Supplementary Material for "*LungDepo*: *Modelling the regional particle deposition in the human lung via the Enalos Cloud Platform*"

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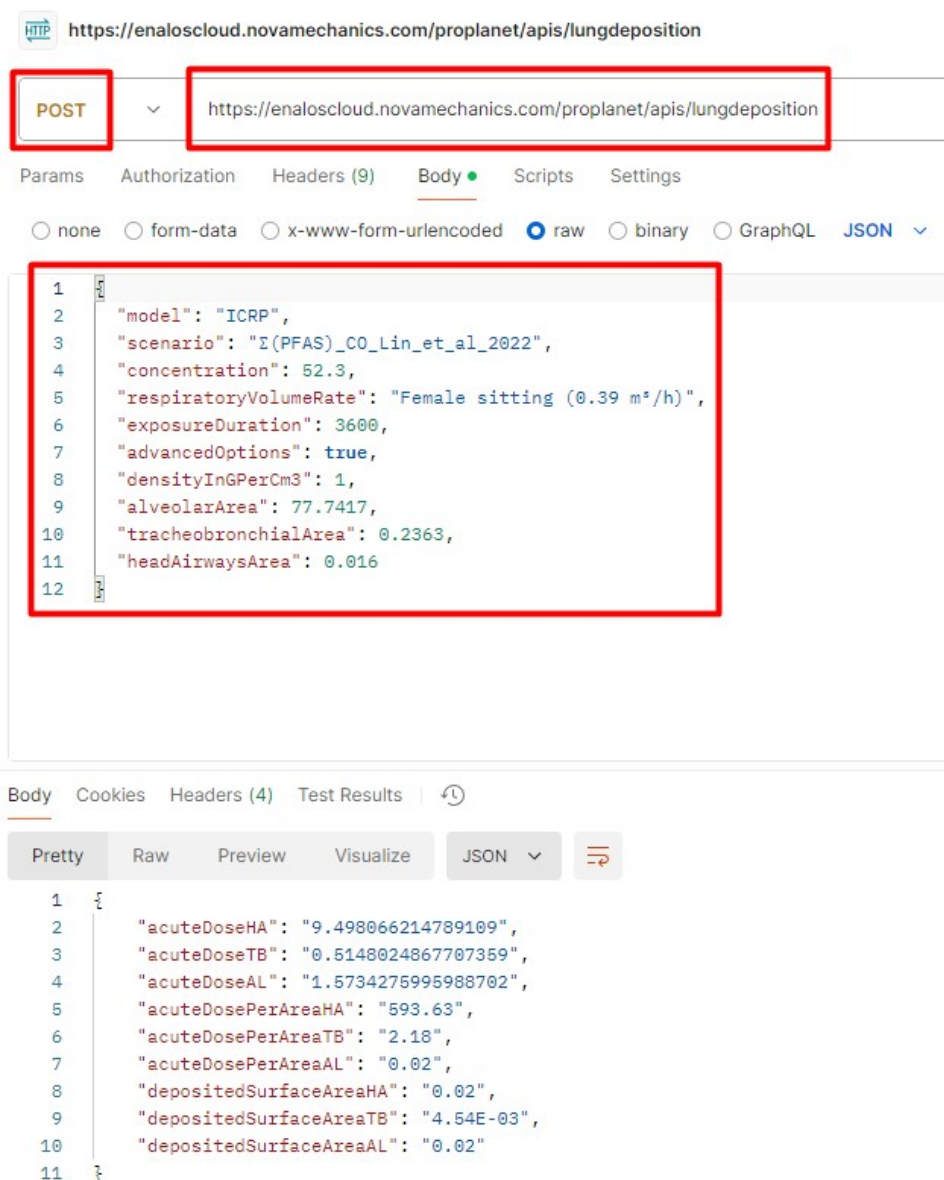
S1. REST APIs

Figure S1. Using Postman to test the functionality of a 'POST' request for the endpoint
https://enaloscloud.novamechanics.com/proplanet/apis/lungdeposition, including input data and response validation.

Figure S2. Using Swagger to perform a /lungdeposition POST request, including input data and response validation.
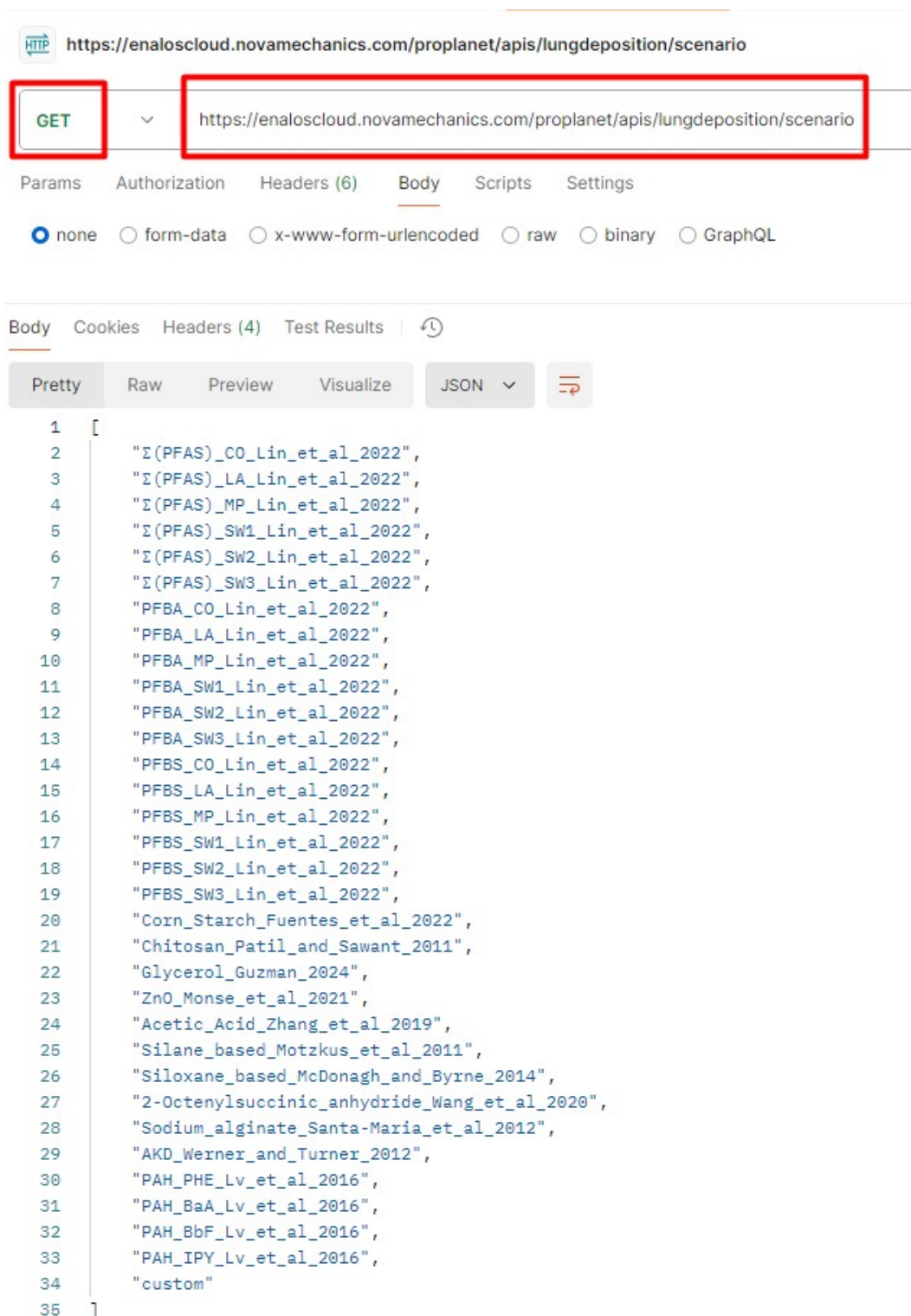
Figure S3. Using Postman to test the functionality of a 'GET' request for the endpoint https://enaloscloud.novamechanics.com/proplanet/apis/lungdeposition/scenario, verifying the request parameters and the expected response.

Figure S4. Using Postman to test the functionality of a 'GET' request for the endpoint https://enaloscloud.novamechanics.com/proplanet/apis/lungdeposition/respiratoryVolumeRate, verifying the request parameters and the expected response.

S2. API robustness tests

https://enaloscloud.novamechanics.com/proplanet/apis/lungdeposition

POST https://enaloscloud.novamechanics.com/proplanet/apis/lungdeposition

Params   Authorization   Headers (9)   Body ●   Pre-request Script   Tests   Settings

○ none   ○ form-data   ○ x-www-form-urlencoded   ● raw   ○ binary   **JSON** ∨

```json
{
    "model": "ICRP",
    "scenario": "Σ(PFAS)_CO_Lin_et_al_2022",
    "concentration": 100000,
    "respiratoryVolumeRate": "Female sitting (0.39 m³/h)",
    "exposureDuration": 360000000,
    "advancedOptions": true,
    "densityInGPerCm3": 10,
    "alveolarArea": 100000,
    "tracheobronchialArea": 200000,
    "headAirwaysArea": 1000
}
```

Body   Cookies   Headers (4)   Test Results

Pretty   Raw   Preview   Visualize   JSON ∨

```json
{
    "acuteDoseHA": "1.8160738460399828E9",
    "acuteDoseTB": "9.84325978529132E7",
    "acuteDoseAL": "3.008465773611608E8",
    "acuteDosePerAreaHA": "1.82E+06",
    "acuteDosePerAreaTB": "492.16",
    "acuteDosePerAreaAL": "3,008.47",
    "depositedSurfaceAreaHA": "443,356.89",
    "depositedSurfaceAreaTB": "86,835.57",
    "depositedSurfaceAreaAL": "454,019.45"
}
```
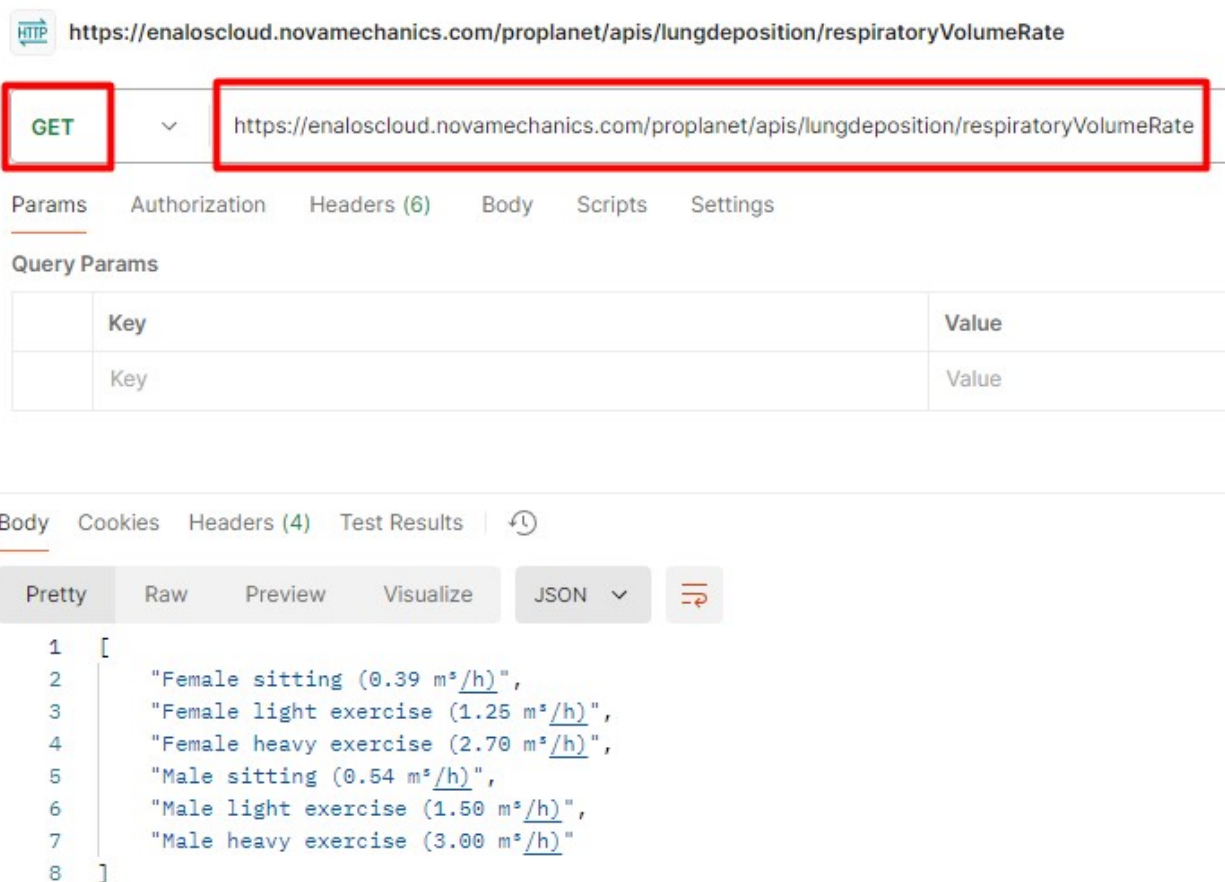
Figure S5. Using Postman to test the functionality of a 'POST' request for the endpoint https://enaloscloud.novamechanics.com/proplanet/apis/lungdeposition, including extremely high input data using the International Commission on Radiological Protection (ICRP) model and the response validation.
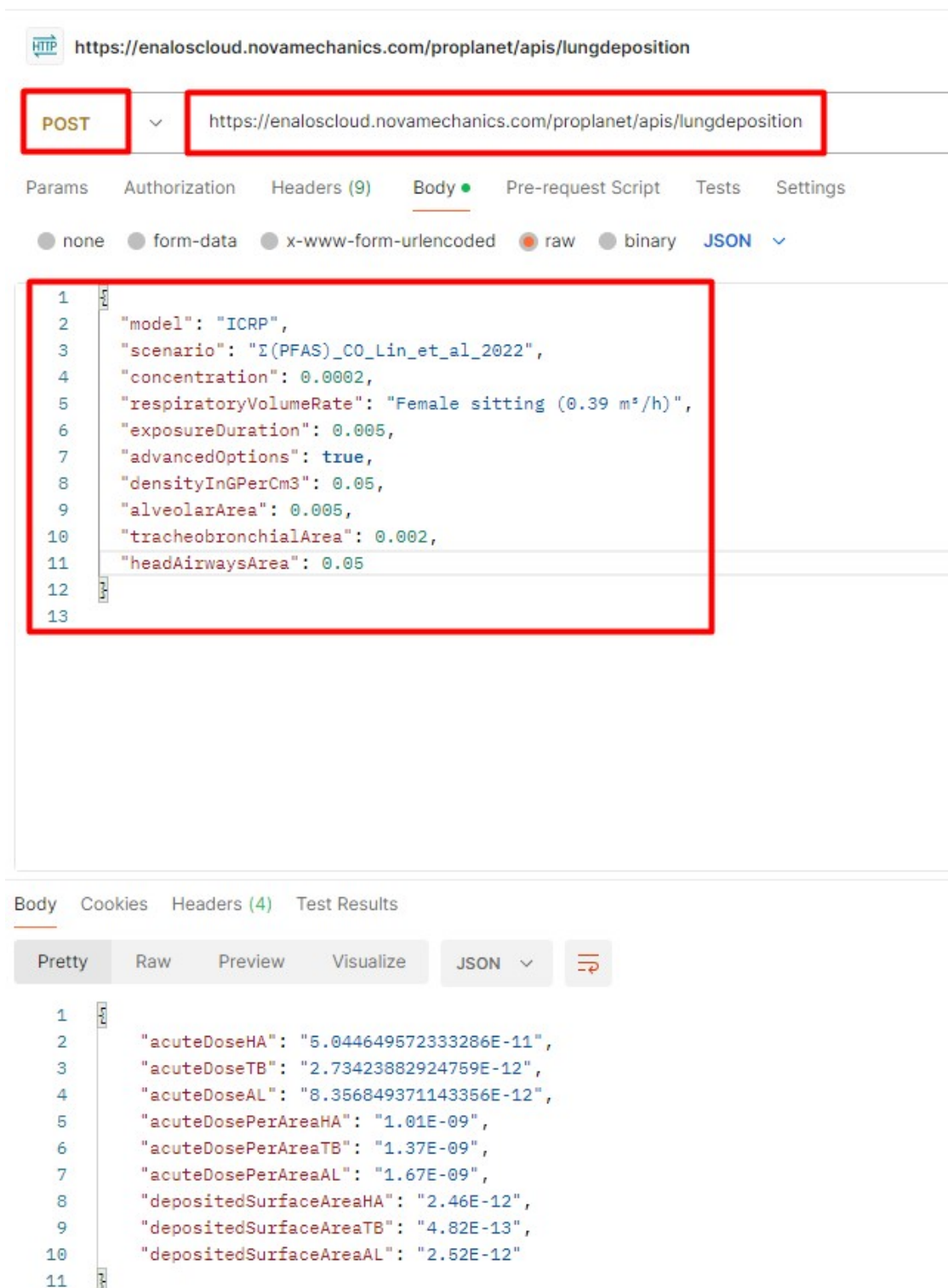
https://enaloscloud.novamechanics.com/proplanet/apis/lungdeposition

POST ∨ https://enaloscloud.novamechanics.com/proplanet/apis/lungdeposition

Params   Authorization   Headers (9)   Body ●   Pre-request Script   Tests   Settings

○ none   ○ form-data   ○ x-www-form-urlencoded   ● raw   ○ binary   JSON ∨

```json
{
    "model": "ICRP",
    "scenario": "Σ(PFAS)_CO_Lin_et_al_2022",
    "concentration": 0.0002,
    "respiratoryVolumeRate": "Female sitting (0.39 m³/h)",
    "exposureDuration": 0.005,
    "advancedOptions": true,
    "densityInGPerCm3": 0.05,
    "alveolarArea": 0.005,
    "tracheobronchialArea": 0.002,
    "headAirwaysArea": 0.05
}
```

Body   Cookies   Headers (4)   Test Results

Pretty   Raw   Preview   Visualize   JSON ∨

```json
{
    "acuteDoseHA": "5.044649572333286E-11",
    "acuteDoseTB": "2.73423882924759E-12",
    "acuteDoseAL": "8.356849371143356E-12",
    "acuteDosePerAreaHA": "1.01E-09",
    "acuteDosePerAreaTB": "1.37E-09",
    "acuteDosePerAreaAL": "1.67E-09",
    "depositedSurfaceAreaHA": "2.46E-12",
    "depositedSurfaceAreaTB": "4.82E-13",
    "depositedSurfaceAreaAL": "2.52E-12"
}
```

Figure S6. Using Postman to test the functionality of a 'POST' request for the endpoint https://enaloscloud.novamechanics.com/proplanet/apis/lungdeposition, including extremely low input data using the ICRP model and the response validation.
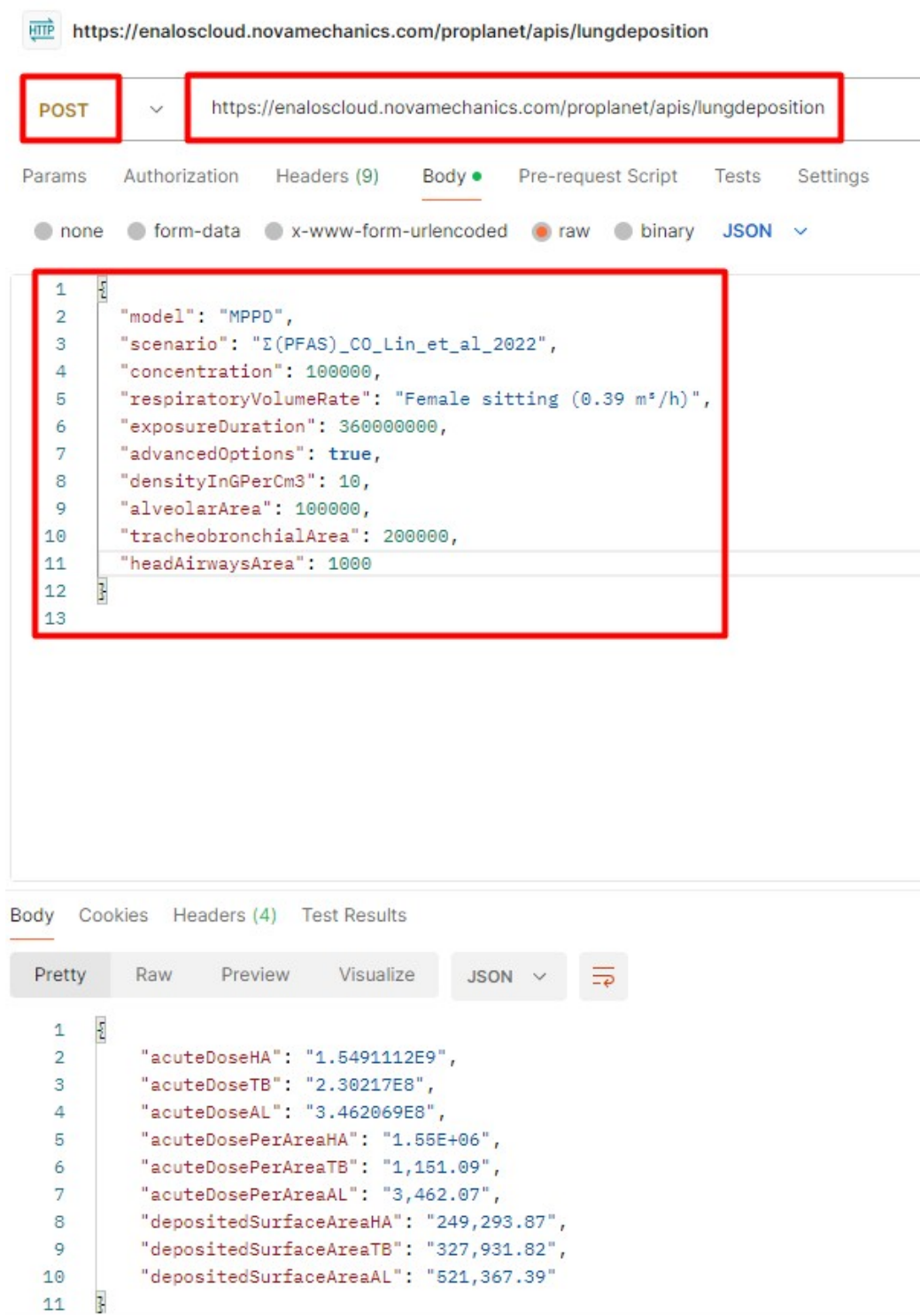
Figure S7. Using Postman to test the functionality of a 'POST' request for the endpoint
https://enaloscloud.novamechanics.com/proplanet/apis/lungdeposition, including extremely high input data using the Multiple-Path Particle Dosimetry (MPPD) model and the response validation.

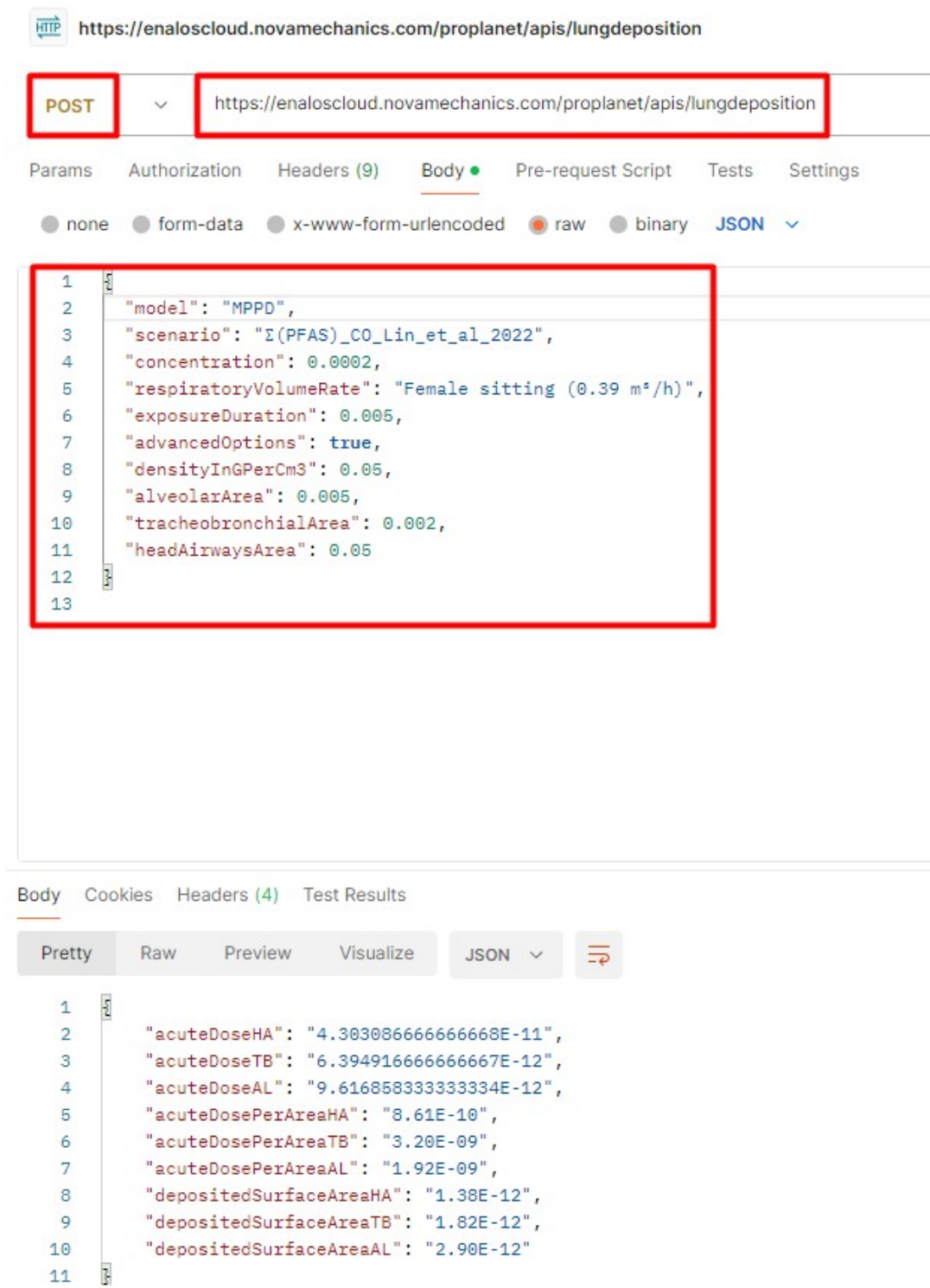https://enaloscloud.novamechanics.com/proplanet/apis/lungdeposition

| POST | ∨ | https://enaloscloud.novamechanics.com/proplanet/apis/lungdeposition |

Params   Authorization   Headers (9)   **Body** •   Pre-request Script   Tests   Settings

◯ none   ◯ form-data   ◯ x-www-form-urlencoded   ● raw   ◯ binary   **JSON** ∨

```
 1  {
 2    "model": "MPPD",
 3    "scenario": "Σ(PFAS)_CO_Lin_et_al_2022",
 4    "concentration": 0.0002,
 5    "respiratoryVolumeRate": "Female sitting (0.39 m³/h)",
 6    "exposureDuration": 0.005,
 7    "advancedOptions": true,
 8    "densityInGPerCm3": 0.05,
 9    "alveolarArea": 0.005,
10    "tracheobronchialArea": 0.002,
11    "headAirwaysArea": 0.05
12  }
13
```

Body   Cookies   Headers (4)   Test Results

Pretty   Raw   Preview   Visualize   JSON ∨   ⇌

```
 1  {
 2    "acuteDoseHA": "4.303086666666668E-11",
 3    "acuteDoseTB": "6.394916666666667E-12",
 4    "acuteDoseAL": "9.616858333333334E-12",
 5    "acuteDosePerAreaHA": "8.61E-10",
 6    "acuteDosePerAreaTB": "3.20E-09",
 7    "acuteDosePerAreaAL": "1.92E-09",
 8    "depositedSurfaceAreaHA": "1.38E-12",
 9    "depositedSurfaceAreaTB": "1.82E-12",
10    "depositedSurfaceAreaAL": "2.90E-12"
11  }
```

Figure S8. Using Postman to test the functionality of a 'POST' request for the endpoint
https://enaloscloud.novamechanics.com/proplanet/apis/lungdeposition, including extremely low input data using the MPPD
model and response validation.

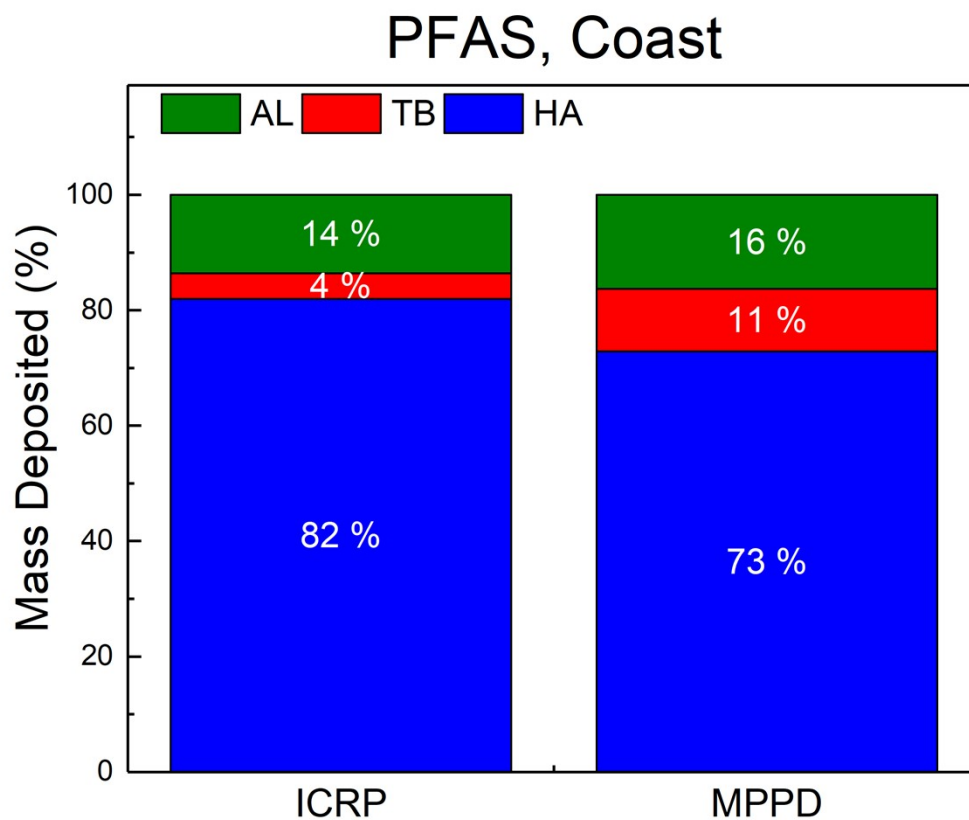## S3. *LungDepo* results regarding mass deposited (%)

Figure S9. Prediction of the mass deposition measured in % of $\sum PFAS$ at coastal site as computed using the ICRP and MPPD models integrated within the *LungDepo w*eb application.
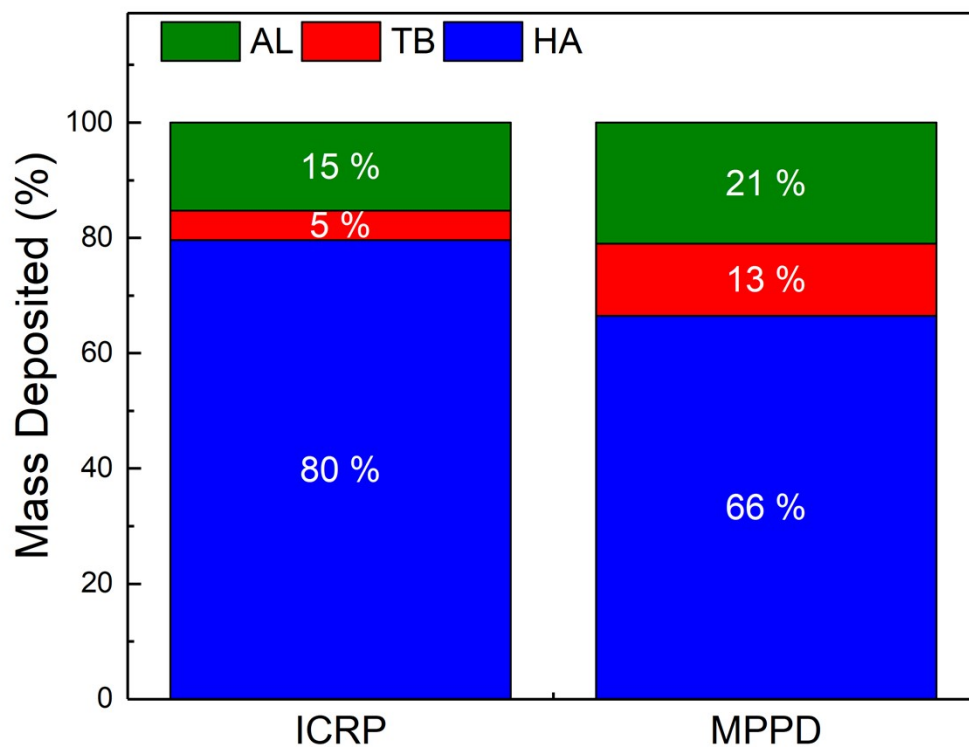
Figure S10. Prediction of the mass deposition measured in % of $\sum PFAS$ at natural reserve site as computed using the ICRP and MPPD models integrated within the *LungDepo w*eb application.
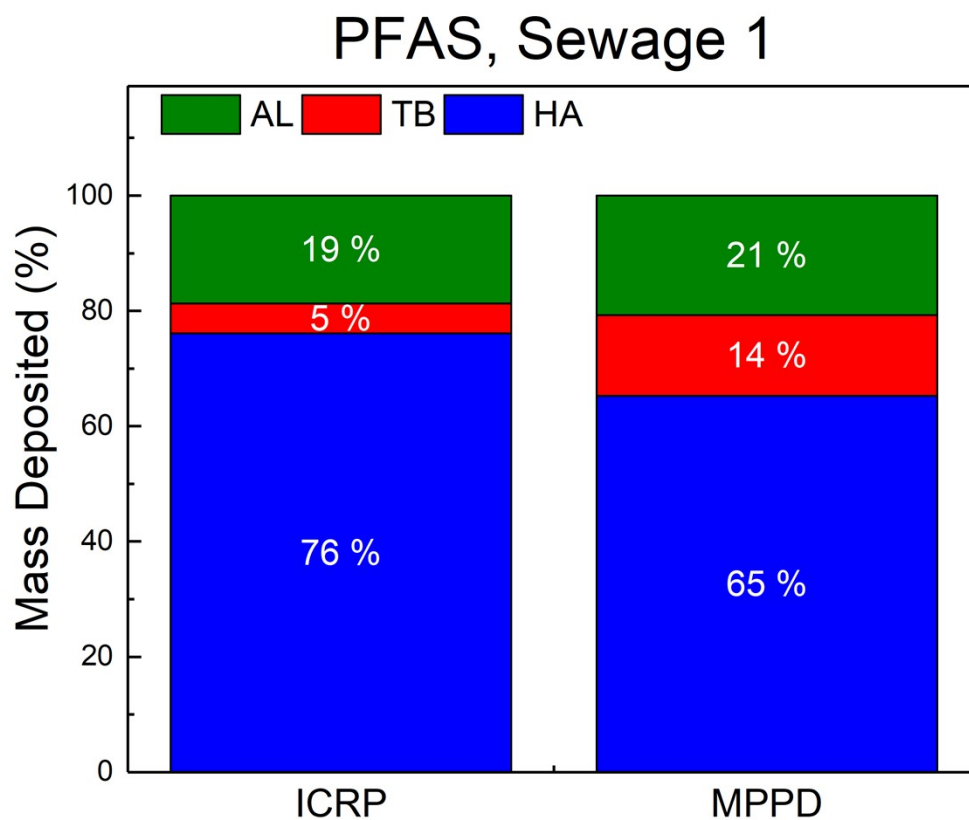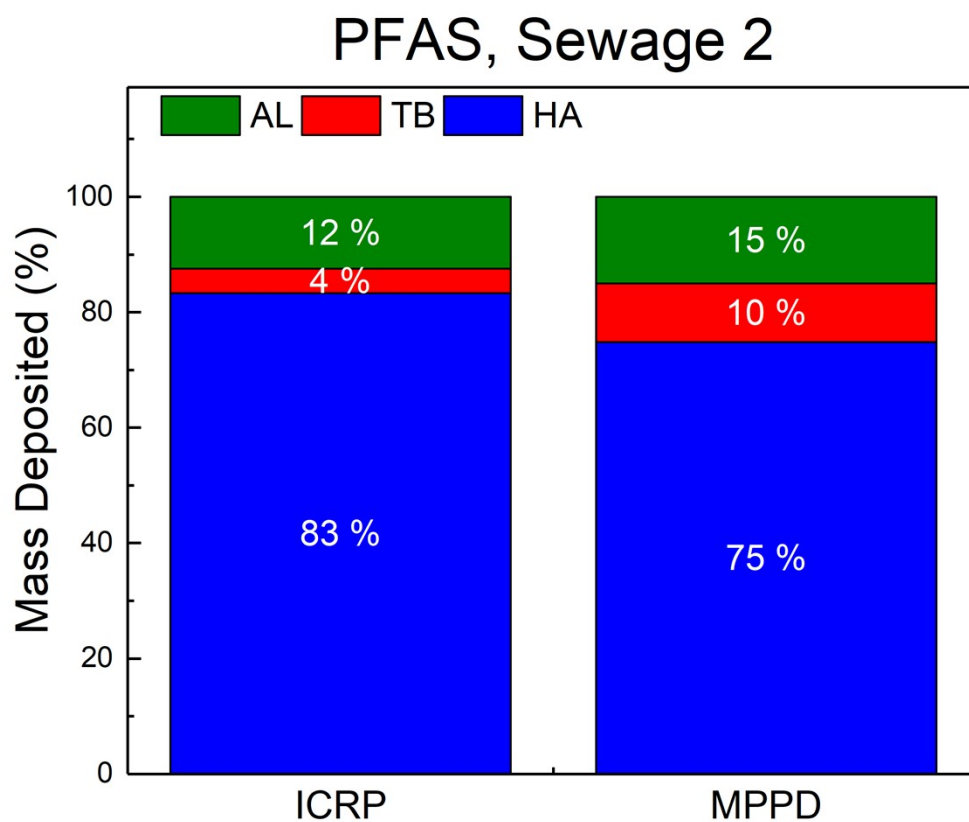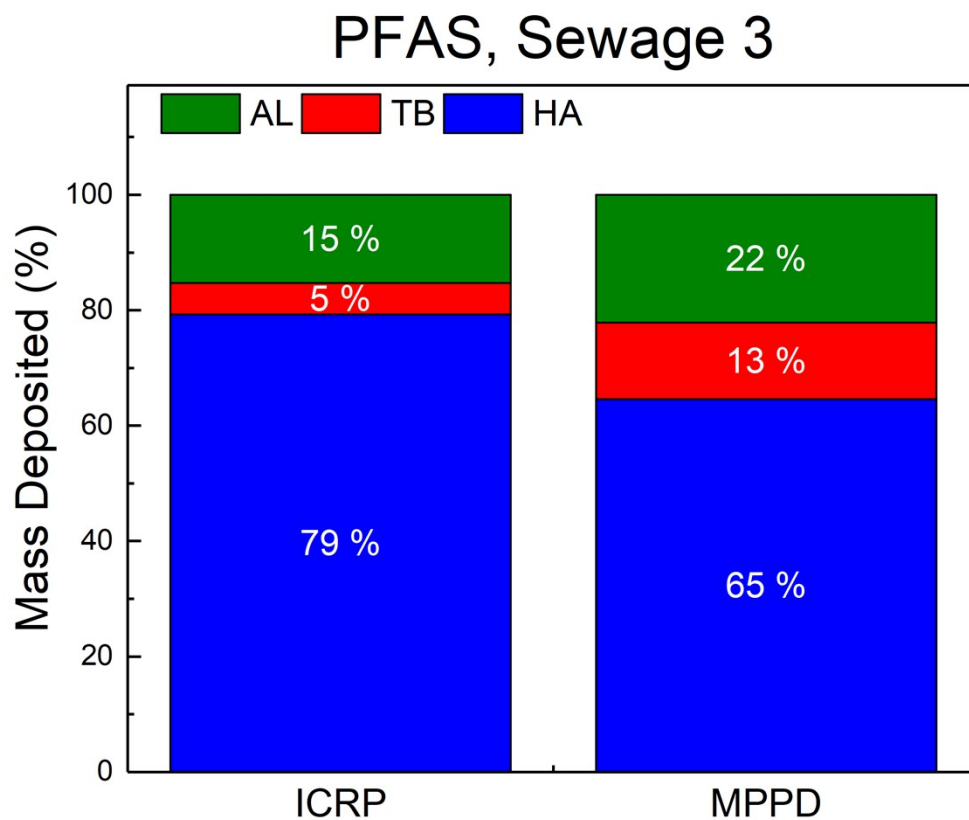
Figure S11. Prediction of the mass deposition measured in % of $\sum PFAS$ at sewage 1 site as computed using the ICRP and MPPD models integrated within the *LungDepo w*eb application.

Figure S12. Prediction of the mass deposition measured in % of $\sum PFAS$ at sewage 2 site as computed using the ICRP and MPPD models integrated within the *LungDepo w*eb application.

Figure S13. Prediction of the mass deposition measured in % of $\sum PFAS$ at sewage 3 site as computed using the ICRP and MPPD models integrated within the *LungDepo w*eb application.

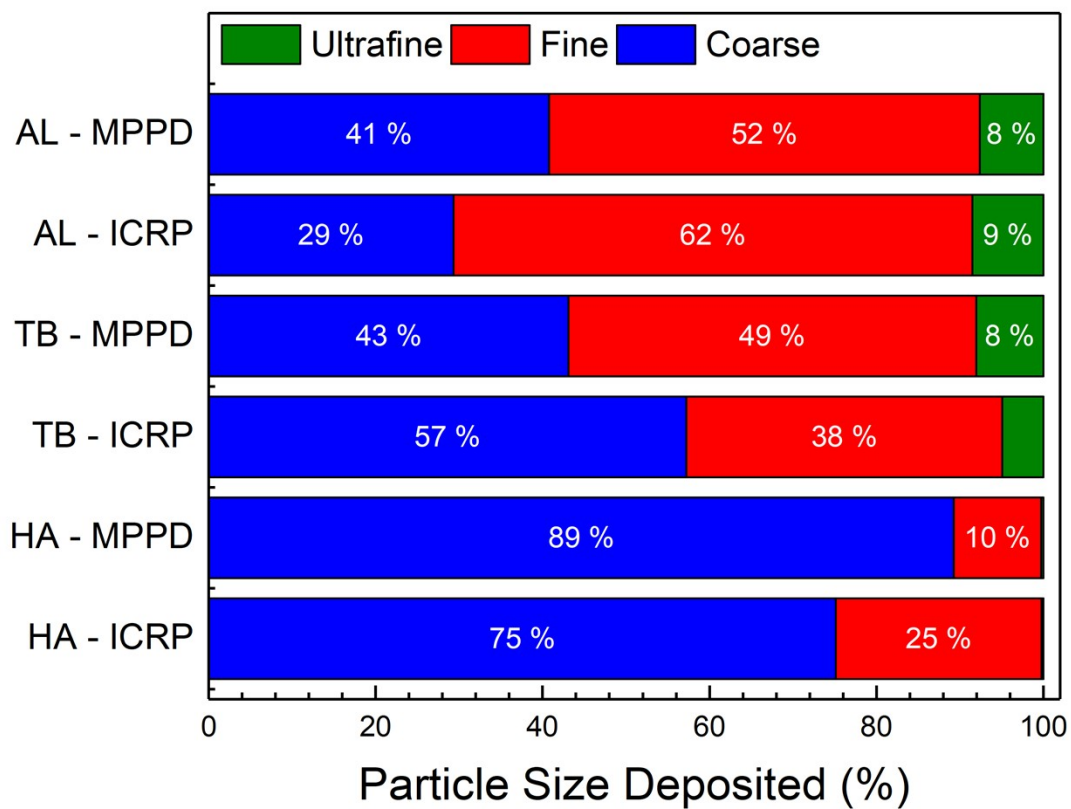**S4.** *LungDepo* **results regarding particle size deposited (%)**
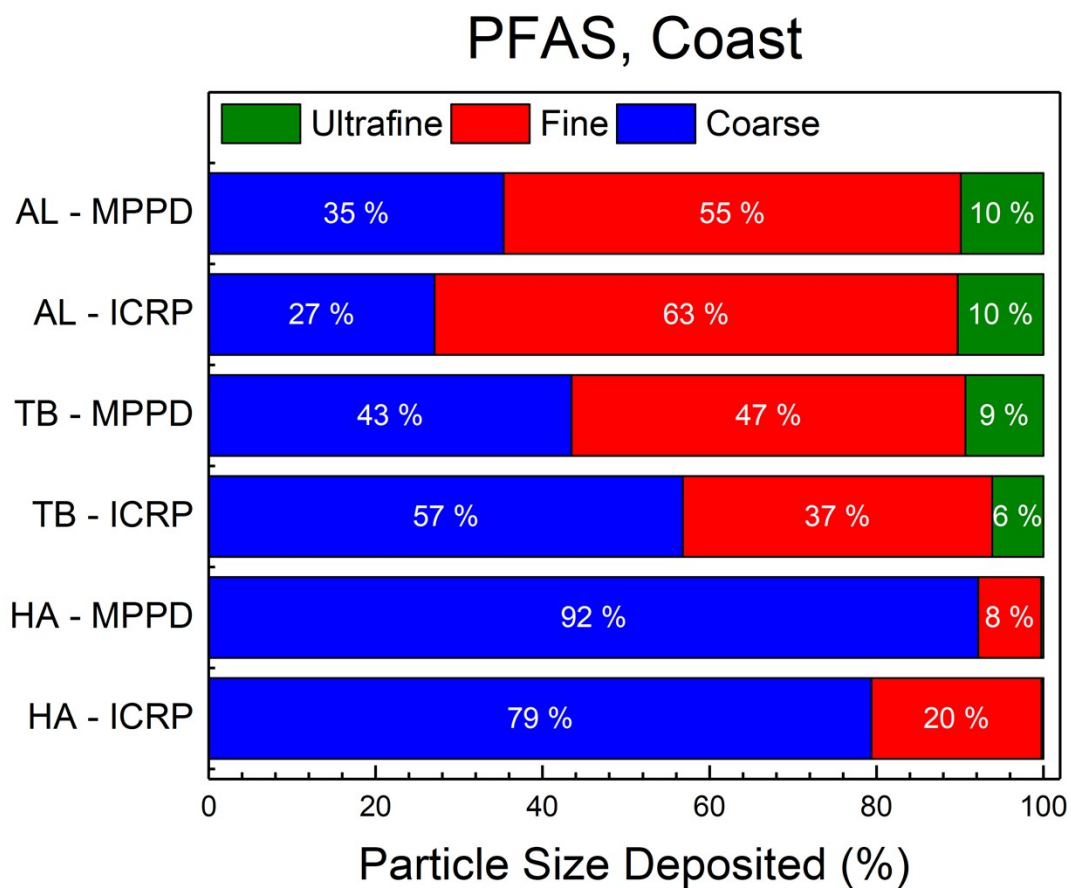
Figure S14. Contributions (expressed as percentages) of inhaled $\sum PFAS$ associated with particles of different sizes (at a coastal site) as calculated using the ICRP and MPPD models integrated within the *LungDepo w*eb application.

Figure S15. Contributions (expressed as percentages) of inhaled $\sum PFAS$ associated with particles of different sizes (at natural reserve site) as calculated using the ICRP and MPPD models integrated within the *LungDepo* web application.
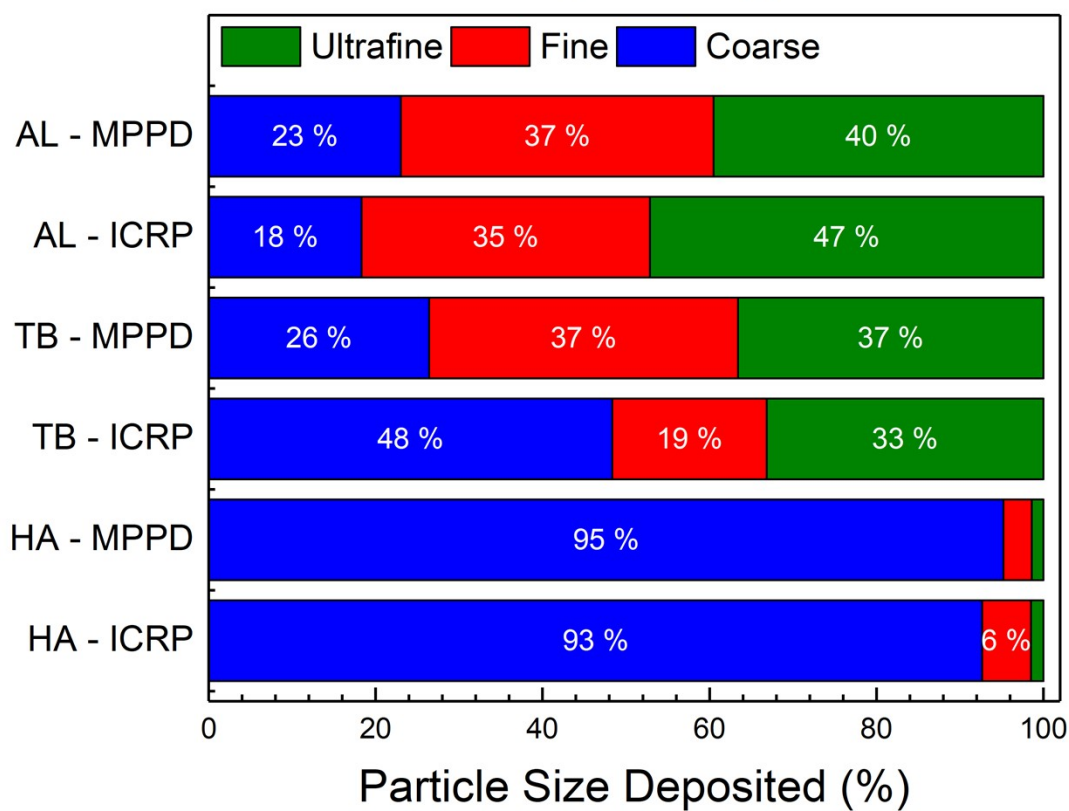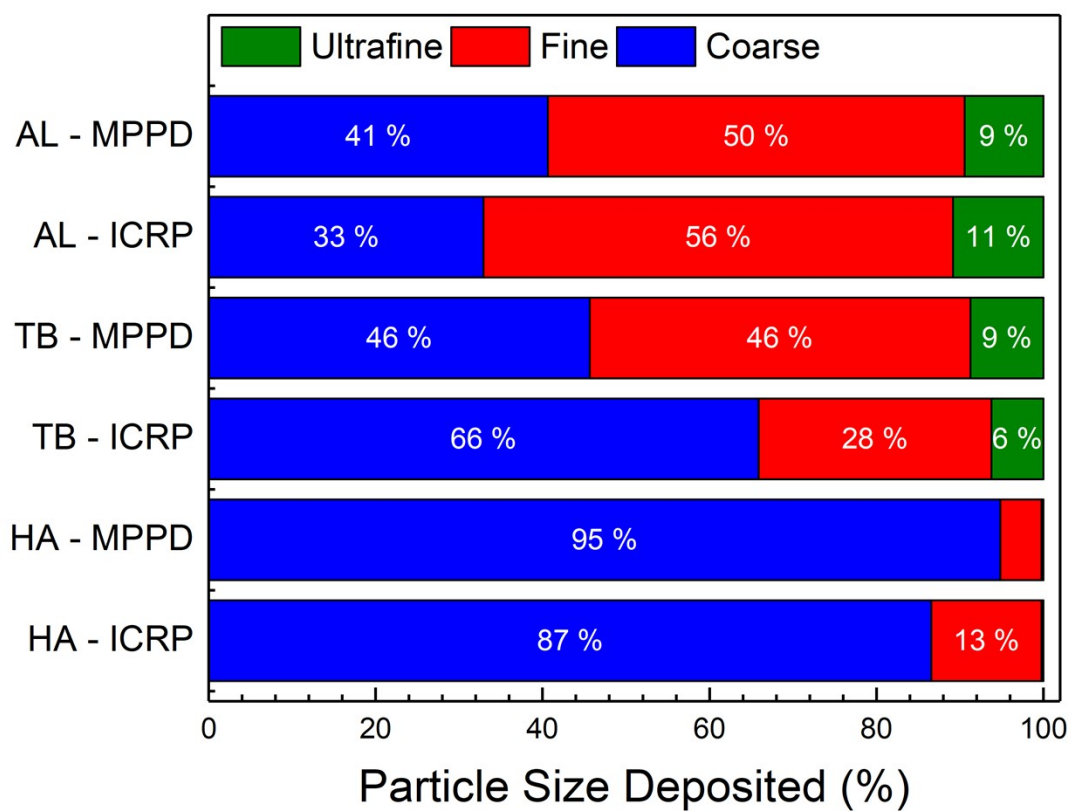
Figure S16. Contributions (expressed as percentages) of inhaled $\sum PFAS$ associated with particles of different sizes (at sewage 1 site) as calculated using the ICRP and MPPD models integrated within the *LungDepo* web application.

Figure S17. Contributions (expressed as percentages) of inhaled $\sum PFAS$ associated with particles of different sizes (at sewage 2 site) as calculated using the ICRP and MPPD models integrated within the *LungDepo* web application.
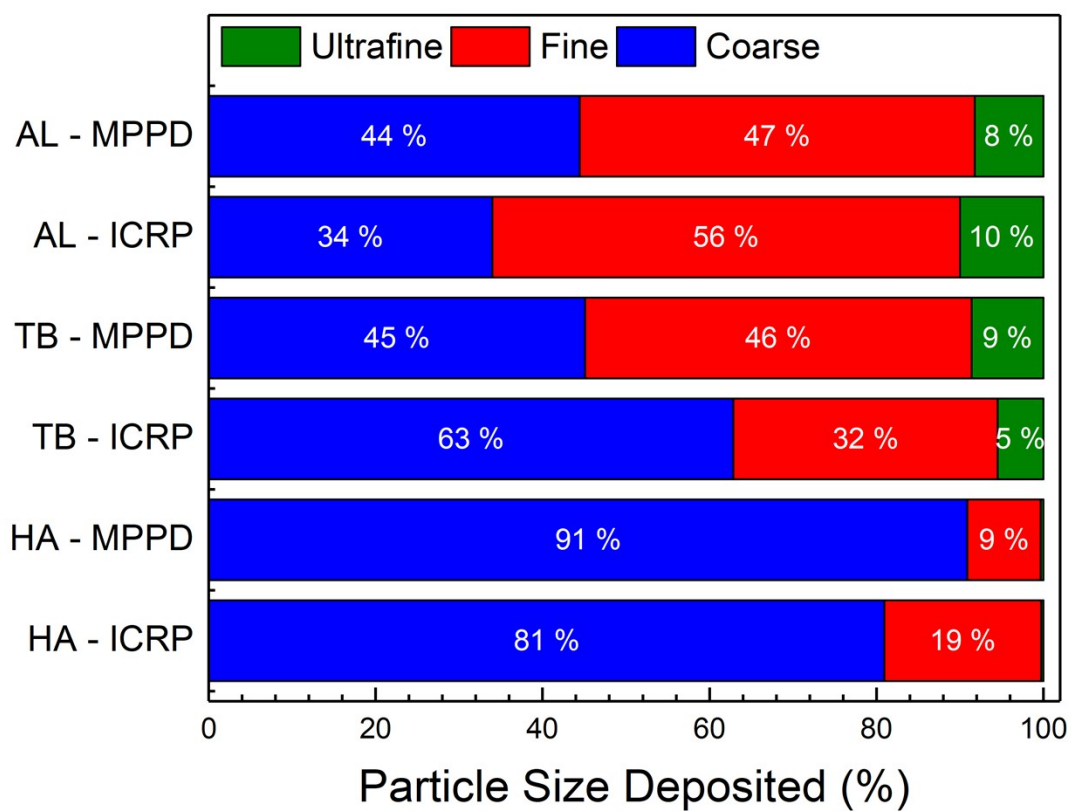
Figure S18. Contributions (expressed as percentages) of inhaled $\sum PFAS$ associated with particles of different sizes (at sewage 3 site) as calculated using the ICRP and MPPD models integrated within the *LungDepo* web application.