Appendix D: Data Evaluation Flowcharts Reproduced from RFLMA and the RFSOG
D.1 Points of Compliance

ROCKY FLATS LEGACY MANAGEMENT AGREEMENT

Flow data and analytical results from continuous flow-paced composite sampling at POCs

Is the appropriate calculated value greater than the applicable Table 1 standard?

Yes

Consultative process: During periodic reviews, is it determined that POC monitoring can be discontinued?

No

Reportable Condition
- Within 15 days of receiving validated data:
  - DOE informs the agencies and public

Within 30 days of receiving validated data:
- DOE submits a plan and schedule to the regulators for an evaluation to address the occurrence

Consultative process: Are mitigating actions necessary?

No

Discontinue POC monitoring

Yes

Modify/continue POC monitoring

Implement mitigating actions

Notes: see Fig. 1 and Tables 1 and 2 for locations, standards, and sampling criteria.

1 Calculated values for determining Reportable Condition and exceedances of remedy performance standards at POCs.

- Reportable conditions (according to Section 8.0):
  - plutonium, americium, uranium, nitrate -- 30-day average

- Reportable Conditions and evaluation of compliance with remedy performance standards in Table 1:
  - plutonium, americium, uranium, nitrate -- 12-month rolling average for POCs inside COU; 30-day average for GS91 and GS93.

2 The 30-day average for a particular day is calculated as a volume-weighted average of a "window" of time containing the previous 30 days with measurable flow. Each day has its own discharge volume (measured with a flow meter) and activity/concentration (from the sample cartridge in place at the end of that day). Therefore, there are 365 30-day moving averages for a location that flows all year. At locations that have intermittent flows, 30-day averages are reported as averages of the previous 30 days of greater than zero flow. For days where no analytical result is available, either due to failed laboratory analysis or non-sufficient quantity (NSQ) for analysis, no 30-day average is reported.

3 The 12-month rolling average for the last day of a particular month is calculated as a volume-weighted average of a "window" of time containing the previous 12 months. Each 12-month "window" includes daily discharge volumes (measured with a flow meter) and daily activities/concentrations (from the sample cartridge in place at the end of that day). Therefore, there are twelve 12-month rolling averages for a given calendar year. Days with no flow or no analytical result, either due to failed laboratory analysis or NSQ for analysis, are not included in the average. When no flow has occurred in the previous 12 months, no 12-month rolling average is reported.

4 Agencies: EPA, CDPR, and USFWS
Public: Cities of Broomfield, Northglenn, Thornton, and Westminster; Rocky Flats Stewardship Council (RFSC)

Figure 5: Points of Compliance

December 2012
Attachment 2, Page 2
D.2 Points of Evaluation

ROCKY FLATS LEGACY MANAGEMENT AGREEMENT

Flow data and analytical results from continuous flow-paced composite sampling at POEs

Is the appropriate calculated value greater than the applicable table 1 standard?

Yes

Reportable Condition

Within 15 days of receiving validated data:
- DOE informs the agencies and public

No

Consultative process: During periodic reviews, is it determined that POE monitoring can be discontinued?

No

Consultative process: Are mitigating actions necessary?

No

Discontinue POE monitoring

Yes

Modify/continue POE monitoring

Implement mitigating actions

Within 30 days of receiving validated data:
- DOE submits a plan and schedule to the regulators for an evaluation to address the occurrence

Notes: see Fig 1 and Tables 1 and 2 for locations, standards, and sampling criteria.

1 Calculated Values by analytes (see Table 2 for references)
- plutonium, americium, uranium — 12-month rolling average
- dissolved Cd and Ag, total Be and Cr — 85th percentile of 30-day averages for previous calendar year

2 The 12-month rolling average for the last day of a particular month is calculated as a volume-weighted average of a “window” of time containing the previous 12 months. Each 12-month “window” includes daily discharge volumes (measured with a flow meter) and daily activities/concentrations (from the sample carbons in place at the end of that day). Therefore, there are twelve 12-month rolling averages for a given calendar year. Days with no flow or no analytical result, either due to failed laboratory analysis or NSO for analysis, are not included in the average. When no flow has occurred in the previous 12 months, no 12-month rolling average is reported.

3 The 30-day average for a particular day is calculated as a volume-weighted average of a “window” of time containing the previous 30 days with measurable flow. Each day has its own discharge volume (measured with a flow meter) and activity/concentration (from the sample carbons in place at the end of that day). Therefore, there are 365 30 day moving averages for a location that flows all year. At locations that have intermittent flows, 30-day averages are reported as averages of the previous 30 days of greater than zero flow. For days where no analytical result is available, either due to failed laboratory analysis or NSO for analysis, no 30-day average is reported.

4 Agencies: EPA, CDPR, and USFWS.
Public: Cities of Broomfield, Northglenn, Thornton, and Westminster; Rocky Flats Stewardship Council (RFSC)

Figure 6. Points of Evaluation

December 2012
Attachment 2, Page 29
D.3 Area of Concern Wells and SW018

ROCKY FLATS LEGACY MANAGEMENT AGREEMENT

Analytical results from routine monitoring of a AOC well or SW018

Do the two most recent results exceed the applicable standard in Table 1 or the uranium threshold?

- Yes
  - Are the results from SW018?
    - Yes
      - Consultative process: Are mitigating actions necessary?
        - Yes
          - Implement mitigating actions
        - No
          - Modify/continue monitoring
    - No
      - Consultative process. Can AOC well/SW018 monitoring be discontinued?
        - Yes
          - Discontinue monitoring
        - No
          - Consultative process: Are mitigating actions necessary?

- No
  - Is monitoring still required at upgradient wells?
    - Yes
      - Consultative process: Are mitigating actions necessary?
        - Yes
          - Implement mitigating actions
        - No
          - Modify/continue monitoring
    - No
      - Consultative process. Can AOC well/SW018 monitoring be discontinued?
        - Yes
          - Discontinue monitoring
        - No
          - Consultative process: Are mitigating actions necessary?

Reportable Condition
Within 15 days of receiving validated data:
- DOE informs the agencies

Within 30 days of receiving validated data:
- DOE submits a plan and schedule to the regulators for an evaluation to address the occurrence

Notes: see Fig. 1 and Tables 1 and 2 for locations, standards, and sampling criteria.
- AOC wells and location SW018 are sampled twice each year; see Table 2.
- Decisions related to uranium in groundwater are based upon a 120 μg/L threshold for AOC wells (basis: a grand mean of results from Site-wide high-resolution uranium analyses performed in the late 1990s through mid-2000s), rather than the standard in Table 1.

Figure 7. Area of Concern Wells and SW018

December 2012
Attachment 2, Page 30
D.4 Sentinel Wells

ROCKY FLATS LEGACY MANAGEMENT AGREEMENT

Figure 8. Sentinel Wells

Notes: see Fig. 1 and Tables 1 and 2 for locations, standards, and sampling criteria.
- Sentinel wells are sampled twice each year; see Table 2.
- Decisions related to uranium are based upon a 120 ug/L threshold for ACC wells (base: a grand mean of results from Site-wide high-resolution uranium analyses performed in the late 1990s through mid-2000s), rather than the standard in Table 1.

Sentinel Well Criteria:
1. The 85th percentile concentration of an analyte is less than or equal to the corresponding concentration in Table 1 or, for uranium, the 85th percentile concentration does not exceed 2×120 ug/L or the highest calendar year concentration, whichever is higher.
2. Analyte concentrations exhibit an indeterminate or statistically-significant decreasing trend at the 95% confidence level.

December 2012
Attachment 2, Page 31
D.5 Evaluation Wells

---

**ROCKY FLATS LEGACY MANAGEMENT AGREEMENT**

Analytical results from routine monitoring of an Evaluation well

- **Do analyte concentrations exceed 100X corresponding Table 1 concentrations?**
  - Yes → Continue monitoring
  - No → **Do concentrations meet either Evaluation well criterion?**
    - Yes → Consultative process: Modify or discontinue monitoring
    - No → (loop back to initial step)

Notes: see Fig. 1 and Tables 1 and 2 for locations, standards, and sampling criteria.
- Evaluation wells are listed in Table 2.

**Evaluation Well Criteria:**
1. The 90th percentile concentration of an analyte is less than or equal to the corresponding concentration in Table 1, or, for uranium, 240 μg/L or highest pre-CY05 concentration, whichever is higher.
2. Analyte concentrations exhibit an indeterminate or statistically-significant decreasing trend at the 95% confidence level.

**Figure 9: Evaluation Wells**
D.6 RCRA Wells

ROCKY FLATS LEGACY MANAGEMENT AGREEMENT

---

![Diagram](image.png)

**Analytical results from routine monitoring of RCRA wells**

- Are results from a downgradient well at the Original Landfill?
  - Yes: Perform evaluation prescribed for Sentinel wells (see Figure 8)
  - No:
    - Are concentrations in downgradient wells significantly > those in upgradient wells?
      - Yes: Are results from a well at the Present Landfill?
        - No: Continue monitoring
        - Yes: Consultative process:
          - Determine appropriate response
          - Modify or discontinue RCRA monitoring
      - No: Do concentrations in downgradient wells show a statistically-significant increasing trend?
        - Yes: Using data from the previous two periodic reviews: Are 95th percentile concentrations in each downgradient well ≤ corresponding Table 1 concentrations, and on an indeterminate or decreasing trend at the 95% confidence level?
          - Yes: Continue monitoring
          - No: Continue monitoring

---

Notes: see Fig. 1 and Tables 1 and 2 for locations, standards, and sampling criteria. RCRA wells are sampled quarterly; see Table 2.

---

Figure 10. RCRA Wells

---

December 2012
Attachment 2, Page 33
D.7 Groundwater Treatment Systems

ROCKY FLATS LEGACY MANAGEMENT AGREEMENT

Figure 11: Groundwater Treatment Systems

Notes:

1 See Fig. 1 and Tables 1 and 2 for locations, standards, and sampling criteria.

Summary statistics:
- PLF influent: 65th percentile
- PLF performance: individual results
- ETPTS, MSPTS, and SPPTS: 65th percentile

Evaluation periods:
- PLF influent: period including a minimum of 16 data points and starting on 12/30/2005
- PLF performance: quarterly
- ETPTS, MSPTS, and SPPTS: period including a minimum of 6 data points and starting on 1/1/2000

Influent locations:
- PLF: PLFSEEPRNF
- ETPTS: ET INFLUENT
- MSPTS: 1-H
- SPPTS: SPIN

Effluent locations:
- PLF: PLFSEEFF
- ETPTS: ET EFFLUENT
- MSPTS: RO E
- SPPTS: SPIN

Performance locations:
- PLF: PLFSEEFF, NNG01
- ETPTS: PM02
- MSPTS: G510
- SPPTS: G513

Only for analytes above standards
D.8 Original Landfill Surface Water

ROCKY FLATS LEGACY MANAGEMENT AGREEMENT

Analytical results from quarterly surface water monitoring at the upgradient (GS95) and downgradient (GS59) locations

Are GS95 mean concentrations above the applicable Table 1 standards AND greater than GS59 mean concentrations?

No

Has ground water monitoring been discontinued at the Original Landfill?

Yes

Consultative process: Should Original Landfill surface-water monitoring be discontinued?

No

Continue/modify monitoring

Yes

Discontinue monitoring

No

Consultative process: Should actions be implemented?

No

Do exceedances continue?

Yes

Implement actions

No

Conduct monthly sampling for three consecutive months

Consultative process: Should actions be implemented?

Notes: see Fig. 1 and Tables 1 and 2 for locations, standards, and sampling criteria.
1 Mean concentration is the arithmetic average of individual results for the quarter.
2 Monthly sampling only for analytes above Table 1 standards.

Figure 12: Original Landfill Surface Water

December 2012
Attachment 2, Page 35
D.9 Pre-discharge Pond Sampling

ROCKY FLATS LEGACY MANAGEMENT AGREEMENT

Terminal Pond A-4, B-5, or C-2 (or other pond upstream of a POC serving as a terminal pond) operated in batch and release and conditions warrant routine non-emergency discharge

Notify agencies and public of intent to discharge terminal pond

Sample pond

Do pre-discharge sample results suggest exceedance(s) of applicable Table 1 standards at a downstream POC?

Yes

Consultative process: Determine appropriate pond management actions

Notify agencies and public of discharge schedule

No

Has batch and release operation been discontinued?

No

Continue pre-discharge monitoring

Yes

Discontinue pre-discharge monitoring

Notes: see Fig. 1 and Tables 1 and 2 for locations, standards, and sampling criteria.

Notification recipients:
- CDHSE
- EPA
- USFWS
- City of Broomfield
- City of Northglenn
- City of Thornton
- City of Westminster

Pre-discharge monitoring is not part of the remedy, but is a component of operational monitoring.

Figure 13. Pre-discharge Pond Sampling