



Monthly Operating Log (MOL) Daily Operational Data (Calculated Dose Approach)

$$\text{Validated Dose} = \frac{\text{Calculated Dose}}{\text{VF} \times \text{CF}}$$

Calculated Dose = Dose calculated by validated PLC algorithm

VF = Validation Factor

CF = UV intensity sensor Correction Factor.

The CF is only applied if sensors do not meet recommended criteria
(NOTE – a CF will not be needed in most cases)

PWS Name: _____

STU Name: _____

PWSID: _____

STUID: _____

Reporting Period: _____

UV Reactor Number: _____

Maximum Validated Flow Rate: _____

Minimum Validated UVT: _____

Target Log Inactivation: _____

Target Pathogen: _____

Dose Required ($D_{req'd}$): _____

| Operational Data | | | Dose Requirements | | Data at Daily Minimum Validated Dose | | | | | UV Dose Adequacy Determination | Total Off-Specification |
|------------------|----------------|-----------------------|---|---|--|------------------------|---|-----------------|---------|--|---|
| Day | Run Time (hrs) | Total Production (MG) | $D_{req'd}^1$ (mJ/cm ²) [A] | UV intensity Sensor Correction Factor ² [B] | Calculated Dose ³ (mJ/cm ²) [C] | Validation Factor (VF) | Daily Minimum Validated Dose ⁴ ((C)/(VF)/[B]) (mJ/cm ²) [D] | Flow Rate (MGD) | UVT (%) | Validated Dose > $D_{req'd}$ ([D] > [A]) (Y/N) | Total Off-Specification Volume ⁵ (MG) |
| 1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |

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|-------|--|--|--|--|--|--|--|--|--|--|--|
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |
| 21 | | | | | | | | | | | |
| 22 | | | | | | | | | | | |
| 23 | | | | | | | | | | | |
| 24 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | | | | | | | | | | | |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 31 | | | | | | | | | | | |
| Min | | | | | | | | | | | |
| Max | | | | | | | | | | | |
| Total | | | | | | | | | | | |

¹ D_{req'd} is the dose required for the target log inactivation without a VF or Sensor CF applied and can be found in the Ultra-Violet Disinfection Guidance Manual, Table 1.4.

² Sensor CF will be 1 if no CF is used.

³ Calculated dose is calculated using the dose algorithm in the PLC.

⁴ The Validated Dose is the dose based on the calculated dose normalized on the Validation Factor and Correction Factor.

⁵ Off-specification worksheet (Figure 6.5) should be used to calculate any daily off-specification volume. If UVT, flowrate, and/or Validated Dose off-specification occur simultaneously, the off-specification time should only be counted once.

I certify under penalty of law that I have personally examined and am familiar with the data submitted in this MOR; that the data in this report is true, accurate and complete; and I am aware that falsification thereof could result in the imposition of fines and penalties including revocation of my certification as a public water system operator.

| | | |
|---|-----------------------------------|------|
| Name of Certified Operator and Certification Number | Signature of Responsible Official | Date |
|---|-----------------------------------|------|



Environmental Protection Agency

Division of Drinking and Ground Waters



Monthly Operating Log (MOL) Off-Specification Calculation Worksheet

PWS Name: _____

STU Name: _____

PWSID: _____

STUID: _____

Reporting Period: _____

(Note – This sheet should only be used when an off-specification event occurs)

| Date ¹ | Reactor Number | Process Train Number | Off-Specification Event Description ³ | Flow Rate ² (gpm) [A] | Time (minutes) [B] | Off-Specification Volume (gallons) ([A]*[B]) |
|---|----------------|----------------------|--|--|----------------------------|--|
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| Total Off-Specification Flow for the Day⁴ | | | | | | |

¹ A worksheet must be completed for each reactor with an off-specification event. All off-specification events in a day can be included in one row. Off-specification events on different days must be reported on separate rows.

² This worksheet assumes the flowrate was constant during the off-specification event. Off-specification event volume can also be obtained from a flow totalizer.

³ Off-specification event can be caused by UVT, flowrate, intensity, or validated dose being out of the validated range.

⁴ The total off-specification flow should be transferred to Figure 6.3 or 6.4 if any off-specification events occurred.

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Monthly Operating Log (MOL) UV Sensor CF Calibration Worksheet

Calibration Ratio: $\left(\frac{S_{Duty}}{S_{Ref}} \right)$

Sensor Correction Factor: $\left(\frac{S_{Duty}}{S_{Ref}} - 0.2 \right)$

where S is the measured intensity

PWS Name: _____
 STU Name: _____
 PWSID: _____
 STUID: _____

Reporting Period: _____
 CF used (if applicable): _____

| Date | Reactor Number | Duty Sensor Number | UV Sensor Operating Time (hrs) | Reference Sensor Serial Number | Duty UV Sensor Reading [A] | Reference UV Sensor Reading [B] | Calibration Ratio ([A]/[B]) | Calibration Ratio ≤ 1.2 (Y/N) | Sensor Correction Factor Used | If CF is used, Calibration Ratio - 0.2 ≤ CF (Y/N) |
|------|----------------|--------------------|--------------------------------|--------------------------------|------------------------------|-----------------------------------|-----------------------------|-------------------------------|-------------------------------|---|
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Certification:

Number of UV sensor calibrated _____
 Number of UV sensors out of calibration _____
 Number of UV sensor(s) sent to manufacturer to be recalibrated as documented below _____

UV intensity sensors sent to manufacturer for calibration (Add additional rows as necessary):

| Sensor Serial Number | Unit No. | Date Sent | Date Put Back in Service |
|----------------------|----------|-----------|--------------------------|
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|---|-----------------------------------|------|



Monthly Operating Log (MOL) Monthly UVT Analyzer Calibration Check Log

PWS Name: _____

STU Name: _____

PWSID: _____

STUID: _____

Reporting Period: _____

UVT Analyzer Number: _____

$$|UVT_{\text{on-line}}(\%) - UVT_{\text{bench}}(\%)| \leq 2\% \text{ UVT}$$

UVT Analyzer Calibration Report (Make Additional Copies of Form as Necessary)

| UVT Analyzer Number | Week Number | Dates | On-line Reading (%) [A] | Grab Sample Result (%) [B] | Difference (%) ([A]-[B]) | Difference ≤ 2% UVT? (Y/N) |
|---------------------|-------------|-------|------------------------------|---------------------------------|---------------------------------|-------------------------------|
| | 1 | | | | | |
| | 2 | | | | | |
| | 3 | | | | | |
| | 4 | | | | | |
| | 5 | | | | | |

Certification:

All Calibration checks were within the acceptable tolerance during this month.

Recalibration was required and is documented below.

On-Site Calibration.

Manufacturer Calibration.

UVT Analyzer Calibration:

| UVT Analyzer Number | On-site or manufacturer recalibration? | Date Recalibration Performed | Recalibration Successful? (Y/N) | Initials (On-site Calibration Only) |
|---------------------|--|------------------------------|---------------------------------|-------------------------------------|
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| | | |
|---|-----------------------------------|------|
| Name of Certified Operator and Certification Number | Signature of Responsible Official | Date |
|---|-----------------------------------|------|