form for married participants	50% joint and survivor annuity, actuarially reduced.
• Optional forms	50%, 75% and 100% joint and survivor annuities, 51% lump sum combined with a 49% annuity. As of January 1, 2005, the 51% lump sum is only applicable to benefits earned through the end of 2004.
• Optional form conversion factors	5% and 417(e) applicable mortality
July 1, 1993 Pension Adjustment	For all pensioners and beneficiaries receiving benefits pursuant to a joint and survivor option who were receiving benefits as of April 1, 1993 (and in addition, all 1992 curtailed employees who were retirement eligible, even if they are not in payment status as of April 1, 1993) the pension benefits were increased as follows: 0.125% per month of retirement from January 1, 1985 through December 31, 1992. Minimum increase was equal to the greater of (i) $20 per month of retirement or (ii) 3% of the pension benefit being paid. The increase is not payable to individuals (or beneficiaries) in pay status who started to receive benefits from status as vested terminated participants with a right to a deferred benefit.
Miscellaneous	
• Maximum compensation	The plan was frozen as of September 30, 2016.
• Maximum benefits	The plan was frozen as of September 30, 2016.

Schedule SB, Part V — Summary of Plan Provisions

Hercules Members
Heritage BetzDearborn Employees

Key Provisions	Averaging period for pay of three years extends one additional month for each month that the individual is employed beyond January 1, 2005. The 51% lump sum provision is available to new retirees based on benefits earned through the end of 2004. Employees hired on or after January 1, 2005 do not become participants in the plan.
Effective date and plan year	Original plan: January 1, 1953. Merged into Hercules Pension Plan January 1, 1999 Restated plan: January 1, 2002
Status of the plan	The plan has no future benefit accruals and new employees are not eligible to participate in the plan once they satisfy the participation requirements.
Significant events that occurred during the year	None
Definitions	
• Participation	January 1 or July 1 following attainment of age 21 and completion of one year of service.
• Employee contributions	None
• Credited service	Each year in which a participant completes 1,000 hours. Effective January 1, 2005, each month in which earnings are accrued.
• Pensionable earnings	Salary or wages including shift premium, overtime, incentive, commissions, bonuses, holidays, vacations and non-occupational and temporary occupational disability benefits paid to an employee up to the first day of the calendar month following date of retirement or termination.
• Final average earnings	Average annual earnings for the highest three consecutive years excluding those years in which the participant did not complete a year of service. Effective January 1, 2005, average monthly earnings for each year of service from the later of January 1, 2002 or date of hire.
• Covered Compensation	35-year average of Social Security wage bases ending with the year the participant attains Social Security Retirement Age.
• Social security integration point	One-half of the Social Security tax base in effect for 12 months immediately prior to the effective date of retirement or termination month.

Schedule SB, Part V — Summary of Plan Provisions

Normal retirement	
• Eligibility	Attain age 65 with five years of participation.
• Benefit	Prior to January 1, 2005: (1) + (2) − (3): 1.2% of Final Average Earnings multiplied by Credited Service up to a maximum of 35 years. 1. 0.6% of Final Average Earnings exceeding Covered Compensation multiplied by Credited Service up to a maximum of 35 years. 2. W.R. Grace Benefit Effective January 1, 2005: (1) − (2): 1. 1.20% of Final Average Earnings up to the Social Security Integration Point plus 1.60% of Final Average Earnings in excess of such integration point multiplied by years and months of Credited Service. 2. W.R. Grace Benefit
Early Retirement (Prior to January 1, 2005)	
• Eligibility	Attainment of age 55 and completion of ten years of service.
• Benefit	As described normal retirement benefit, but reduced 1/180 for each of the first 60 months and 1/300 for each of the next 60 months commencement precedes Normal Retirement Date.
Rule-of-85 early retirement	
• Eligibility	Attainment of age 55 and age plus service equals at least 85 years; also, certain individuals who terminate by October 2000 are deemed to have satisfied Rule of 85.
• Benefit	As described in normal retirement benefit, but (1) is reduced 1/240 for each month commencement precedes age 60, and in (2) is reduced 1/180 for each of the first 60 months and 1/300 for each of the next 60 months commencement precedes Normal Retirement Date.
Early Retirement (effective January 1, 2005)	
• Eligibility	Unreduced: Attainment of age 60 and completion of ten years of Service. Reduced: Attainment of age 55 and completion of ten years of Service.
• Benefit	Unreduced: As described in normal retirement benefit with no adjustment. Reduced: As described normal retirement benefit, but reduced for each month by which the date of retirement precedes age 60. The reduction is

Schedule SB, Part V — Summary of Plan Provisions

	equal to 150% divided by an individual's Service for each year prior to age 60. The maximum annual reduction is 5%.
Rule-of-85 Minimum	
• Eligibility	Attainment of age 55 and age plus service equals at least 85 years; also, certain individuals who terminate by October 2000 are deemed to have satisfied Rule of 85.
Benefit	As described normal retirement benefit using earnings and service as of December 31, 2004, but (1) is reduced 1/240 for each month commencement precedes age 60, and in (2) is reduced 1/180 for each of the first 60 months and 1/300 for each of the next 60 months commencement precedes Normal Retirement Date.
Deferred vested	
• Eligibility	Five years of vesting service.
• Benefit	As described in normal retirement benefit.
Disability	
• Eligibility	Not applicable
• Benefit	None (continued service credit while receiving benefits under Company long-term disability plan).
Pre-retirement death	
• Eligibility	Spousal beneficiaries of active participants who are vested; also, spousal beneficiaries of vested terminated participants.
• Benefit	Benefit that would have been payable to beneficiary under the 50% contingent annuity option if the participant elected retirement on his date of death (or if the participant had terminated employment on his date of death and commenced benefits on the earliest possible date).
Post-retirement death	None except as elected by optional forms of benefits.
Postponed retirement	
• Eligibility	Employee option
• Benefit	As described normal retirement benefit based on earnings and service at actual retirement date.
Form of benefits	

Schedule SB, Part V — Summary of Plan Provisions

• Automatic form for unmarried participants	Life annuity
• Automatic form for married participants	50% joint and survivor annuity, actuarially reduced.
• Optional forms	50%, 75% and 100% joint and survivor annuities and a 5-year certain and continuous annuity. A 51% lump sum combined with a 49% annuity is available on the benefits earned through the end of 2004.
• Optional form conversion factors	5% and 417(e) applicable mortality
Miscellaneous	
• Maximum compensation	The plan was frozen as of September 30, 2016.
• Maximum benefits	The plan was frozen as of September 30, 2016.

Schedule SB, Part V — Summary of Plan Provisions

Benefits included or excluded

Unless noted below, all benefits provided by the plan are included in this valuation:

- **Most recent plan amendments included (Ashland Hercules Pension Plan, Ashland Hercules Pension Plan II):** The Ashland Hercules Pension Plan document as amended through September 30, 2019.
- **Plan amendments excluded:** None
- **Internal Revenue Code limitations:** The limitations of Internal Revenue Code Section 415(b) and 401(a)(17) have been incorporated into our calculations.
- **IRC Section 416 rules for top-heavy plans:** We did not test whether the Ashland Hercules Pension Plan or the Ashland Hercules Pension Plan II are top-heavy (when the present value of benefits for key employees equals or exceeds 60 percent of the present value for all participants). However, we expect that the Ashland Hercules Pension Plan and the Ashland Hercules Pension Plan II are not top-heavy due to the large number of rank-and-file participants; therefore, the funding target and target normal cost do not reflect any liability for top-heavy benefit accruals.

Plan provisions specific to funding

Additional benefits included or excluded

- **IRC Section 436 benefit restrictions:**
  - *Unpredictable contingent event benefits:* This valuation excludes restricted contingent event benefits that occurred before the valuation date but includes contingent event benefits which are expected to occur on or after the valuation date regardless of anticipated funding-based limitations.
  - *Plan amendments:* See above.
  - *Prohibited payments:* Limitations on prohibited benefits (if any) are reflected for annuity starting dates before the valuation date but are ignored for annuity starting dates on or after the valuation date.
  - *Benefit accruals:* The Ashland Hercules Pension Plan and the Ashland Hercules Pension Plan II are frozen and therefore do not have benefit accruals.
- **Unpredictable contingent event benefits:** The plan does not have any unpredictable contingent event benefits.

Plan provision changes since prior valuation

None.

Schedule SB, line 22 — Description of Weighted Average Retirement Age

Each employee is assumed to retire in accordance with the applicable attached table of retirement rates. The proportion of employees expected to retire at each potential retirement age is shown in each applicable table. The average retirement age for the plan as a whole is 62.

Retirement Rates for Affiliates actives as of 6/30/2003 with 10+ years of service on that date

(1)	(2)	(3)	(4)	(5)
Age	Number of Lives	Probability of Retirement	Expected Number of Retirees	= (1) x (3)
55	1,000,000	10%	100,000	5,500,000
56	900,000	10%	90,000	5,040,000
57	810,000	10%	81,000	4,617,000
58	729,000	10%	72,900	4,228,200
59	656,100	10%	65,610	3,870,990
60	590,490	20%	118,098	7,085,880
61	472,392	20%	94,478	5,763,182
62	377,914	30%	113,374	7,029,193
63	264,540	20%	52,908	3,333,198
64	211,632	20%	42,326	2,708,885
65	169,305	60%	101,583	6,602,906
66	67,722	30%	20,317	1,340,898
67	47,405	30%	14,222	952,850
68	33,184	30%	9,955	676,950
69	23,229	30%	6,969	480,834
70	16,260	100%	16,260	1,138,206
			1,000,000	60,369,172
Wtd. Avg. Retirement Age = sum of column (5) ÷ sum of column (4) =				60.37

Schedule SB, line 22 — Description of Weighted Average Retirement Age

Retirement Rates for Affiliates actives on 6/30/2003 with less than 10 years of service on that date

(1) Age	(2) Number of Lives	(3) Probability of Retirement	(4) Expected Number of Retirees	(5) = (1) x (3)
55	1,000,000	5%	50,000	2,750,000
56	950,000	5%	47,500	2,660,000
57	902,500	5%	45,125	2,572,125
58	857,375	5%	42,869	2,486,388
59	814,506	5%	40,725	2,402,793
60	773,781	7%	54,165	3,249,880
61	719,616	7%	50,373	3,072,761
62	669,243	15%	100,386	6,223,961
63	568,857	15%	85,328	5,375,695
64	483,528	15%	72,529	4,641,870
65	410,999	30%	123,300	8,014,479
66	287,699	30%	86,310	5,696,445
67	201,389	30%	60,417	4,047,929
68	140,973	30%	42,292	2,875,842
69	98,681	30%	29,604	2,042,693
70	69,077	100%	69,077	4,835,361
			1,000,000	62,948,224
Wtd. Avg. Retirement Age = sum of column (5) ÷ sum of column (4) =				62.95

Schedule SB, line 22 — Description of Weighted Average Retirement Age

Retirement Rates for Affiliates members hired after 6/30/2003

(1)	(2)	(3)	(4)	(5)
Age	Number of Lives	Probability of Retirement	Expected Number of Retirees	= (1) x (3)
55	1,000,000	15%	150,000	8,250,000
56	850,000	15%	127,500	7,140,000
57	722,500	15%	108,375	6,177,375
58	614,125	15%	92,119	5,342,888
59	522,006	15%	78,301	4,619,755
60	443,705	15%	66,556	3,993,348
61	377,150	20%	75,430	4,601,224
62	301,720	35%	105,602	6,547,316
63	196,118	35%	68,641	4,324,396
64	127,477	35%	44,617	2,855,474
65	82,860	70%	58,002	3,770,119
66	24,858	30%	7,457	492,187
67	17,401	30%	5,220	349,751
68	12,180	30%	3,654	248,480
69	8,526	30%	2,558	176,494
70	5,968	100%	5,968	417,787
			1,000,000	59,306,593
Wtd. Avg. Retirement Age = sum of column (5) ÷ sum of column (4) =				59.31

Schedule SB, line 22 — Description of Weighted Average Retirement Age

Retirement Rates for Hercules members

(1) Age	(2) Number of Lives	(3) Probability of Retirement	(4) Expected Number of Retirees	(5) = (1) x (3)
50	1,000,000	5%	50,000	2,500,000
51	950,000	5%	47,500	2,422,500
52	902,500	5%	45,125	2,346,500
53	857,375	5%	42,869	2,272,044
54	814,506	5%	40,725	2,199,167
55	773,781	10%	77,378	4,255,795
56	696,403	15%	104,460	5,849,784
57	591,942	15%	88,791	5,061,108
58	503,151	15%	75,473	4,377,414
59	427,678	17%	72,705	4,289,614
60	354,973	17%	60,345	3,620,725
61	294,628	17%	50,087	3,055,289
62	244,541	22%	53,799	3,335,539
63	190,742	22%	41,963	2,643,683
64	148,779	25%	37,195	2,380,459
65	111,584	25%	27,896	1,813,241
66	83,688	50%	41,844	2,761,705
67	41,844	50%	20,922	1,401,774
68	20,922	50%	10,461	711,348
69	10,461	50%	5,231	360,905
70	5,231	100%	5,231	366,135
			1,000,000	58,024,729
Wtd. Avg. Retirement Age = sum of column (5) ÷ sum of column (4) =				58.02

Overall Weighted Average Retirement Age for Entire Plan = 62

Schedule SB, Part V — Summary of Plan Provisions

Summary of major plan provisions

Affiliates Members

Effective date and plan year	Original plan: March 1, 1951 Restated plan: July 1, 2003
Status of the plan	The plan has no future benefit accruals. Effective January 1, 2011 no new entrants are allowed into the plan and RGA cash balance accruals have been frozen.
Significant events that occurred during the year	None
Definitions	
• Participation	One year of service and age 21. Effective January 1, 2011 no new entrants are allowed into the plan.
• Employee contributions	None
• Employer contributions	Entire cost of the Plan
• Credited service	Continuous service from most recent date of hire

Schedule SB, Part V — Summary of Plan Provisions

• Final average Compensation	Average of highest 3 years earnings during last 10 years of service, limited as required by the Tax Reform Act of 1986. Effective January 1, 2011, the final average compensation began transitioning from a 3-year average to a 4-year average, and effective January 1, 2016, the final average compensation begins transitioning from a 4-year average to a 5-year average for grandfathered annuity participants.
Normal retirement	
• Eligibility	Age 65
• Benefit	**For members with 10 or more years of service on July 1, 2003 (referred to as Annuity Participants):** Greatest of (1) and (2) offset by annuity purchased as of October 1, 1986 and the benefit attributable to 50% of the LESOP balance 1. A. Prior to 4/1/1976 – Benefit accrued to 3/31/1976 in accordance with terms of plan in effect on that date B. Beginning 4/1/1976 through 9/30/1989 - 1.50% of annual compensation under $12,000 plus 2.25% of annual compensation over $12,000. C. Beginning 10/1/1989 – no further accruals under this formula. 2. 1.08% of final average compensation up to $10,700 plus 1.50% of such average compensation in excess of $10,700 multiplied by years of credited service (maximum of 35). Effective September 30, 2016, accrued benefits were frozen.

Schedule SB, Part V — Summary of Plan Provisions

For members with less than 10 years of service on July 1, 2003 (referred to as RGA Participants), cash balance benefit formula defined as follows:

1. Opening Balance - Present value of accrued benefit as of 6/30/2003 (present value based on 5.5% interest and GATT 2003 mortality).
2. Interest Credits – Average of United States 1 year Treasury Constant Maturity Rates for August preceding the beginning of the plan year plus 1%, the rate shall never be less than 4% or more than 7%.
3. Contribution Credits – As determined from the following table:

Age + continuous service at end of plan year	Contribution credit
Less than 30	3%
30 – 39	4%
40 – 49	5%
50 – 59	6%
60 – 69	7%
70 – 79	9%
80 or more	11%

4. Additional transition credits for those age 45 or older on 6/30/2003 in accordance with the following table:

Age on June 30, 2003	Transition credit percentage
45 to 49	3%
50 to 54	4%
55 and Over	5%

The account balance is reduced for any applicable LESOP offset.

Effective January, 2011, both contribution credits and transition credits are frozen, and only interest credits continue to accrue on cash balance accounts going forward for RGA participants.

Early retirement

- Eligibility

Eligible for early retirement if either:

1. Age 55 and 3 years of vesting service.
2. Age plus years of vesting service equal to 80 or more.

Schedule SB, Part V — Summary of Plan Provisions

- Benefit

Annuity Participants receive a percentage of their accrued benefit as specified in the following table:

Retirement Age	Percentage of accrued benefit
50	46%
51	51%
52	56%
53	62%
54	68%
55	75%
56	80%
57	84%
58	88%
59	91%
60	94%
61	97%
62 or older	100%

RGA Participants receive an early retirement benefit equal to the value of their RGA account less any LESOP offset.

Deferred retirement Benefit

- Benefit

Participants working past their Normal Retirement Date shall continue to accrue benefits up to their actual date of retirement.

Schedule SB, Part V — Summary of Plan Provisions

Deferred vested

- Eligibility: Three or more years of vesting service
- Benefit: 100% vested, reduced based on the following table:

Retirement Age	Percentage of accrued benefit
55	50%
56	54%
57	58%
58	62%
59	66%
60	70%
61	76%
62	82%
63	88%
64	94%
65	100%

For terminations after September 30, 2016, reductions are the same as for Early Retirement.

Disability

- Eligibility: Total and permanent disability
- Benefit: Benefits continue to accrue until Normal Retirement Date. Future service benefits after disability will accrue based on the member's compensation rate on October 1 of the year prior to his disability.

Pre-retirement death

- Eligibility: Annuity Participants – A member is eligible if vested and survived by a spouse. His spouse will receive a survivor annuity equal to 50% of the pension the Member would have received had he retired under the qualified Joint and Survivor option on his date of death.
  RGA Participants – Value of RGA account reduced by any LESOP offset

Post-retirement death

- Benefit: In accordance with annuity form elected by Member.

Form of benefits

- Automatic form for unmarried participants: Life annuity

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• Automatic form for married participants	Joint and 50% Survivor annuity in amount actuarially equivalent to single life annuity.

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• Optional forms	50%, 66-2/3%, 75% and 100% contingent annuities, life with 10 years guaranteed, and single life annuity with no guarantee. A lump sum option is also available for RGA participants.
• Optional form conversion factors	6% and GAM 1971 Male mortality, set back 5 years for the spouse
Miscellaneous	
• Maximum compensation	The plan was frozen as of September 30, 2016.
• Maximum benefits	The plan was frozen as of September 30, 2016.

Schedule SB, Part V — Summary of Plan Provisions

Hercules Members
Represented Employees of Heritage Hercules

Effective date and plan year	Original plan: 1913 Restated plan: July 1, 2005
Status of the plan	The plan has no future benefit accruals and new employees are eligible to participate in the plan once they satisfy the participation requirements.
Significant events that occurred during the year	None
Definitions	
• Participation	All regular full-time represented employees.
• Employee contributions	None
• Credited service	Continuous service from most recent date of hire
• Pensionable earnings	Salary and wages including overtime, holidays, vacations, commissions and non-occupational and temporary occupational disability benefits.
• Final average earnings	Average of highest 3 years earnings during last 10 years of service, limited as required by the Tax Reform Act of 1986.
• Social security earnings base	Twelve times the 35-year average monthly compensation used under the Social Security Act to calculate a maximum unreduced primary Social Security benefit in the calendar year prior to the year in which retirement or termination occurs.

Schedule SB, Part V — Summary of Plan Provisions

Normal retirement

- Eligibility: Age 65
- Benefit:
  1. Except as noted below: 1.15% of final average earnings up to the Social Security earnings base plus 1.35% of final average earnings in excess of such base multiplied by years of service.
  2. Bacchus wage employees:

     From June 1, 1996 - $33.75 per month for each year of service.

     At no time shall the benefit be less than the benefit as described in (1) above, with earnings frozen as of

     October 31, 1986
  3. McGregor wage employees:

     From September 15, 1994 - $23.00 per month for each year of service.

     At no time shall the benefit be less than the benefit as described in (1) above, with both earnings and service frozen as of June 30, 1989.

     McGregor employees age 55 and older as of July 1, 1989 will receive the benefit as described in (1) above.
  4. Hattiesburg, Jefferson, MCW, Gibbstown, Savannah, Parlin Powerhouse, and Milwaukee employees:

     The benefits available to non-represented participants covered by this plan. All employees who were represented participants in this plan on the effective date maintain rights to the benefits determined in accordance with their representation immediately preceding the effective date.

Location	Effective Date
Hattiesburg	January 1, 1995
Jefferson	January 1, 1995
MCW	July 1, 1996
Gibbstown	October 1, 1996
Savannah	July 1, 1998
Parlin Powerhouse	July 1, 1998
Milwaukee	November 11, 2000

Schedule SB, Part V — Summary of Plan Provisions

Early retirement

- Eligibility

Unreduced Benefits: Eligibility for unreduced early retirement is as follows:

Age	Service
55	35
56	32
57	29
58	26
59	23
60	20
61	18
62	16
63	14
64	12

Reduced Benefits: Eligibility for reduced early retirement benefits is age 50 and 10 years of service (except in cases of dishonesty, misconduct, etc.).

- Benefit

Unreduced Benefits: As described in normal retirement benefits.
Reduced Benefits: Actuarial reduction (6% and 1971 TPF&C) from the earliest date that the employee would have been eligible for unreduced benefits.

Deferred vested

- Eligibility

1. Five years of service where one year of vesting service is granted by any anniversary computation period in which an employee receives compensation for any six months.
2. Prior disability pensioner whose disability has terminated and who has not been offered suitable work.
3. Attainment of age 65.

- Benefit

Same as early retirement benefit

Disability

- Eligibility

Ten years of service and unable to perform the employee's normal work.

- Benefit

1. For employees receiving Social Security disability benefits, benefit as described in normal retirement benefits.
2. For employees who fail to qualify or remain qualified for Social Security disability benefits, 1.15% of final average earnings multiplied by years of service or any other pension payable under this plan.

Schedule SB, Part V — Summary of Plan Provisions

Pre-retirement death	
• Eligibility	Spousal or nonspousal beneficiaries of active participants who are vested and who have elected this coverage; also, spousal beneficiaries of vested terminated participants who have elected this coverage.

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• Benefit	Benefit that would have been payable to beneficiary under the 50% contingent annuity option if the participant had elected retirement on his date of death (or if the participant had terminated employment on his date of death and commenced benefits on the earliest possible date). In addition, active employees who are eligible for retirement benefit may elect the 100% contingent annuity option.
• Cost of benefit	Eliminated as of September 15th, 2015
Post-retirement death	None except as elected by optional forms of benefits.
Postponed retirement	
• Eligibility	Employee option.
• Benefit	Benefit as described in normal retirement benefits based on earnings and service at actual retirement date.
Form of benefits	
• Automatic form for unmarried participants	Life annuity
• Automatic form for married participants	50% joint and survivor annuity actuarially reduced.
• Optional forms	50%, 75% and 100% contingent annuities; also, Bacchus wage, Jefferson, Hattiesburg, Gibbstown, Milwaukee, Savannah, Parlin Powerhouse, and MCW employees and employees at the Parlin location may select a 51% lump sum combined with a 49% annuity.
• Optional form conversion factors	5% and 417(e) applicable mortality
Miscellaneous	
• Maximum compensation	The plan was frozen as of September 30, 2016.
• Maximum benefits	The plan was frozen as of September 30, 2016.

Schedule SB, Part V — Summary of Plan Provisions

Hercules Members
Non-Represented Employees of Heritage Hercules

Effective date and plan year	Original plan: January 1, 2005
Status of the plan	The plan has no future benefit accruals and new employees are eligible to participate in the plan once they satisfy the participation requirements.
Significant events that occurred during the year	None
Definitions	
• Participation	Any person not represented by a union, who is employed either at a location at which the Predecessor Plan was in effect or at a location to which this Plan has been extended by the Board. For represented employees participating in Schedule D (the career average pay formula) and for all non-represented employees, individuals hired on or after January 1, 2005 will not become participants in this plan.
• Employee contributions	None
• Vesting Service	At least six months of Earnings are required for one year of vesting service. Prior service under Hercules Incorporated's Pension Plan is included.
• Credited service	Each month in which Earnings are accrued. The total months of Credited Service divided by 12 are the years of Credited Service, whether or not consecutive. Prior service under Hercules Incorporated's Pension Plan is included. For former employees of SP Microwave, Inc., no Credited Service is granted prior to January 1, 1968.
• Pensionable earnings	Salary or wages including overtime, holidays, vacations, commissions, sales incentives, MICP bonuses and non-occupational and temporary occupational disability benefits paid to an employee up to the first day of the calendar month following date of retirement or termination. Effective January 1, 2011, variable pay is added and overtime is excluded going forward.
• Final average earnings	Average monthly earnings for the highest five consecutive years during the last ten years of service, limited as required by the Tax Reform Act of 1986. Effective January 1, 2005, the averaging period of five years extends one additional month for each month that the individual is employed beyond January 1, 2005. (Note that the extended averaging period does not apply to the represented employees at MCW).
• Social security earnings base	One-half of the Social Security tax base in effect for 12 months immediately prior to the effective date of retirement or termination month.

Schedule SB, Part V — Summary of Plan Provisions

Normal retirement	
• Eligibility	Age 65
• Benefit	Prospective Monthly Benefit: 1.20% of Final Average Earnings up to the Social Security Integration Point plus 1.60% of Final Average Earnings in excess of such integration point multiplied by years and months of Credited Service. Predecessor Plan: All participants who participated in the Predecessor Plan in effect on December 31, 1984 maintain rights to the benefits determined in accordance with such Plan. Former Employees of SP Microwave, Inc.: The minimum benefit under this plan is the benefit accrued as of June 30, 1987 under the SP Microwave, Inc. Plan. Former Employees of Aqualon Company Pension Plan (Kenedy): The minimum benefit under this plan is the accrued benefit as of December 31, 1992 under the Aqualon Company Pension Plan (Kenedy). Effective September 30, 2016, accrued benefits were frozen
Early retirement	
• Eligibility	Unreduced Benefits: Eligibility: Attainment of age 62. Reduced Benefits: Attainment of age 55 and completion of ten years of Service.

Schedule SB, Part V — Summary of Plan Provisions

- Benefit

Unreduced Benefits: As described in normal retirement benefits.

Reduced Benefits: As described in normal retirement benefits (Prospective Monthly Benefit), but reduced for each month by which the date of retirement precedes age 60, minimum of benefit based on Predecessor Plan. The reduction is equal to 150% divided by an individual's Service for each year prior to age 60. The maximum annual reduction is 5%. Effective January 1, 2011, the early retirement factors described above are replaced with the following early retirement factors:

Retirement Age	Percentage of accrued benefit
55	75%
56	80%
57	84%
58	88%
59	91%
60	94%
61	97%
62 or older	100%

This change in early retirement factors is being made using a “wear-away” approach, whereby the early retirement benefit determined after this change in reduction factors cannot be less than the early retirement benefit determined using the December 31, 2010 accrued benefit and the early retirement factors in effect prior to 2011.

Schedule SB, Part V — Summary of Plan Provisions

Deferred vested

- Eligibility: Five years of vesting service.
- Benefit: As described in normal retirement. A participant may elect to receive payment of a vested benefit as early as age 55 by proper application. The benefit that would have been payable at age 65 will be actuarially reduced as described in the following table:

Retirement Age	Percentage of accrued benefit
55	50%
56	54%
57	58%
58	62%
59	66%
60	70%
61	76%
62	82%
63	88%
64	94%
65 or older	100%

For terminations after September 30, 2016, reductions are the same as for Early Retirement.

Disability

- Eligibility: Not applicable

None (continued service credit while receiving benefits under Company long-term disability plan).

Pre-retirement death

- Eligibility: Spousal or non-spousal beneficiaries of active participants who are vested and who have elected this coverage; also, spousal beneficiaries of vested terminated participants who have elected this coverage.
- Benefit: Benefit that would have been payable to beneficiary under the 50% contingent annuity option if the participant had elected retirement on his date of death (or if the participant had terminated employment on his date of death and commenced benefits on the earliest possible date). In addition, active employees who are eligible for retirement benefit may elect the 100% contingent annuity option.
- Cost of benefit: Eliminated as of September 15th, 2015

Schedule SB, Part V — Summary of Plan Provisions

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Post-retirement death	None except as elected by optional forms of benefits.
Postponed retirement	
• Eligibility	Employee option.
• Benefit	Benefit as described in normal retirement benefits based on earnings and service at actual retirement date.
Form of benefits	
• Automatic form for unmarried participants	Life annuity
• Automatic form for married participants	50% joint and survivor annuity, actuarially reduced.
• Optional forms	50%, 75% and 100% joint and survivor annuities, 51% lump sum combined with a 49% annuity. As of January 1, 2005, the 51% lump sum is only applicable to benefits earned through the end of 2004.
• Optional form conversion factors	5% and 417(e) applicable mortality
July 1, 1993 Pension Adjustment	For all pensioners and beneficiaries receiving benefits pursuant to a joint and survivor option who were receiving benefits as of April 1, 1993 (and in addition, all 1992 curtailed employees who were retirement eligible, even if they are not in payment status as of April 1, 1993) the pension benefits were increased as follows: 0.125% per month of retirement from January 1, 1985 through December 31, 1992. Minimum increase was equal to the greater of (i) $20 per month of retirement or (ii) 3% of the pension benefit being paid. The increase is not payable to individuals (or beneficiaries) in pay status who started to receive benefits from status as vested terminated participants with a right to a deferred benefit.
Miscellaneous	
• Maximum compensation	The plan was frozen as of September 30, 2016.
• Maximum benefits	The plan was frozen as of September 30, 2016.

Schedule SB, Part V — Summary of Plan Provisions

Hercules Members
Heritage BetzDearborn Employees

Key Provisions	Averaging period for pay of three years extends one additional month for each month that the individual is employed beyond January 1, 2005. The 51% lump sum provision is available to new retirees based on benefits earned through the end of 2004. Employees hired on or after January 1, 2005 do not become participants in the plan.
Effective date and plan year	Original plan: January 1, 1953. Merged into Hercules Pension Plan January 1, 1999 Restated plan: January 1, 2002
Status of the plan	The plan has no future benefit accruals and new employees are not eligible to participate in the plan once they satisfy the participation requirements.
Significant events that occurred during the year	None
Definitions	
• Participation	January 1 or July 1 following attainment of age 21 and completion of one year of service.
• Employee contributions	None
• Credited service	Each year in which a participant completes 1,000 hours. Effective January 1, 2005, each month in which earnings are accrued.
• Pensionable earnings	Salary or wages including shift premium, overtime, incentive, commissions, bonuses, holidays, vacations and non-occupational and temporary occupational disability benefits paid to an employee up to the first day of the calendar month following date of retirement or termination.
• Final average earnings	Average annual earnings for the highest three consecutive years excluding those years in which the participant did not complete a year of service. Effective January 1, 2005, average monthly earnings for each year of service from the later of January 1, 2002 or date of hire.
• Covered Compensation	35-year average of Social Security wage bases ending with the year the participant attains Social Security Retirement Age.
• Social security integration point	One-half of the Social Security tax base in effect for 12 months immediately prior to the effective date of retirement or termination month.

Schedule SB, Part V — Summary of Plan Provisions

Normal retirement	
• Eligibility	Attain age 65 with five years of participation.
• Benefit	Prior to January 1, 2005: (1) + (2) − (3): 1.2% of Final Average Earnings multiplied by Credited Service up to a maximum of 35 years. 1. 0.6% of Final Average Earnings exceeding Covered Compensation multiplied by Credited Service up to a maximum of 35 years. 2. W.R. Grace Benefit Effective January 1, 2005: (1) − (2): 1. 1.20% of Final Average Earnings up to the Social Security Integration Point plus 1.60% of Final Average Earnings in excess of such integration point multiplied by years and months of Credited Service. 2. W.R. Grace Benefit
Early Retirement (Prior to January 1, 2005)	
• Eligibility	Attainment of age 55 and completion of ten years of service.
• Benefit	As described normal retirement benefit, but reduced 1/180 for each of the first 60 months and 1/300 for each of the next 60 months commencement precedes Normal Retirement Date.
Rule-of-85 early retirement	
• Eligibility	Attainment of age 55 and age plus service equals at least 85 years; also, certain individuals who terminate by October 2000 are deemed to have satisfied Rule of 85.
• Benefit	As described in normal retirement benefit, but (1) is reduced 1/240 for each month commencement precedes age 60, and in (2) is reduced 1/180 for each of the first 60 months and 1/300 for each of the next 60 months commencement precedes Normal Retirement Date.
Early Retirement (effective January 1, 2005)	
• Eligibility	Unreduced: Attainment of age 60 and completion of ten years of Service. Reduced: Attainment of age 55 and completion of ten years of Service.
• Benefit	Unreduced: As described in normal retirement benefit with no adjustment. Reduced: As described normal retirement benefit, but reduced for each month by which the date of retirement precedes age 60. The reduction is

Schedule SB, Part V — Summary of Plan Provisions

	equal to 150% divided by an individual's Service for each year prior to age 60. The maximum annual reduction is 5%.
Rule-of-85 Minimum	
• Eligibility	Attainment of age 55 and age plus service equals at least 85 years; also, certain individuals who terminate by October 2000 are deemed to have satisfied Rule of 85.
Benefit	As described normal retirement benefit using earnings and service as of December 31, 2004, but (1) is reduced 1/240 for each month commencement precedes age 60, and in (2) is reduced 1/180 for each of the first 60 months and 1/300 for each of the next 60 months commencement precedes Normal Retirement Date.
Deferred vested	
• Eligibility	Five years of vesting service.
• Benefit	As described in normal retirement benefit.
Disability	
• Eligibility	Not applicable
• Benefit	None (continued service credit while receiving benefits under Company long-term disability plan).
Pre-retirement death	
• Eligibility	Spousal beneficiaries of active participants who are vested; also, spousal beneficiaries of vested terminated participants.
• Benefit	Benefit that would have been payable to beneficiary under the 50% contingent annuity option if the participant elected retirement on his date of death (or if the participant had terminated employment on his date of death and commenced benefits on the earliest possible date).
Post-retirement death	None except as elected by optional forms of benefits.
Postponed retirement	
• Eligibility	Employee option
• Benefit	As described normal retirement benefit based on earnings and service at actual retirement date.
Form of benefits	

Schedule SB, Part V — Summary of Plan Provisions

• Automatic form for unmarried participants	Life annuity
• Automatic form for married participants	50% joint and survivor annuity, actuarially reduced.
• Optional forms	50%, 75% and 100% joint and survivor annuities and a 5-year certain and continuous annuity. A 51% lump sum combined with a 49% annuity is available on the benefits earned through the end of 2004.
• Optional form conversion factors	5% and 417(e) applicable mortality
Miscellaneous	
• Maximum compensation	The plan was frozen as of September 30, 2016.
• Maximum benefits	The plan was frozen as of September 30, 2016.

Schedule SB, Part V — Summary of Plan Provisions

Benefits included or excluded

Unless noted below, all benefits provided by the plan are included in this valuation:

- **Most recent plan amendments included (Ashland Hercules Pension Plan, Ashland Hercules Pension Plan II):** The Ashland Hercules Pension Plan document as amended through September 30, 2019.
- **Plan amendments excluded:** None
- **Internal Revenue Code limitations:** The limitations of Internal Revenue Code Section 415(b) and 401(a)(17) have been incorporated into our calculations.
- **IRC Section 416 rules for top-heavy plans:** We did not test whether the Ashland Hercules Pension Plan or the Ashland Hercules Pension Plan II are top-heavy (when the present value of benefits for key employees equals or exceeds 60 percent of the present value for all participants). However, we expect that the Ashland Hercules Pension Plan and the Ashland Hercules Pension Plan II are not top-heavy due to the large number of rank-and-file participants; therefore, the funding target and target normal cost do not reflect any liability for top-heavy benefit accruals.

Plan provisions specific to funding

Additional benefits included or excluded

- **IRC Section 436 benefit restrictions:**
  - *Unpredictable contingent event benefits:* This valuation excludes restricted contingent event benefits that occurred before the valuation date but includes contingent event benefits which are expected to occur on or after the valuation date regardless of anticipated funding-based limitations.
  - *Plan amendments:* See above.
  - *Prohibited payments:* Limitations on prohibited benefits (if any) are reflected for annuity starting dates before the valuation date but are ignored for annuity starting dates on or after the valuation date.
  - *Benefit accruals:* The Ashland Hercules Pension Plan and the Ashland Hercules Pension Plan II are frozen and therefore do not have benefit accruals.
- **Unpredictable contingent event benefits:** The plan does not have any unpredictable contingent event benefits.

Plan provision changes since prior valuation

None.

Schedule SB, Line 32 — Schedule of Amortization Bases

The total shortfall amortization charge is the sum of the individual shortfall amortization installments for each plan year since the IRC Section 430 changes made by the Pension Protection Act of 2006 (PPA) took effect for the plan. Although an individual shortfall amortization installment can be negative, the combined shortfall amortization charge cannot be less than $0.

SHORTFALL BASES					
YEAR ESTABLISHED		OUTSTANDING BALANCE	YEARS REMAINING		2021 INSTALLMENT
2019	$	210,893,275	13	$	21,660,849
2020		(53,174,575)	14		(5,191,111)
2021		(72,505,781)	15		(6,760,553)
Total	$	85,212,919		$	9,709,185

Schedule SB, line 24 — Change in Actuarial Assumptions

Actuarial Assumption Changes Since Prior Valuation

- The expected expenses changed from $4,293,396 to $4,335,063.
- The expected investment return assumption changed from 3.69% for the 2020 plan year to 3.48% for the 2021 plan year.