DOE Sustainability Data Verification Sample Site

Fiscal Year 2022

U.S. Department of Energy
Sustainability Performance Division

Contents

Fugitives and Refrigerants Q2 FY22

Point of Contact (POC)	
Name	Leslie Knope
Job Title	Sustainability Manager
Email Address	Leslie.Knope@doe.gov
Phone Number	(202) 123-4567

Table 1. Mixed Refrigerant totals.

Chemical	Purchases Used to Charge Equipment	Total Full Capacity of New Equipment	Quantity Used to Service Equipment	Total Full Capacity of Retiring Equipment	Recovered from Retiring Equipment	Amount
R-22	73	4				69
R-134a			113		77	36
R-404A	96					96
R-407C	50					50
R-123		5				-5

Table 2. Documented usage versus Dashboard reported usage.

Chemical	Documented lbs.	Dashboard lbs.	Lbs. Difference	Notes
R-22	69	69	No discrepancy	
R-134a	36	36	No discrepancy	
R-404A	96	96	No discrepancy	
R-407C	50	100	50 lbs.	Entered Dashboard report amount incorrectly. Submitted a change request to correct the amount to 50 lbs, as documented in Table 1.
R-123	-5	-5	No discrepancy	

I. Methodology Overview

Mixed refrigerants are kept in a centralized secured location for laboratory use. Each refrigerant container has a separate log associated with it (e.g., R-22 Log). The simplified material balance approach is used to calculate the mixed refrigerant usage. Whenever a refrigerant is used, the amount is tracked. Purchases, acquisitions, sales, and distributions are also logged.

Information from these logs are then totaled and compiled into *Table 1* which notes the pounds of each chemical that were added or removed from inventory during the fiscal year. These amounts reflect the

information that was entered into the Dashboard. *Table 2* depicts the documented use of each chemical, the amount entered into the Dashboard, and discrepancies between the two values, if any.

II. Calculations & Assumptions

The simplified material balance approach is used to calculate chemical totals. All chemicals are totaled in pounds, and there are no additional conversions needed in calculating fugitive and refrigerants besides addition and subtraction used in the simplified material balance approach.

Attachments:

R-134a Log (PDF)
R404A Log (PDF)
R-407C Log (PDF)
R-123 Logs (PDF)

Potable Water FY22

Point of Contact (POC)	
Name	Tom Haverford
Job Title	Utilities Manager
Email Address	Tom.Haverford@doe.gov
Phone Number	(202) 789-1234

Table 3. Potable water use values in documentation compared to reported values.

Documented Usage	Dashboard Usage	% Difference
765.43 mGAL	765.43 mGAL	0%

Table 4. Potable water cost values in documentation compared to reported values.

Documented Cost	Dashboard Cost	% Difference
$993,893.78	$993,893.78	0%

I. Methodology Overview

Sample site's Contractor pumps raw water from the Blue River to the site via a set of pipelines. The water is treated on-site and produces potable water for the site. Water gallons are tracked using a set of water meters from the river and in the Treatment Plant. Potable water production data is compiled from Monthly Operational Reports that are part of Sample Site's Public Water System permit. For cost estimates, water treatment chemicals, labor cost, and raw water pump electric cost are compiled to calculate a total cost (see below).

Sample site also purchases potable water from Potomac Springs. Sample site is sent a monthly invoice for purchased 5-gallon jugs and 24 packs of 16-ounce bottles.

II. Calculations & Assumptions

Potable Water Produced On-site

Sample site sends Monthly Operational Reports to the State government detailing the gallons of potable water produced (table 5).

Table 5. Potable water produced for FY22.

Month	**Potable Water Produced (gallons)**
October-21	52,992,000
November-21	49,460,000
December-21	55,043,000
January-22	53,957,000
February-22	64,752,000

March-22	72,930,000
April-22	70,867,000
May-22	73,759,000
June-22	70,670,000
July-22	76,167,000
August-22	65,400,000
September-21	59,400,000
Total	765,397,000

Table 6. Water Treatment Chemical, Labor, and Raw Water Pump Cost

Input	**Purchase Order**	**Cost**
Lime	PO-061975	$49,695.40
Polymer Tote	PO-061965	$5,876.64
Chlorine Cylinder – 1 ton	PO-033979	$45,450.93
Chlorine Cylinder – 150 #	PO-061215	$5,235.59
Sodium Hexametaphosphate	PO-036585	$29,785.00
Sodium Thiosulfate	PO-062023	$58,482.20
Water Treatment Labor	PO-095623	$520,457.60
Raw Water Pumps/Electrical	TVA Invoices	$225,303.94
Total Cost: $940,287.30		

The cost per gallon is calculated by dividing the total cost by the number of gallons produced:

$$\frac{\$940{,}287.30}{765{,}397{,}000\ gallons} = \$0.00123\ per\ gallon$$

The cost per quarter is found by multiplying the potable water produced (in gallons) by the cost per gallon (above). For entry into the Dashboard, the gallons of water produced are divided by one million to get millions of gallons (mGAL) of water produced.

Table 7. Total produced potable water in gallons, millions of gallons, and cost in dollars.

FY2022	**Potable Water Produced (Gallons)**	**Potable Water Produced (mGAL)**	**Calculated Cost/quarter ($)**
1st Quarter	157,495,000	157.495	$193,482.01
2nd Quarter	191,639,000	191.639	$235,427.78
3rd Quarter	215,296,000	215.296	$264,490.32
4th Quarter	200,967,000	200.967	$246,887.19

Purchased Potable Water

Sample site purchases potable water from Potomac Springs. The site receives a monthly invoice for purchased 5-gallon jugs and packs with 24 bottles that hold 16-ounces of water. These were compiled for reporting to the Dashboard.

The individual jugs are compiled and multiplied by 5 to give total gallons received for the month. Take for example December 2021:

$$333\ jugs * \frac{5\ gallons}{jug} = \ 1{,}665\ gallons$$

The water bottle packs are multiplied by 24 bottles, that are multiplied by 16.9 ounces to give total ounces. Those ounces are then converted to gallons by dividing by 128 ounces/gallon. An example for March 2022 would be:

$$659\ packs\ of\ water * 24\frac{bottles}{pack} * 16.9\frac{ounces}{bottle} = 267{,}290.40\ ounces$$

$$\frac{267{,}290.40\ ounces}{128\frac{ounces}{gallon}} = 2{,}088.21\ gallons$$

Table 8. Purchase Potable Water Cost

Date	**Cost ($)**
October-21	$5,235.41
November-21	$5,243.05
December-22	$3,584.38
January-22	$1,560.14
February-22	$3,300.14
March-22	$2,587.91
April-22	$3,698.85
May-22	$2,351.15
June-22	$6,234.25
July-22	$7,933.13
August-22	$5,666.50
September-22	$6,211.57

Table 9. Total 5 Gallon Jugs and water bottles

Date	**5 Gallon Jugs**	**Calculated Gallons**	**Bottled Water Packs**	**Calculated ounces**	**Calculated Gallons**
October-20	265	1,325.00	358	145,204.80	1,134.41
November-20	335	1,675.00	265	107,484.00	839.72
December-20	333	1,665.00	125	50,700.00	396.09
January-21	187	935.00	356	144,393.60	1,128.08
February-21	260	1,300.00	214	86,798.40	678.11
March-21	231	1,155.00	659	267,290.40	2,088.21
April-21	428	2,140.00	327	132,631.20	1,036.18
May-21	322	1,610.00	325	131,820.00	1,029.84
June-21	323	1,615.00	358	145,204.80	1,134.41
July-21	647	3,235.00	485	196,716.00	1,536.84
August-21	456	2,280.00	198	80,308.80	627.41
September-21	345	1,725.00	341	138,309.60	1,080.54

Table 10. Quarterly Total usage and cost of purchased water

FY2022	Quarterly Purchased Water Cost ($)	Quarterly Purchased Water (Gallons)	Quarterly Purchased Water (Million Gallons)
1st Quarter	14,062.84	7,035.23	0.007035225
2nd Quarter	7,448.19	7,284.39	0.007284394
3rd Quarter	12,284.25	8,565.44	0.008565438
4th Quarter	19,811.20	10,484.80	0.0104848

Table 11. Quarterly Total usage and cost of produced and purchased water

FY2022	Quarterly Water Cost ($)	Quarterly Water (Gallons)	Quarterly Water (Million Gallons)
1st Quarter	207,544.85	157,502,035.23	157.5020352
2nd Quarter	242,875.97	191,646,284.39	191.6462844
3rd Quarter	276,774.57	215,304,565.44	215.3045654
4th Quarter	266,698.39	200,977,484.80	200.9774848
Total	993,893.78	765,430,369.86	765.43

Attachments:
Sample Site Verification Calculations (Excel)
Monthly Operational Reports (PDF)
Water Treatment Chemical, Labor, and Raw Water Pump Receipts (PDF)
Potomac Springs receipts, 5 Gallon Jugs and water bottles (PDF)

Fleet Gasoline FY22

Point of Contact (POC)	
Name	Andy Dwyer
Job Title	Fleet Manager
Email Address	andy.dwyer@doe.gov
Phone Number	(202) 568-1234

Table 12. Fleet gasoline use values in documentation compared to reported values.

Documented Usage	Dashboard Usage	% Difference
9725.79 gallons	9725.79 gallons	0%

Table 13. Fleet gasoline cost values in documentation compared to reported values.

Documented Cost	Dashboard Cost	% Difference
$39,087.34	$39,087.34	0%

Table 14. Fleet diesel use values in documentation compared to reported values.

Documented Usage	Dashboard Usage	% Difference
2442.27 gallons	2442.27 gallons	0%

Table 15. Fleet diesel cost values in documentation compared to reported values.

Documented Cost	Dashboard Cost	% Difference
$11,041.31	$11,041.31	0%

I. Methodology Overview

Sample site has a refueling station located on its main campus, which has gasoline solely for the use of government vehicles and government equipment. Additionally, Sample site has a small fleet of diesel vehicles that are required to purchase fuel off-site and submit usage and purchasing data via WEX Cards to the fleet manager monthly. Sample site's Fleet Manager is responsible for tracking monthly gasoline and diesel usage for FY 2022 (October 2021 through September 2022). The data was compiled into one Excel sheet called "Sample Site Verification Calculations.xlsx".

II. Calculations & Assumptions

Gasoline and Diesel Usage

Sample site's Fleet Manager records all purchases at the site's refueling station and creates a monthly usage report (Table 16).

The total usage in gallons is calculated by dividing the total cost of a given month by the average price of gasoline or diesel for the given month based in EIA data:

$$\frac{\$4{,}271.05}{\$3.38/\text{gallon}} = 1263.62\ gallons\ in\ October\ 2021$$

Table 16. Monthly expenditures for FY22 (Gasoline)

Month	Gasoline cost (dollars)	Gasoline usage (gallons)
October-21	$4,271.05	1263.62
November-21	$2,349.05	673.08
December-21	$2,470.98	724.63
January-22	$3,080.41	903.35
Febraury-22	$2,447.53	677.99
March-22	$3,383.16	783.14
April-22	$3,712.03	881.72
May-22	$4,059.21	892.13
June-22	$3,965.61	871.56
July-22	$3,361.57	738.81
August-22	$3,314.33	728.42
September-22	$2,672.41	587.34
Total	$39,087.34	9725.79

Table 17. Monthly diesel usage for FY22.

Month	Diesel cost (dollars)	Diesel usage (gallons)
October-21	$1,075.98	298.06
November-21	$979.78	262.68
December-21	$789.02	219.17
January-22	$944.52	253.90
Febraury-22	$403.13	100.03
March-22	$1,100.21	215.31
April-22	$956.34	183.56
May-22	$542.08	97.32
June-22	$743.93	134.04
July-22	$1,175.25	227.32
August-22	$909.73	175.96
September-22	$1,421.33	274.92
Total	$11,041.31	2442.27

The cost and usage per quarter were found by compiling each quarter independently. This data is then used to populate FAST. This data is then exported to the DOE Sustainability Dashboard.

Table 18. Quarterly total usage and cost of purchased gasoline and diesel

FY2022	Quarterly Gasoline Cost (dollars)	Quarterly Diesel Cost (dollars)	Quarterly Usage Gasoline (Gallons)	Quarterly Usage Diesel (Gallons)
1st Quarter	$9,091.08	$2,844.78	2661.33	779.90
2nd Quarter	$8,911.10	$2,447.86	2364.47	569.24
3rd Quarter	$11,736.85	$2,242.36	2645.41	414.92
4th Quarter	$9,348.31	$3,506.31	2054.57	678.20
Total	$39,087.34	$11,041.31	9725.79	2442.27

Attachments:

Sample Site Verification Calculations (Tab 2 – Fleet)