Attachment 2

Legacy Management Requirements

Document History

Rocky Flats Legacy Management Agreement
Attachment 2, Legacy Management Requirements

Date	Description of Changes
February 2007	Original document, effective on RFLMA effective date, March 14, 2007.
March 2008	Modification to Section 5.3.2 to change reference for *Present Landfill Monitoring and Maintenance Plan and Post-Closure Plan* (PLF M&M Plan) to "as approved," to allow modification of the PLF M&M Plan, without need to update the specific date in Attachment 2 each time.
March 2008	Modification to Table 2 regarding PLF Area sampling frequency for GWISINFNORTH and GWISINFSOUTH from "Quarterly; Monthly (if required by decision)", to "Discontinued". Table 2 Note 11 changed to add "GWISINFNORTH and GWISINFSOUTH may be used for investigative purposes." See RFLMA Contact Record 2007-08.
March 2008	Modification to Table 3 regarding frequency of PLF inspections and exit strategy to reflect reduction in frequency based on results of inspections since closure. Based on modification of PLF M&M Plan. See RFLMA Contact Record 2007-08.
September 2009	Modification to Section 5.3.1 to change reference for *Final Landfill Monitoring and Maintenance Plan, RFETS, Original Landfill* (OLF M&M Plan) to "as approved," to allow modification of the OLF M&M Plan, without need to update the specific date in Attachment 2 each time.
September 2009	Modification to Table 1 to make standards consistent with changes promulgated by the Colorado Water Quality Control Commission (WQCC) through June 2009, as follows: • gross alpha/beta removed from analyte list; • Uranium standard changed to 16.8 µg/L; • Arsenic standard changed from 50 µg/L to 0.02 -10 µg/L; • Footnote [a] modified to change the reference to the December 31, 2005 effective date of the Colorado WQCC regulations to "promulgated", and added, "If relevant, effective date information is included in subsequent footnotes", for simplicity; • Deleted PRG acronym in Footnote [b] because not used in Table 1; • Deleted reference to segment specific ambient uranium standards in Footnote [l] and added explanation of radiological parameter units; and, • Footnote [n] added for arsenic, "Standard is 50 µg/L until December 31, 2009. Beginning January 1, 2010, the second number in the range is applied as the applicable or corresponding Table 1 standard the flowcharts in Figures 5 through 13." This is based on footnote 13 to Table III of WQCC Regulation 31, "Water bodies will be considered in attainment of this standard, and not included on the Section 303(d) List, so long as the existing ambient water quality does not exceed the second number in the range."
September 2009	Modification to Table 2 and Figure 1 to reflect changes to Table 1 for uranium and changes to monitoring locations, as follows: • U** replaced with U, and note ** referring to uranium isotopes deleted; • Well 45605 removed and replaced with well 45608; and, • Well TH046992 removed and SPPMM01 replaced by SPOUT. See RFLMA Contact Records 2007-07, 2008-04, and 2008-09.
September 2009	Modification to Table 3 regarding frequency of OLF inspections and exit strategy to reflect reduction in frequency based on results of inspections since closure and based on modification of OLF M&M Plan. See RFLMA Contact Record 2008-07. Clarified frequency for vegetation surveys and vegetation monitoring, and made PLF and OLF requirement read the same.

September 2009	Modification of Section 5.3.7 and Table 5 to reflect completion of additional ecological sampling. See RFLMA Contact Record 2008-01.
September 2009	Modification of Section 7.2 to change reference “DOE 2006” to “as approved” for the PLF and OLF M&M Plan for consistency with modification to Sections 5.3.1 and 5.3.2.
December 2009	Modification to Table 1, Footnote [m] making 1,4-dioxane standard effective through 3/21/2012, consistent with changes promulgated by the WQCC in November 2009.

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1.0 PURPOSE AND BACKGROUND

The purpose of this attachment to the Rocky Flats Legacy Management Agreement (RFLMA) is to specify the legacy management requirements that will ensure the response action selected and approved in the final Corrective Action Decision and Record of Decision (CAD/ROD) for the Central Operable Unit (OU) remains protective of human health and the environment. The remedy specified in the final CAD/ROD is supported by a Comprehensive Risk Assessment, which is based on a specific land use. The remedy, therefore, relies on certain physical and institutional controls, which must be maintained to ensure long-term protectiveness. The remedy also includes engineered features – landfills and water treatment systems – which must be maintained to remain protective. Reduced levels of residual soil contamination remain at the site and may continue to affect surface water. Contaminated groundwater also exists at the site and may impact surface water quality. Continued routine monitoring for groundwater and surface water is therefore required. Air, soil, and ecological receptors have been extensively monitored for many years and routine monitoring is no longer required.

Legacy management requirements described in this attachment are intended to address the requirements of the following statutes:

- Resource Conservation and Recovery Act (RCRA);
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) including applicable or relevant and appropriate requirements (ARARs); and
- Colorado Hazardous Waste Act (CHWA).

Modifications to this attachment will occur in accordance with the provisions of Part 10 of RFLMA.

2.0 REMEDY PERFORMANCE STANDARDS AND REQUIREMENTS

Remedy performance standards and requirements are enforceable numerical values or narrative descriptions of conditions or restrictions, designed to protect existing or potential uses, against which remedy performance can be measured. These standards and requirements are derived from state surface water standards and from requirements established in the final CAD/ROD.

2.1 Surface Water Standards

Protection of surface water was a basis for making soil and groundwater response action decisions during the cleanup period so that surface water on site and leaving the site would be of sufficient quality to support all uses. The applicable surface water uses are consistent with the following Colorado Water Quality Control Commission (WQCC) surface water use classifications:

- Water Supply,
- Aquatic Life – Warm 2,

- Recreation 2, and
- Agriculture.

The remedy performance standards for surface water at the Rocky Flats Site are found in Table 1 and are based on the tables found in the WQCC Regulation No. 31: Basic Standards and Methodologies for Surface Water (5 CCR 1002-31) and on the site-specific standards in the WQCC Regulations No. 38 (5 CCR 1002-38). If the numeric values from the basic standards and the site-specific standards differ, the site-specific standard applies, except where temporary modifications are in place. Temporary modifications for six organic compounds, nitrate and nitrite, as listed in Table 1, have been granted through the year 2009 by the WQCC. In addition to practical quantitation levels (PQLs) allowed by the WQCC regulations, site-specific PQLs may be proposed to Colorado Department of Public Health and Environment (CDPHE) for approval. Any changes to the standards will be discussed in the annual legacy management report.

The WQCC-designated groundwater use classification at the site is surface water protection. The numeric values for measuring potential effects of contaminated groundwater on surface water quality are the surface water standards in Table 1. Exceedances of water quality standards at a surface water POC may be subject to civil penalties under Sections 109 and 310(c) of CERCLA.

Criteria and strategies for comparing analytical results to these numeric values are established in Section 5 and in attached flowcharts.

2.2 Requirements of the Final CAD/ROD

Some response actions taken under Rocky Flats Cleanup Agreement decision documents specified conditions or restrictions that extend into the legacy management period. These requirements are captured in the final CAD/ROD and are specified in this attachment.

3.0 PHYSICAL CONTROLS

3.1 Engineered Remedies

DOE will maintain physical controls as necessary to protect engineered elements of the remedy, such as landfill covers, groundwater treatment systems, and monitoring equipment.

3.2 Signs

DOE will post signs legible from at least 25 feet at intervals around the perimeter of the Central OU, sufficient to notify persons that they are at the boundary of the Central OU. These signs will measure at least 11 inches by 14 inches and will include the following language: “U.S. Department of Energy – No Trespassing”. In addition, signs listing use restrictions and providing contact information will be posted at access points to the Central OU.

4.0 INSTITUTIONAL CONTROLS

Institutional controls in the form of use restrictions are established in the final CAD/ROD. These controls are embodied in an environmental covenant granted by DOE to the CDPHE and are listed in Table 4. The covenant is recorded by Reception Number 2006148295 in Jefferson County, Colorado.

DOE will employ administrative procedures to control all site modification, maintenance, or other activities requiring excavation within the Central OU in accordance with the institutional controls to ensure to prevent violation of the restrictions listed in Table 4. DOE shall ensure that all such site activities will not compromise the integrity or function of the remedy or result in uncontrolled releases of or exposures to subsurface contamination, in accordance with the land use restrictions in Table 4.

DOE will utilize work control procedures to help maintain the use restrictions and ensure protection of the integrity of the institutional controls. These procedures derive from EPA and State of Colorado regulation and guidance and DOE Orders and guidance. The DOE Integrated Safety Management System (ISMS) utilizes processes such as the job hazard analysis (JHA) to identify and mediate environmental, health and safety risks to ensure all work is done in a safe and environmentally protective manner.

5.0 MONITORING REQUIREMENTS

Monitoring will provide measurements for remedy performance, safety, compliance with standards, and effectiveness of physical and institutional controls. Monitoring requirements are designed to provide data that meet designated monitoring objectives (as outlined in Table 2 and in attached flowcharts) and that support operational and regulatory decision making. Legacy Management operational documents relating to the monitoring and maintenance performed by DOE will be provided to CDPHE and the Environmental Protection Agency (EPA) and will be available to the public.

Environmental sampling, analysis, and data management required by this attachment will conform to the Legacy Management CERCLA Sites Quality Assurance Project Plan (QAPP) and meet the quality assurance and quality control requirements in current EPA guidance. DOE will submit the QAPP to the CDPHE and EPA within two months of execution of the RFLMA. DOE will ensure that laboratories generating data have procedures for assuring that the precision, accuracy, representativeness, completeness, and comparability (and sensitivity in the case of radiological analyses) of data are known and documented. DOE will also perform periodic assessments of analytical data, including laboratory audits. Upon request, all analytical data including QA/QC procedures, audits, and reports will be provided to CDPHE and/or EPA.

Standard EPA analytical methods will be used with the intent that detection limits will be less than the respective standards. If standard analytical methods cannot attain the standard,

then alternative methods or PQLs will be proposed to CDPHE. The currently accepted PQLs are listed in Table 1.

5.1 Monitoring Surface Water

Compliance with the surface-water standards in Table 1 will be measured at the Points of Compliance (POCs) downstream of the terminal ponds in Woman and Walnut Creeks. If the terminal ponds are removed, new monitoring and compliance points will be designated and will consider groundwater in alluvium. Points of Evaluation (POEs) and additional performance monitoring locations serve to monitor the quality of surface water in the Central OU. The data evaluation methods described in the attached flowcharts will be used to evaluate sampling data collected at these locations. POCs, POEs and performance monitoring locations are shown in Figure 1; sampling criteria are identified in Table 2.

- Points of Compliance (POCs): Located in Woman and Walnut Creeks downstream of the terminal ponds and at Indiana Street. These locations are used to demonstrate compliance with the surface-water standards in Table 1.
- Points of Evaluation (POEs): Located in the Central OU upstream of the ponds and POCs. These locations are used to evaluate water-quality in comparison to the surface-water standards in Table 1.
- Performance monitoring locations: Located downstream of specific remedies to determine the short and long-term effectiveness of these remedies where known contaminants may affect surface water.

5.2 Monitoring Groundwater

Groundwater is monitored in or near areas of groundwater contamination that might adversely affect surface water quality (Figure 2). Contaminated groundwater emerges to surface water before leaving the Central OU. DOE will maintain a network of groundwater monitoring wells to assess the potential effects of contaminated groundwater on surface water quality. These wells and sampling criteria are identified in Table 2 and shown in Figure 1 with the following well classifications:

- Area of Concern (AOC) Wells: Located within a drainage and downgradient of a contaminant plume or group of contaminant plumes. These wells are monitored to determine whether the plume(s) may be discharging to surface water.
- Sentinel Wells: Typically located near downgradient edges of contaminant plumes, in drainages, and downgradient of groundwater treatment systems. These wells are monitored to determine whether concentrations of contaminants are increasing, which could indicate plume migration or treatment system problems.
- Evaluation Wells: Typically located within plumes and near plume source areas, or in the interior of the Central OU. Data from these wells will help determine when monitoring of an area or plume can cease. A subset of these wells is located in areas that may experience significant changes in groundwater conditions as a result of closure activities.

- RCRA Wells: Dedicated to monitoring the Present Landfill and Original Landfill.

5.3 Remedy Monitoring and Maintenance

5.3.1 Original Landfill

Groundwater and surface water monitoring details, including criteria and analytes, are listed in Table 2. Table 3 summarizes the inspection and maintenance requirements contained in the approved *Original Landfill Monitoring and Maintenance Plan,* which is incorporated by reference as an enforceable requirement of the RFLMA.

5.3.2 Present Landfill

Groundwater and surface water monitoring details, including criteria and analytes, are listed in Table 2. Table 3 summarizes the inspection and maintenance requirements contained in the approved *Present Landfill Monitoring and Maintenance Plan and Post-Closure Plan,* which is incorporated by reference as an enforceable requirement of the RFLMA.

5.3.3 Groundwater Treatment Systems

Each system will be monitored, at a minimum, for untreated influent and treated effluent, and for impacts to surface water downstream of the effluent discharge point according to the sampling criteria in Table 2 and the decision rules in the attached flowcharts. The systems will be maintained to ensure the effluent meets Table 1 standards.

5.3.4 Residual Subsurface Contamination

The Central OU will be monitored for significant erosion annually and following major precipitation events. DOE will evaluate whether the erosion is in proximity to the subsurface features shown in Figures 3 and 4. Monitoring will include visual observation (and measurements, if necessary) of precursor evidence of significant erosion (cracks, rills, slumping, subsidence, sediment deposition, etc.).

5.3.5 Monitoring Physical Controls

The condition of signs and other physical controls maintained by DOE will be inspected on a quarterly basis.

5.3.6 Monitoring Institutional Controls

The effectiveness of the institutional controls described in Table 4 of this attachment and in the Environmental Covenant will be determined by inspecting the Central OU at least annually for any evidence of violations of those controls. DOE will also annually verify that

the Environmental Covenant for the Central OU remains in the Administrative Record and on file with the Jefferson County Planning and Zoning Department.

5.3.7 Ecological Sampling

The Ecological Risk Assessment determined that residual contamination does not represent a significant risk of adverse ecological effects. The CAD/ROD, however, requires that specific additional sampling be conducted to reduce the uncertainties determined in the Ecological Risk Assessment. Additional ecological sampling listed in Table 5 was completed and approved by CDPHE on April 2, 2008.

5.4 Operational Monitoring

Operational monitoring is not a requirement of the CAD/ROD, but is a requirement of this Attachment. Operational monitoring provides information that will supplement CAD/ROD required monitoring.

5.4.1 Boundary Wells

Boundary wells are located on the east boundary of the Rocky Flats Site (see Figure 1) where Walnut Creek and Woman Creek exit Rocky Flats. These wells are used to demonstrate that contaminants listed in Table 2 are not migrating offsite. Action determinations for Boundary wells are found in Figure 7.

5.4.2 Pre-discharge Pond Sampling

DOE will collect pre-discharge samples from Pond A-4, Pond B-5, and Pond C-2, and as needed from any other upstream pond temporarily functioning as a terminal pond. DOE will notify appropriate parties in accordance with Figure 13 in advance of pre-discharge pond sampling. CDPHE and EPA will be allowed the opportunity to collect duplicate or split samples. Samples will be analyzed for POC constituents far enough in advance of a routine discharge to allow action to be taken if exceedances are suggested, but near enough to the time of discharge to be representative of the discharge composition. Figure 13 shows how actions are determined based on the results of pre-discharge samples. Ponds will be operated to maintain dam safety regardless of the status or results of pond sampling.

5.4.3 Adverse Biological Conditions

DOE will note evidence of adverse biological conditions (e.g., unexpected mortality or morbidity) observed during other monitoring and maintenance activities described above.

6.0 ACTION DETERMINATIONS

Whenever any of the following reportable conditions are observed, DOE shall follow the appropriate procedures in this section. Reportable conditions include:

- Exceedances of surface water standards at surface water and groundwater monitoring locations consistent with the attached flowcharts;
- Evidence of significant erosion in areas of residual subsurface contamination;
- Evidence of adverse biological conditions;
- Conditions affecting the effectiveness of the landfill covers;
- Evidence of violation of the institutional controls;
- Physical control failure that adversely affects the remedy; or
- Other abnormal conditions that adversely affect the remedy.

When reportable conditions occur (except in the case of evidence of violation of institutional controls as described below), DOE will inform CDPHE and EPA within 15 days of receiving the inspection reports or validated data. Within 30 days of receiving inspection reports or validated analytical data documenting a reportable condition, DOE will submit a plan and a schedule for an evaluation to address the condition. DOE will consult as described in RFLMA Paragraph 11 to determine if mitigating actions are necessary. Final plans and schedules for mitigating actions, if any, will be approved by CDPHE in consultation with EPA. DOE is not, however, precluded from undertaking timely mitigation once a reportable condition has been identified.

In the case of evidence of violation of institutional controls, DOE will notify EPA and CDPHE within 2 days of discovering any evidence of such a violation, and at that time will initiate the consultative process to address the situation. In no case will DOE notify EPA and CDPHE more than 10 days after the discovery of a situation that may interfere with the effectiveness of the institutional controls. DOE will notify EPA and CDPHE of the actions it is taking within 10 days after beginning the process to address the situation.

The RFLMA Parties will consult whenever reportable conditions are observed or at the request of one of the Parties when routine communication processes are not sufficient or appropriate. The objective of the consultation will be to determine a course of action to address the reportable condition and to ensure the remedy remains protective. Results of consultation will be documented in contact records and/or written correspondence.

Surface water and groundwater monitoring results will be evaluated as described in the following flowcharts:

- Figure 5 Flowchart – Points of Compliance
- Figure 6 Flowchart – Points of Evaluation

- Figure 7 Flowchart – Area of Concern Wells, Boundary Wells, and SW018
- Figure 8 Flowchart – Sentinel Wells
- Figure 9 Flowchart – Evaluation Wells
- Figure 10 Flowchart – RCRA Wells
- Figure 11 Flowchart – Groundwater Treatment Systems
- Figure 12 Flowchart – Original Landfill Surface Water
- Figure 13 Flowchart – Pre-discharge Pond Sampling

Exceedances of water quality standards at a POC may be subject to civil penalties under Sections 109 and 310(c) of CERCLA. In addition, failure of DOE to notify the State and EPA of such exceedances or other reportable occurrences, or failure to undertake source evaluations or mitigating actions as described above, will be enforceable consistent with the terms of Part 8 of the RFLMA.

7.0 PERIODIC REPORTING REQUIREMENTS

In addition to notifications of reportable conditions described in Section 6, periodic reporting will provide CDPHE, EPA, and the public with updated information pertaining to the surveillance and maintenance of the remedy prescribed in the final CAD/ROD. Analytical data and other information will be clearly presented along with summaries and evaluations to help interpret the data. Reports will be posted on the LM website and available for regulatory and public review in accordance with the following schedule:

Quarter ending March 31 will be posted by July 15
Quarter ending June 30 will be posted by October 15
Quarter ending September 30 will be posted by January 15
Year and Quarter ending December 31 will be posted by April 30

7.1 Quarterly Legacy Management Reports

The various reporting requirements may be combined into a summary report of surveillance and maintenance activities that occurred during the applicable quarter. The following topics will be included in quarterly reports:

- Surface water monitoring data;
- Groundwater monitoring data;
- Groundwater treatment system monitoring data;
- Ecological sampling data;
- Adverse biological conditions;
- Inspection reports; and
- Summary of maintenance and repairs.

7.2 Annual Legacy Management Reports

The various reporting requirements may be combined into a comprehensive report of all surveillance and maintenance activities that occurred during the applicable calendar year. Annual reports may include a summary for the previous quarter. The following will be included in annual reports:

- Discussion of surface water monitoring data;
- Discussion of groundwater monitoring data;
- Discussion of groundwater treatment system monitoring data;
- Discussion of ecological sampling data;
- Adverse biological conditions;
- Summary of actions taken in response to reportable conditions;
- Summary of maintenance and repairs;
- Inspection reports;
- Verification of the Environmental Covenant and evaluation of the effectiveness of institutional controls;
- Original Landfill Monitoring Report (see Table 3 and Section 6.1 of the *Original Landfill Monitoring and Maintenance Plan*, as approved);
- Present Landfill Monitoring Report (see Table 3 and Section 6.1 of the *Present Landfill Monitoring and Maintenance Plan and Post-Closure Plan*, as approved);
- Assessments of analytical data, including laboratory audits; and
- Other conditions or actions taken that are pertinent to the continued effectiveness of the remedy.

7.3 CERCLA 5-Year Review

A statutory 5-year review is required under CERCLA for the Central OU because the selected remedy will result in hazardous substances, pollutants or contaminants remaining above levels that allow for unrestricted use and unlimited exposure. DOE will prepare the 5-year review consistent with EPA-OSWER Directive 9355.7-03B-P (or subsequent EPA directives), as applicable to Rocky Flats. DOE will submit the 5-year review to EPA by August 1, 2007 so as to allow for EPA approval by September 17, 2007. DOE will prepare subsequent reviews at five-year intervals from the aforementioned date, until such time as EPA determines that CERCLA periodic reviews are no longer required. The 5-year review will evaluate site conditions and determine whether the selected remedy remains protective of human health and the environment. In doing so, the 5-year review will evaluate the components of the remedy (including, but not limited to, requirements for monitoring, maintenance and inspections, institutional controls, and reporting.) The 5-year review will

determine whether such remedy components will be continued, modified, or discontinued. The public will be notified when the review will be conducted. Results of 5-year reviews will be made available to the public.

Table 1. Surface Water Standards

Analyte	CAS Reference Number	Standards [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)
Acenaphthene	83-32-9	4.20E-01	W+F, WS		
Acrolein	107-02-8	3.50E-03	W+F, WS		2.50E-02
Acrylamide	79-06-1	7.80E-06	WS		3.20E-04
Acrylonitrile	107-13-1	5.10E-05	W+F		2.50E-02
Alachlor	15972-60-8	2.00E-03	W+F, WS		
Aldicarb	116-06-3	7.00E-03	WS		
Aldicarb sulfone	1646-88-4	7.00E-03	WS		
Aldicarb sulfoxide	1646-87-3	7.00E-03	WS		
Aldrin	309-00-2	4.90E-08	W+F		5.00E-05
Ammonia, un-ionized	7664-41-7	[e]	[e]		
Aniline	62-53-3	6.10E-03	WS		1.00E-02
Anthracene	120-12-7	2.10E+00	W+F, WS		
Aramite	140-57-8	1.40E-03	WS		2.00E-02
Arsenic, total recoverable	7440-38-2	2.00E-5 to 1.00E-02 [n]	SS		
Atrazine	1912-24-9	3.00E-03	WS		
Azobenzene	103-33-3	3.20E-04	WS		3.00E-02
Benzene	71-43-2	2.20E-03	W+F	5.00E-03	
Benzidine	92-87-5	8.60E-08	W+F		4.00E-02
alpha-BHC	319-84-6	2.60E-06	W+F		3.00E-05
beta-BHC	319-85-7	9.10E-06	W+F		6.00E-05
gamma-BHC [Lindane]	58-89-9	8.00E-05	AL		
Benzo(a)anthracene	56-55-3	3.80E-06	W+F		2.00E-02
Benzo(a)pyrene	50-32-8	3.80E-06	W+F		1.00E-02
Benzo(b)fluoranthene	205-99-2	3.80E-06	W+F		1.00E-02
Benzo(g,h,i)perylene	191-24-2	3.80E-06	W+F		1.00E-02
Benzo(k)fluoranthene	207-08-9	3.80E-06	W+F		1.00E-02
Benzotrichloride	98-07-7	2.70E-06	WS		1.00E-02
Benzyl chloride	100-44-7	2.10E-04	WS		1.00E-03
Beryllium	7440-41-7	4.00E-03	SS		
Boron, total	7440-42-8	7.50E-01	AG, SS		
Bromate	15541-45-4	5.00E-05	WS		1.00E-03
Bromodichloromethane	75-27-4	5.50E-04	W+F [f]		1.00E-03
Bromoform [Tribromomethane]	75-25-2	4.30E-03	W+F [f]		
Bromomethane [Methyl Bromide]	74-83-9	9.80E-04	W+F		1.00E-03
Butylbenzylphthalate	85-68-7	1.40E+00	W+F, WS		
Cadmium, dissolved	7440-43-9	1.50E-03	TVS [g]		
Carbofuran	1563-66-2	4.00E-02	WS		
Carbon tetrachloride	56-23-5	2.30E-04	W+F	5.00E-03	1.00E-03
Chlordane	57-74-9	8.00E-07	W+F		2.00E-04
Chlorobenzene	108-90-7	1.00E-01	W+F, WS		
Chlorodibromomethane (HM)	124-48-1	5.40E-02	W+F		
bis(2-Chloroethyl)ether	111-44-4	3.00E-05	W+F		1.00E-02
Chloroform [Trichloromethane]	67-66-3	3.40E-03	W+F [f]		
bis(2-Chloroisopropyl)ether	108-60-1	2.80E-01	W+F, WS		

Table 1 (continued). Surface Water Standards

Analyte	CAS Reference Number	Standards [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)
Chloromethane [Methyl chloride]	74-87-3	5.60E-03	W+F		
Bis(chloromethyl)ether (BCME)	542-88-1	1.00E-07	W+F		1.00E-02
4-Chloro-3-methylphenol	59-50-7	3.00E-02	AL		
Chloronaphthalene	91-58-7	5.60E-01	W+F, WS		
2-Chlorophenol	95-57-8	3.50E-02	W+F, WS		
Chloropyrifos	2921-88-2	4.10E-05	AL		5.00E-03
Chromium III, Total Recoverable	16065-83-1	5.00E-02	SS		
Chromium VI, dissolved	18540-29-9	1.10E-02	TVS [g]		2.00E-02
Chrysene	218-01-9	3.80E-06	W+F		1.00E-02
Copper, dissolved	7440-50-8	1.60E-02	TVS [g]		2.50E-02
Cyanide	57-12-5	5.00E-03	SS		
4,4-DDD	72-54-8	3.10E-07	W+F		1.10E-04
4,4-DDE	72-55-9	2.20E-07	W+F		5.00E-05
4,4-DDT	50-29-3	2.20E-07	W+F		1.20E-04
Dalapon	75-99-0	2.00E-01	WS		
Demeton	8065-48-3	1.00E-04	AL		1.00E-02
Dibenzo(a,h)anthracene	53-70-3	3.80E-06	W+F		1.00E-02
Dibromochloromethane	124-48-1	8.00E-02	W+F, WS [f]		
1,2-Dibromo-3-chloropropane	96-12-8	2.00E-04	WS		1.00E-03
Di-n-butylphthalate	84-74-2	7.00E-01	W+F, WS		
Dichloroacetic acid	79-43-6	7.00E-04	WS		5.00E-04
1,2-Dichlorobenzene	95-50-1	4.20E-01	W+F		
1,3-Dichlorobenzene	541-73-1	9.40E-02	W+F, WS		
1,4-Dichlorobenzene	106-46-7	6.30E-02	W+F		
3,3-Dichlorobenzidine	91-94-1	2.10E-05	W+F		2.00E-02
1,2-Dichloroethane	107-06-2	3.80E-04	W+F	5.00E-03	1.00E-03
1,1-Dichloroethene	75-35-4	7.00E-03	W+F, WS	7.00E-03	
1,2-Dichloroethene (cis)	156-59-2	7.00E-02	WS		
1,2-Dichloroethene (trans)	156-60-5	1.00E-01	W+F, WS		
2,4-Dichlorophenol	120-83-2	2.10E-02	W+F, WS		
Dichlorophenoxyacetic acid [2,4-D]	94-75-7	7.00E-02	WS		
1,2-Dichloropropane	78-87-5	5.00E-04	W+F		1.00E-02
1,3-Dichloropropylene	542-75-6	3.40E-04	W+F		1.00E-02
Dichlorvos	62-73-7	1.20E-04	WS		1.00E-02
Dieldrin	60-57-1	5.20E-08	W+F		2.00E-05
Di(2-ethylhexyl)adipate	103-23-1	4.00E-01	WS		
Diethylphthalate	84-66-2	5.60E+00	W+F, WS		
Diisopropyl methyl phosphonate	1445-75-6	8.00E-03	WS		1.00E-02
2,4-Dimethylphenol	105-67-9	1.40E-01	W+F, WS		
Dimethylphthalate	131-11-3	7.00E+01	W+F, WS		
4,6-Dinitro-2-methylphenol	534-52-1	2.70E-04	WS		5.00E-02
2,4-Dinitrophenol	51-28-5	1.40E-02	W+F, WS		5.00E-02
2,4-Dinitrotoluene	121-14-2	1.10E-04	W+F, WS		1.00E-02
2,6-Dinitrotoluene	606-20-2	2.30E-01	AL		

Table 1 (continued). Surface Water Standards

Analyte	CAS Reference Number	Standards [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)
Dinoseb	88-85-7	7.00E-03	WS		
1,4-Dioxane	123-91-1	6.10E-03	WS [m]		1.00E-02
Dioxin (2,3,7,8 TCDD)	1746-01-6	5.00E-12	W+F		1.00E-05
1,2-Diphenylhydrazine	122-66-7	3.60E-05	W+F		1.00E-02
Diquat	85-00-7	2.00E-02	WS		
Endosulfan	115-29-7	5.60E-05	AL		
Endosulfan, alpha	959-98-8	5.60E-05	AL		2.00E-04
Endosulfan, beta	33213-65-9	5.60E-05	AL		
Endosulfan sulfate	1031-07-8	5.60E-05	AL		6.60E-04
Endothall	145-73-3	1.00E-01	WS		
Endrin (technical)	72-20-8	3.60E-05	AL		6.00E-05
Endrin aldehyde	7421-93-4	2.90E-04	W+F		
Epichlorohydrin	106-89-8	3.50E-03	WS		1.00E-02
Ethylbenzene	100-41-4	5.30E-01	W+F		
Ethylene dibromide [1,2-Dibromomethane]	106-93-4	5.00E-05	WS		1.00E-03
bis(2-Ethylhexyl)phthalate	117-81-7	1.20E-03	W+F		1.00E-02
Fluoranthene	206-44-0	1.30E-01	W+F		
Fluorene	86-73-7	2.80E-01	WS		
Folpet	133-07-3	1.00E-02	WS		
Furmecyclox	60568-05-0	1.20E-03	WS		1.00E-02
Glyphosate	1071-83-6	7.00E-01	WS		
Guthion	86-50-0	1.00E-05	AL		1.00E-01
Heptachlor	76-44-8	7.80E-08	W+F		5.00E-05
Heptachlor epoxide	1024-57-3	3.90E-08	W+F		1.00E-03
Hexachlorobenzene	118-74-1	2.80E-07	W+F		1.00E-02
Hexachlorobutadiene	87-68-3	4.40E-04	W+F		5.00E-03
Hexachlorocyclohexane, Technical	608-73-1	1.20E-05	W+F		1.00E-02
Hexachlorocyclopentadiene	77-47-4	5.00E-03	AL		1.00E-02
Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-hcdd)	19408-74-3	5.60E-09	WS		2.50E-05
Hexachloroethane	67-72-1	4.00E-04	W+F		1.00E-03
Hydrazine/Hydrazine sulfate	302-01-2	1.20E-05	WS		1.00E-02
Indeno(1,2,3-cd)pyrene	193-39-5	3.80E-06	W+F		1.00E-02
Isophorone	78-59-1	1.30E-01	W+F		
Lead, dissolved	7439-92-1	6.50E-03	TVS [g]		
Malathion	121-75-5	1.00E-04	AL		1.00E-02
Mercury, total	7439-97-6	1.00E-05	SS		1.00E-03
Methoxychlor	72-43-5	3.00E-05	AL		1.80E-03
4,4-Methylene bis (N,N'-dimethyl)aniline	101-61-1	7.60E-04	WS		1.00E-02
Methylene chloride [Dichloromethane]	75-09-2	4.60E-03	W+F		
Mirex	2385-85-5	1.00E-06	AL		1.00E-02
Naphthalene	91-20-3	1.40E-01	W+F, WS		
Nickel, dissolved	7440-02-0	1.23E-01	TVS [g]		

Table 1 (continued). Surface Water Standards

Analyte	CAS Reference Number	Standards [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)
Nitrate	14797-55-8	1.00E+01	AG, SS	100 [h]	
Nitrite	14797-65-0	5.00E-01	AL [i], SS	4.5 [h]	
Nitrobenzene	98-95-3	3.50E-03	W+F, WS		
Nitrophenol 4	100-02-7	5.60E-02	WS, W+F		
Nitrosodibutylamine N	924-16-3	4.30E-06	W+F		1.00E-02
N-Nitrosodiethanolamine	1116-54-7	1.30E-05	WS		1.00E-02
Nitrosodiethylamine N	55-18-5	2.30E-07	W+F, WS		1.00E-02
Nitrosodimethylamine N	62-75-9	6.90E-07	W+F, WS		2.00E-02
n-Nitrosodiphenylamine	86-30-6	3.30E-03	W+F		1.00E-02
n-Nitrosodipropylamine	621-64-7	5.00E-06	W+F, WS		1.00E-02
N-Nitroso-N-methylethylamine	10595-95-6	1.60E-06	WS		1.00E-02
Nitrosopyrrolidine N	930-55-2	1.60E-05	W+F		4.00E-02
Oxamyl(vydate)	23135-22-0	2.00E-01	WS		
PCBs	1336-36-3	6.40E-08	W+F [j]		5.00E-04
Parathion	56-38-2	1.30E-05	AL		1.00E-02
Pentachlorobenzene	608-93-5	1.40E-03	W+F		1.00E-02
Pentachlorophenol	87-86-5	2.70E-04	W+F		5.00E-02
Phenol	108-95-2	2.10E+00	W+F, WS		
Picloram	1918-02-1	4.90E-01	WS		
Propylene oxide	75-56-9	1.50E-04	WS		1.00E-02
Pyrene	129-00-0	2.10E-01	W+F, WS		
Quinoline	91-22-5	1.20E-05	WS		
Selenium	7782-49-2	4.60E-03	AL		
Silver, dissolved	7440-22-4	6.00E-04	TVS [g]		1.00E-03
Simazine	122-34-9	4.00E-03	WS		
Sulfide	18496-25-8	2.00E-03	SS		
Styrene	100-42-5	1.00E-01	WS		
1,2,4,5-Tetrachlorobenzene	95-94-3	9.70E-04	W+F		1.00E-03
1,1,2,2-Tetrachloroethane	79-34-5	1.70E-04	W+F		1.00E-03
Tetrachloroethene	127-18-4	6.90E-04	W+F	5.00E-03	1.00E-03
Toluene	108-88-3	1.00E+00	W+F, WS		
Toxaphene	8001-35-2	2.00E-07	AL		2.50E-03
Tributyltin (TBT)	56573-85-4	7.20E-05	AL		1.00E-02
1,2,4-Trichlorobenzene	120-82-1	3.50E-02	W+F		
1,1,1-Trichloroethane	71-55-6	2.00E-01	WS		
1,1,2-Trichloroethane	79-00-5	2.70E-03	W+F		
Trichloroethene	79-01-6	2.50E-03	W+F	5.00E-03	
2,4,6-Trichlorophenol	88-06-2	1.40E-03	W+F		1.00E-02
Trichlorophenol 2,4,5	95-95-4	7.00E-01	WS, W+F		
Trichlorophenoxyproprionic acid	93-72-1	5.00E-02	WS		
Vinyl chloride	75-01-4	2.30E-05	W+F		2.00E-04
Xylene (total)	1330-20-7	1.00E+01	WS		
Zinc, dissolved	7440-66-6	1.41E-01	TVS [g]		

Table 1 (continued). Surface Water Standards

Analyte	CAS Reference Number	Standards [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)
PHYSICAL PARAMETERS:					
Dissolved oxygen (minimum)		5.0 mg/L	SS		
pH		6.5-9.0	SS		
RADIONUCLIDES [l]					
Americium 241	14596-10-2	0.15 (pCi/L)	BS		
Plutonium 239/240	10-12-8	0.15 (pCi/L)	BS		
Radium 226/228		5 (pCi/L) [k]	BS		
Strontium 89/90	11-10-9	8 (pCi/L)	BS		
Tritium	10028-17-8	500 (pCi/L)	SS		
Uranium, total	7440-61-1	16.8 (µg/L)]	SS		

NOTES:

[a] The values in this table reflect the promulgated Colorado WQCC classifications and standards. . If relevant, effective date information is included in subsequent footnotes. Standards for chloride, dissolved iron, dissolved manganese, and sulfate are Secondary Drinking Water Standards, which are based on aesthetic considerations. They have been removed as site-specific standards since Segments 4a, 4b, and 5 waters will not be used for drinking water supply.

[b] Acronyms: AG = Agriculture; AL = Aquatic Life; BS = Basic Standard; SS = Site Specific Standard; TVS = Table Value Standard; WS = Water Supply; W+F = Water plus Fish

[c] Temporary modifications affect Segment 5 only and apply until December 31, 2009.

[d] Whenever the practical quantitation level (PQL) for a pollutant is higher (less stringent) than a standard or temporary modification, "less than" the PQL will be used as the compliance threshold.

[e] There is no un-ionized ammonia standard for Segment 5 or Segment 4b. A standard of 0.1 mg/L applies to Segment 4a, which begins in Walnut Creek downstream of Indiana Street.

[f] Per the Basic Standards, the Total Trihalomethane (TTHM) standard applies to the sum of the four TTHM compounds. For dibromochloromethane the TTHM value for water supply, 80 parts per billion, was applied.

[g] Table value standards for metals are based on a toxicity equation which uses a hardness value of 143 mg/L.

[h] The temporary modifications for nitrate and nitrite apply to the Walnut Creek portions of Segment 5 only.

[i] The listed nitrite value is the chronic aquatic life standard based on chloride levels in excess of 22 mg/L in Segment 4.

[j] The total PCB standard in the Basic Standards is based on the sum of the Araclor analytes.

[k] Per the basic standard, this value applies to the sum of the two radium isotopes.

[l] Radionuclides are measured in activity per volume units except for uranium, which is measured as a metal parameter in mass per volume units.

[m] Effective through 3/21/2012; starting 3/22/2012 the standard is 3.20E-03 mg/L

[n] Standard is 50 ug/L until December 31, 2009. Beginning January 1, 2010, the second number in the range is applied as the applicable or corresponding Table 1 standard the flowcharts in Figures 5 through 13.

The scientific notation used in this table indicates the power of ten by which the two-decimal-place number is multiplied (e.g., 2.52E-02 = 2.52 X 10-2 = .0252).

Table 2. Water Monitoring Locations and Sampling Criteria

General Objective	Classification	Media	Location ID (1)	Location Description	Frequency	Analytes (4)
Points of Compliance (POCs)						
	POC (5)	SW	GS01	Woman Creek at Indiana Street	Flow-paced (varies)	Pu, Am, U, flow rate
	POC (5)	SW	GS03	Walnut Creek at Indiana Street	Flow-paced (varies)	Pu, Am, U, nitrate (pond discharges only), flow rate
	POC (5)	SW	GS08	Pond B-5 outlet	Flow-paced (varies)	Pu, Am, U, nitrate, flow rate
	POC (5)	SW	GS11	Pond A-4 outlet	Flow-paced (varies)	Pu, Am,U, nitrate, flow rate
	POC (5)	SW	GS31	Pond C-2 outlet	Flow-paced (varies)	Pu, Am,U, flow rate
Points of Evaluation (POEs)						
	POE (6)	SW	GS10	S. Walnut Creek at B-Series Bypass	Flow-paced (varies)	Pu, Am, U, dissolved Ag and Cd, total Be and Cr, flow rate
	POE (6)	SW	SW027	SID at Pond C-2	Flow-paced (varies)	Pu, Am,U, dissolved Ag and Cd, total Be and Cr, flow rate
	POE (6)	SW	SW093	N. Walnut Creek at end of FC-3	Flow-paced (varies)	Pu, Am, U, dissolved Ag and Cd, total Be and Cr, flow rate
Boundary Wells						
	Boundary (7)	GW	10394	Woman Creek at Indiana Street	Annual	VOCs, U, nitrate
	Boundary (7)	GW	41691	Walnut Creek at Indiana Street	Annual	VOCs, U, nitrate
Present Landfill (PLF) Area (2)						
	RCRA (10)	GW	70193	Upgradient	Quarterly	VOCs, metals
	RCRA (10)	GW	70393	Upgradient	Quarterly	VOCs, metals
	RCRA (10)	GW	70693	Upgradient	Quarterly	VOCs, metals
	RCRA (10)	GW	73005	Downgradient	Quarterly	VOCs, metals
	RCRA (10)	GW	73105	Downgradient	Quarterly	VOCs, metals
	RCRA (10)	GW	73205	Downgradient	Quarterly	VOCs, metals
	AOC (7)	GW	4087	Below East Landfill Pond	Semiannual	VOCs, U, nitrate
	AOC (7)	GW	B206989	Below East Landfill Pond	Semiannual	VOCs, U, nitrate
	Treatment System (11)	GW	PLFSEEPINF	Seep influent to treatment system	Quarterly	VOCs,U, metals, instantaneous flow rate
	Treatment System (11)	GW	GWMSINFNORTH	North GWMS influent to treatment system	Discontinued	VOCs, U, metals, nitrate
	Treatment System (11)	GW	GWMSINFSOUTH	South GWMS influent to treatment system	Discontinued	VOCs, U, metals, nitrate
	Treatment System (11)	SW	PLFSYSEFF	Treatment system effluent	Quarterly; Monthly (if required by decision)	VOCs, SVOCs, U, metals
	Treatment System (11)	SW	PLFPONDEFF	East Landfill Pond at outlet	As required by decision rule	As required by decision rule
Original Landfill (OLF) Area (3)						
	RCRA (10)	GW	P416589	Upgradient	Quarterly	VOCs, metals, SVOCs
	RCRA (10)	GW	80005	Downgradient	Quarterly	VOCs, metals, SVOCs
	RCRA (10)	GW	80105	Downgradient	Quarterly	VOCs, metals, SVOCs
	RCRA (10)	GW	80205	Downgradient	Quarterly	VOCs, metals, SVOCs
	AOC (7)	GW	11104	Downgradient, downstream	Semiannual	VOCs, U
	OLF SW (12)	SW	GS05	Woman Creek at west property line (upstream)	Quarterly; Monthly (if required by decision)	VOCs, U, metals
	OLF SW (12)	SW	GS59	Woman Creek 700 feet east of OLF (downstream)	Quarterly; Monthly (if required by decision)	VOCs, U, metals
Mound Site Plume and Treatment System (MSPTS)						
	Evaluation (9)	GW	00897	Source area	Biennial	VOCs
	Sentinel (8)	GW	15699	Downgradient of intercept trench	Semiannual	VOCs
	Treatment System (11)	GW	MOUND R1-0	Treatment system influent	Semiannual	VOCs
	Treatment System (11)	GW	MOUND R2-E	Treatment system effluent	Semiannual	VOCs
	Treatment System (11)	SW	GS10	S. Walnut Creek at B-Series Bypass	Semiannual	VOCs

Table 2 (continued). Water Monitoring Locations and Sampling Criteria

General Objective	Classification	Media	Location ID (1)	Location Description	Frequency	Analytes (4)
East Trenches Plume and Treatment System (ETPTS)						
	Evaluation (9)	GW	3687	Source area	Biennial	VOCs
	Evaluation (9)	GW	05691	Source area	Biennial	VOCs
	Evaluation (9)	GW	03991	East of source area	Biennial	VOCs
	Sentinel (8)	GW	04091	East of source area	Semiannual	VOCs
	Sentinel (8)	GW	95299	Downgradient of intercept trench	Semiannual	VOCs
	Sentinel (8)	GW	95199	Downgradient of intercept trench	Semiannual	VOCs
	Sentinel (8)	GW	95099	Downgradient of intercept trench	Semiannual	VOCs
	Sentinel (8)	GW	23296	Downgradient of intercept trench	Semiannual	VOCs, U
	Treatment System (11)	GW	ET INFLUENT	Treatment system influent	Semiannual	VOCs
	Treatment System (11)	GW	ET EFFLUENT	Treatment system effluent	Semiannual	VOCs
	Treatment System (11)	SW	POM2	S. Walnut Creek at Pond B-4 outlet	Semiannual	VOCs
Solar Ponds Plume and Treatment System (SPPTS)						
	Evaluation (9)	GW	P210189	VOC plume source area	Biennial	VOCs, U, nitrate
	Evaluation (9)	GW	79102	SPP source area - north	Biennial	VOCs, U, nitrate
	Evaluation (9)	GW	79202	SPP source area - north	Biennial	VOCs, U, nitrate
	Evaluation (9)	GW	P208989	SPP source area - north	Biennial	VOCs, U, nitrate
	Evaluation (9)	GW	79302	SPP source area - northeast	Biennial	U, nitrate
	Evaluation (9)	GW	79402	SPP source area - northeast	Biennial	U, nitrate
	Evaluation (9)	GW	79502	SPP source area - east	Biennial	U, nitrate
	Evaluation (9)	GW	79605	SPP source area - east	Biennial	U, nitrate
	Evaluation (9)	GW	00203	SPP source area - south	Biennial	VOCs, U, nitrate
	Evaluation (9)	GW	22205	SPP downgradient plume - north	Biennial	VOCs, U, nitrate
	Sentinel (8)	GW	P210089	SPP downgradient plume - north	Semiannual	VOCs, U, nitrate
	Sentinel (8)	GW	70099	Northwest of system	Semiannual	U, nitrate
	Treatment System (11)	GW	SPIN	Treatment system influent	Semiannual	U, nitrate
	Treatment System (11)	GW	SPOUT	Treatment system effluent	Semiannual	U, nitrate
	Treatment System (11)	SW	GS13	N. Walnut Creek at A-Series Bypass	Semiannual	U, nitrate
	Evaluation (9)	GW	B210489	Downgradient of treatment system	Biennial	U, nitrate
	Evaluation (9)	GW	51605	Downgradient, adjacent to GS13	Biennial	U, nitrate

Table 2 (continued). Water Monitoring Locations and Sampling Criteria

General Objective	Classification	Media	Location ID (1)	Location Description	Frequency	Analytes (4)
Other Areas of Interest						
Drainages Below Impacted Areas	AOC (7)	GW	10594	N. Walnut Creek downstream of Pond A-1	Semiannual	VOCs, U, nitrate
	AOC (7)	GW	00997	S. Walnut Creek upstream of Pond B-5	Semiannual	VOCs, U, nitrate
	AOC (7)	GW	00193	Woman Creek upstream of Pond C-2	Semiannual	VOCs, U
Former Building 371/374	Sentinel (8)	GW	37505	North part of former B371 area	Semiannual	VOCs, U, nitrate
	Sentinel (8)	GW	37405	North/northeast part of former B371/374 area	Semiannual	VOCs, U, nitrate, Pu*, Am*
	Sentinel (8)	GW	37705	East/southeast of former B371/374 area at foundation drain confluence	Semiannual	VOCs, U, nitrate, Pu*, Am*
Former Building 771/774	Sentinel (8)	GW	20705	North/northwest of former B771 area	Semiannual	VOCs, U, nitrate, Pu*, Am*
	Sentinel (8)	GW	20505	North of former B771/774 area	Semiannual	VOCs, U, Pu*, Am*
	Sentinel (8)	GW	20205	North/northeast of former B771/774 area	Semiannual	VOCs, U, Pu*, Am*
Former North-Central IA	Evaluation (9)	GW	P114689	Southwest of former B559 area	Biennial	VOCs
	Evaluation (9)	GW	P115589	West part of former B551 Warehouse area	Biennial	VOCs
	Evaluation (9)	GW	70705	East part of former B707 area	Biennial	VOCs, U
	Evaluation (9)	GW	33905	North of former 231 Tanks area	Biennial	VOCs
	Evaluation (9)	GW	21505	West of former B776/777 area	Biennial	VOCs
	Sentinel (8)	GW	52505	West of former IHSS 118.1 area	Semiannual	VOCs
	Evaluation (9)	GW	20902	Northwest of former IHSS 118.1	Biennial	VOCs
	AOC (7)	GW	42505	Terminus of FC-2	Semiannual	VOCs
Former Building 559	Evaluation (9)	GW	55905	North part of former B559 area	Biennial	VOCs, U, nitrate
	Evaluation (9)	GW	56305	West part of former B559 area	Biennial	VOCs, U, nitrate
Former IHSS 118.1	Evaluation (9)	GW	18199	North of former IHSS 118.1 area	Biennial	VOCs
	SW Performance [SW018]	SW	SW018	Upstream of FC-2 wetland	Semiannual	VOCs
Former Building 444 Complex	Evaluation (9)	GW	40005	West part of former B444 area	Biennial	VOCs, U
	Evaluation (9)	GW	40205	South part of former B444 end	Biennial	VOCs, U
	Evaluation (9)	GW	P419689	Southeast of former B444 area	Biennial	VOCs, U
	Sentinel (8)	GW	40305	East part of former B444 area	Semiannual	VOCs, U
	Evaluation (9)	GW	P416889	Southeast of former B444 area	Biennial	VOCs, U
	Sentinel (8)	GW	11502	Southeast of former B444 area	Semiannual	VOCs, U
Former Building 881	Evaluation (9)	GW	88205	South part of former B881 area	Biennial	VOCs, U
	Sentinel (8)	GW	88104	South part of former B881 area	Semiannual	VOCs, U
	Sentinel (8)	GW	00797	South of former B881 area	Semiannual	VOCs, U
Former Building 886	Evaluation (9)	GW	22996	East/northeast part of former B886 area	Biennial	VOCs, U
Former Building 991	Sentinel (8)	GW	99305	East part of former B991 area	Semiannual	VOCs, U, nitrate
	Sentinel (8)	GW	99405	Southeast part of former B991 area	Semiannual	VOCs, U, nitrate
	Sentinel (8)	GW	91305	South of confluence of FC-4 and FC-5	Semiannual	VOCs, U, nitrate
Former Oil Burn Pit No. 1	Evaluation (9)	GW	33502	Source area	Biennial	VOCs
	Evaluation (9)	GW	33604	Source area	Biennial	VOCs
	Sentinel (8)	GW	33703	Downgradient of source area	Semiannual	VOCs
Former Oil Burn Pit No. 2	Evaluation (9)	GW	91105	Source area	Biennial	VOCs
	Sentinel (8)	GW	91203	Downgradient of source area	Semiannual	VOCs
Former SW056	Sentinel (8)	GW	45608	Adjacent to French drain remnants and drain interruption	Semiannual	VOCs
OU1 Plume	Evaluation (9)	GW	891WEL	Source area	Biennial	VOCs
	AOC (7)	GW	89104	Downgradient at Woman Creek	Semiannual	VOCs
903 Pad/Ryan's Pit Plume	Evaluation (9)	GW	00191	East of former 903 Pad area	Biennial	VOCs
	Evaluation (9)	GW	50299	East of former 903 Pad area	Biennial	VOCs
	Evaluation (9)	GW	90402	Southeast of former 903 Pad area	Biennial	VOCs
	Evaluation (9)	GW	00491	Southeast of former 903 Pad area	Biennial	VOCs
	Evaluation (9)	GW	07391	Ryan's Pit source area	Biennial	VOCs, U
	Evaluation (9)	GW	90804	Southeast part of 903 Pad/Ryan's Pit Plume	Biennial	VOCs
	Sentinel (8)	GW	90399	Southeast part of 903 Pad/Ryan's Pit Plume at SID	Semiannual	VOCs
	Sentinel (8)	GW	90299	Southeast part of 903 Pad/Ryan's Pit Plume at SID	Semiannual	VOCs
	AOC (7)	GW	10304	Southeast of 903 Pad/Ryan's Pit Plume at Woman Creek	Semiannual	VOCs, U, nitrate
PU&D Yard Plume	Evaluation (9)	GW	30900	Source area	Biennial	VOCs
	Sentinel (8)	GW	30002	Downgradient at N. Walnut Creek	Semiannual	VOCs

Table 2 (continued). Water Monitoring Locations and Sampling Criteria

General Objective	Classification	Media	Location ID (1)	Location Description	Frequency	Analytes (4)
Pre-discharge						
	Pre-discharge (13)	SW	Pond A-4	A-Series terminal pond on N. Walnut Creek	Prior to routine discharge	Pu, Am, U, nitrate
	Pre-discharge (13)	SW	Pond B-5	B-Series terminal pond on S. Walnut Creek	Prior to routine discharge	Pu, Am, U, nitrate
	Pre-discharge (13)	SW	Pond C-2	C-Series terminal pond in Woman Creek	Prior to routine discharge	Pu, Am, U
Notes					**Acronyms and Abbreviations**	
(1) See Figure 1 for monitoring locations					Ag: silver	
(2) Laboratory analytes are limited to those listed in Appendix C of the Present Landfill Monitoring and Maintenance Plan and Post-Closure Plan					Am: americium-241	
(3) Laboratory analytes are limited to those listed in Appendix C of the Landfill Monitoring and Maintenance Plan, RFETS Original Landfill					AOC: Area of Concern	
(4) Analysis and evaluation for metals and VOCs will be performed for some or all of the analytes listed in Table 1					B (followed by numerals): Building (e.g., B371)	
(5) Results for POCs are evaluated using Figure 5.					Be: beryllium	
(6) Results from POEs are evaluated using Figure 6.					Cd: cadmium	
(7) Results from AOC and Boundary wells and SW018 are evaluated using Figure 7.					Cr: chromium	
(8) Results from Sentinel wells are evaluated using Figure 8.					FC: Functional Channel (e.g., FC-2)	
(9) Results from Evaluation wells are evaluated using Figure 9.					GW: ground water	
(10) Results from RCRA wells are evaluated using Figure 10.					IA: Industrial Area	
(11) Results from Treatment System locations are evaluated using Figure 11. GWISINFNORTH and GWISINFSOUTH may be used for investigative purposes.					N/A: not applicable	
(12) Results from OLF SW locations are evaluated using Figure 12.					OLF: Original Landfill	
(13) Results from Predischarge locations are evaluated using Figure 13.					OU1: Operable Unit 1	
* Samples of ground water collected for Pu and Am analysis will be filtered in the field using a 0.45 um in-line filter.					PLF: Present Landfill	
					POC: Point of Compliance	
					POE: Point of Evaluation	
					PU&D: Property Utilization and Disposal	
					Pu: plutonium-239,240	
					RCRA: Resource Conservation and Recovery Act	
					SID: South Interceptor Ditch	
					SPP: Solar Ponds Plume	
					SVOCs: semi-volatile organic compounds	
					SW: surface water	
					U: uranium	
					VOCs: volatile organic compounds	

Table 3. Present and Original Landfill Inspection and Maintenance Requirements

Present Landfill

Requirement	Description of activity	Frequency	Documentation/Reporting	Exit strategy
Final cover inspection and monitoring	- inspect/monitor slope stability, soil cover - visually inspect surface of landfill cover for cracks, depressions, heaving, and sinkholes - monitor settlement monuments and side slope stability monuments - vegetation surveys and monitoring	- quarterly (settlement and stability monuments annually); evaluate frequency during CERCLA periodic review - additional weather-related inspections within 2 days after storm event of one inch or more of rain in a 24-hour period or significant melt of 10-inch or more snowstorm - Quarterly vegetation surveys. - Annually for vegetation monitoring	- conditions affecting effectiveness of landfill cover to be reported per note 1 below - document on inspection checklist; submit to parties within one month of inspection; include in quarterly and annual reports	- Consultative process or periodic CERCLA review - Vegetation monitoring performed until PLF M&M Plan grassland success criteria are met
Inspection and monitoring of stormwater management system and erosion control features	- Visually inspect stormwater management structures (channels/lining, culverts, and outfalls); erosion control features (perimeter channels and natural drainages); and seep treatment system	- monthly for first year; evaluate frequency during CERCLA periodic review - additional weather-related inspections within 2 days after a storm event of one inch or more of rain in a 24-hour period or significant melt of a 10-inch or more snowstorm	- conditions affecting effectiveness of landfill cover to be reported per note 1 below - document on inspection checklist; submit to parties within one month of inspection; include in quarterly and annual reports	- Consultative process or periodic CERCLA review
GW monitoring	Included in Table 2, Figure 1, and Figure 10	Included in Table 2, Figure 1, and Figure 10	Included in Table 2, Figure 1, and Figure 10	Included in Table 2, Figure 1, and Figure 10
Landfill seep and pond monitoring	Included in Table 2, Figure 1, and Figure 11	Included in Table 2, Figure 1, and Figure 11	Included in Table 2, Figure 1, and Figure 11	Included in Table 2, Figure 1, and Figure 11
Maintenance and repairs	Perform minor or major repairs as needed; for major damage or repairs, consult with parties and develop appropriate actions for approval by CDPHE	- as needed	- minor/routine repairs and maintenance report on inspection form - conditions affecting effectiveness of landfill cover to be reported per note 1 below	Consultative process or periodic CERCLA review
Institutional and physical controls	Fence around perimeter of Central OU, signs at entry points to Central OU, warning signs in accordance with 6 CCR 1007-3 Part 265.14		- failure of physical controls to be reported per note 1 below - failure of institutional controls to be per note 2 below	Consultative process or periodic CERCLA review

Table 3 (continued). Present and Original Landfill Inspection and Maintenance Requirements

Original Landfill

Requirement	Description of activity	Frequency	Documentation/Reporting	Exit strategy
Final cover inspection and monitoring	- inspect/monitor slope stability and soil cover - visually inspect surface of landfill cover for cracks, depressions, heaving, sinkholes; visually inspect diversion berms; measure height and gradient if indicated (employ inclinometer monitoring results and topographic surveys as described in OLF M&M Plan.) - monitor settlement monuments - .Vegetation surveys and monitoring	- Monthly, until CDPHE approves Quarterly frequency; topographic survey every other year; evaluate frequency during CERCLA periodic review. - Additional weather-related monitoring within 2 days after a storm event of one inch or more or rain in a 24-hour period or significant melt of a 10-inch or more snowstorm - Quarterly until CDPHE approves annual frequency. - Quarterly vegetation surveys. - Annually for vegetation monitoring.	- conditions affecting effectiveness of landfill cover to be reported per note 1 below - document on inspection checklist; submit to parties within one month of inspection; include in quarterly and annual reports	- Consultative process or periodic CERCLA review - Vegetation monitoring performed until OLF M&M Plan grassland success criteria are met.
Inspection and monitoring of stormwater management system, seeps, and erosion controls	- Visually inspect/monitor stormwater management structures, seeps, and erosion controls	- Monthly, until CDPHE approves Quarterly, Semi-annual or Annual frequency; evaluate frequency during CERCLA periodic review - Additional weather-related inspections within 2 days after a storm event of one inch or more of rain in a 24-hour period or significant melt of a 10-inch or more snowstorm	- conditions affecting effectiveness of landfill cover to be reported per note 1 below - document on inspection checklist; submit to parties within one month of inspection; include in quarterly and annual reports	- Consultative process or periodic CERCLA review
GW monitoring	Included in Table 2, Figure 1, and Figure 10	Included in Table 2, Figure 1, and Figure 10	Included in Table 2, Figure 1, and Figure 10	Included in Table 2, Figure 1, and Figure 10
SW monitoring	Included in Table 2, Figure 1, and Figure 12	Included in Table 2, Figure 1, and Figure 12	Included in Table 2, Figure 1, and Figure 12	Included in Table 2, Figure 1, and Figure 12
Maintenance and repairs	- Perform minor or major repairs and maintenance - For major damage or repairs, consult with parties and develop appropriate actions for approval by CDPHE	- as needed	- minor/routine repairs and maintenance, report on inspection form - conditions affecting effectiveness of landfill cover to be reported per note 1 below	Consultative process or periodic CERCLA review
Institutional and physical controls	- inspection for evidence that institutional controls were violated or physical controls damaged	- document on inspection forms	- failure of physical controls to be reported per note 1 below - failure of institutional controls to be reported per note 2 below	Consultative process or periodic CERCLA review

Table 3 (continued). Present and Original Landfill Inspection and Maintenance Requirements

Note 1: For reportable conditions as defined in RFLMA Attachment 2, Section 6.0 (except in the case of failure of institutional controls), DOE will inform CDPHE and EPA within 15 days of receiving the inspection reports or validated data. Evaluation and planning for mitigating actions, if any, will be prepared and submitted as defined in RFLMA, Attachment 2, Section 6.0.

Note 2: In case of failure of institutional controls, DOE will notify EPA and CDPHE within 2 days of discovering evidence and will perform evaluation, consultation, and actions as defined in RFLMA, Attachment 2, Section 6.0.

Table 4. Institutional Controls for the Central Operable Unit

Controls	Use Restrictions
1	The construction and use of buildings that will be occupied on a permanent or temporary basis (such as for residences or offices) is prohibited. The construction and use of storage sheds or other, non-occupied structures is permitted, consistent with the restrictions contained in controls 2 and 3 below, and provided such use does not impair any aspect of the response action at Rocky Flats.
2	Excavation, drilling, and other intrusive activities below a depth of three feet are prohibited, except for remedy-related purposes and routine or emergency maintenance of existing utility easements, in accordance with pre-approved procedures.
3	No grading, excavation, digging, tilling, or other disturbance of any kind of surface soils is permitted, except in accordance with an erosion control plan (including Surface Water Protection Plans submitted to EPA under the Clean Water Act) approved by CDPHE or EPA. Any such soil disturbance will restore the soil surface to preexisting grade.
4	Surface water may not be used for drinking water or agricultural purposes.
5	The construction or operation of groundwater wells is prohibited, except for remedy-related purposes.
6	Digging, drilling, tilling, grading, excavation, construction of any sort (including construction of any structures, paths, trails or roads), and vehicular traffic are prohibited on the covers of the Present Landfill and the Original Landfill, except for authorized response actions.
7	Activities that may damage or impair the proper functioning of any engineered component of the response action, including but not limited to any treatment system, monitoring well, landfill cap, or surveyed benchmark, are prohibited.

Table 5. Ecological Sampling

Requirement	Description of Activity	Frequency	Documentation/Reporting	Exit Strategy
Sample surface water and sediment for: Ammonia Cyanide Radium-228	Collect surface water and sediment samples from Ponds A4, B5, and C2	Surface water: Quarterly (minimum of 3) Sediment: Once	Report data in quarterly and annual reports; evaluate in CERCLA Periodic Review for relevance of the data to the ecological risks and uncertainty identified in the CAD/ROD	Sampling completed and data reported. Approved by CDPHE on April 2, 2008.

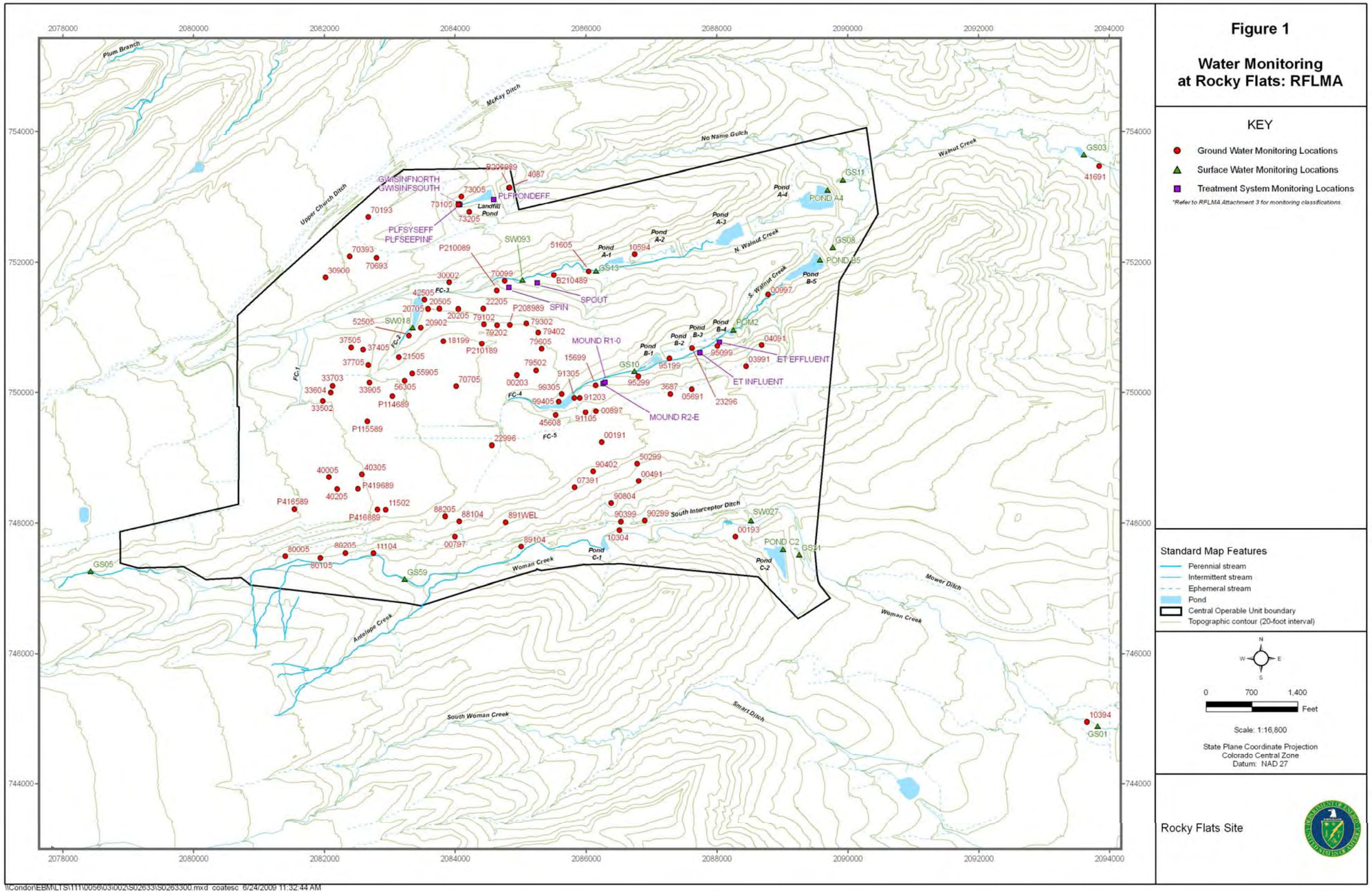


Figure 1. Water Monitoring Locations

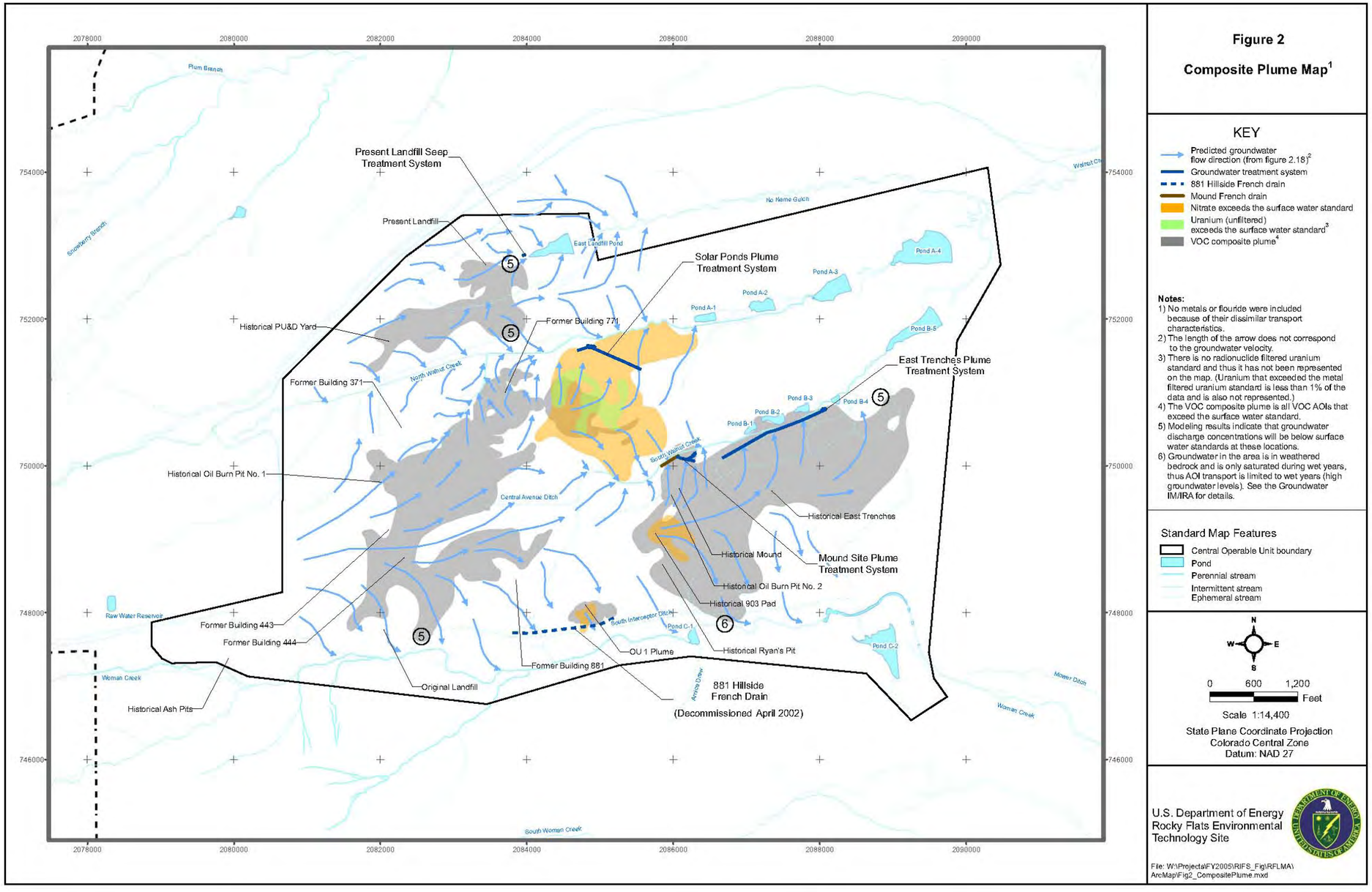


Figure 2. Composite Plume Map

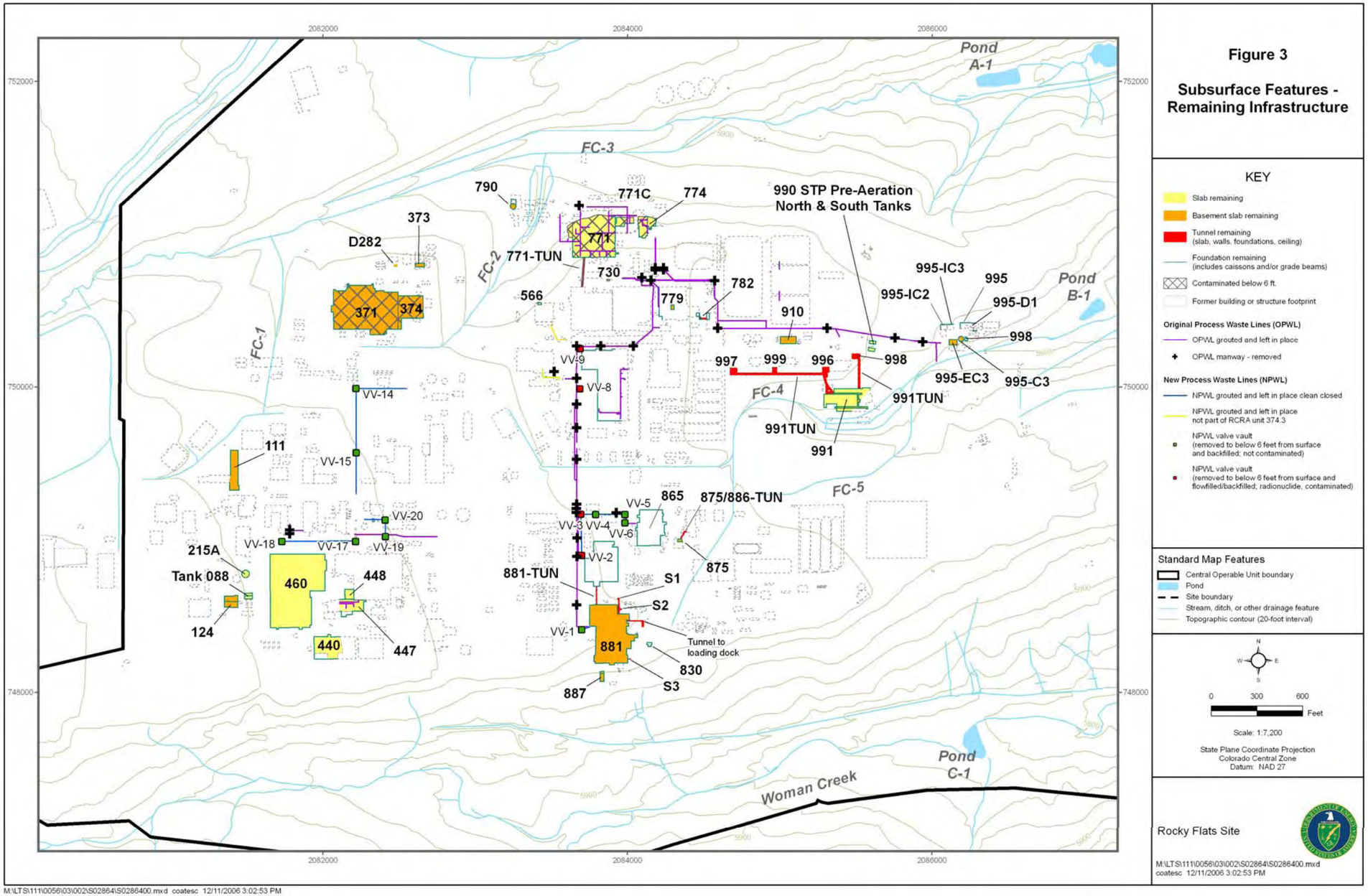


Figure 3. Subsurface Features – Remaining Infrastructure

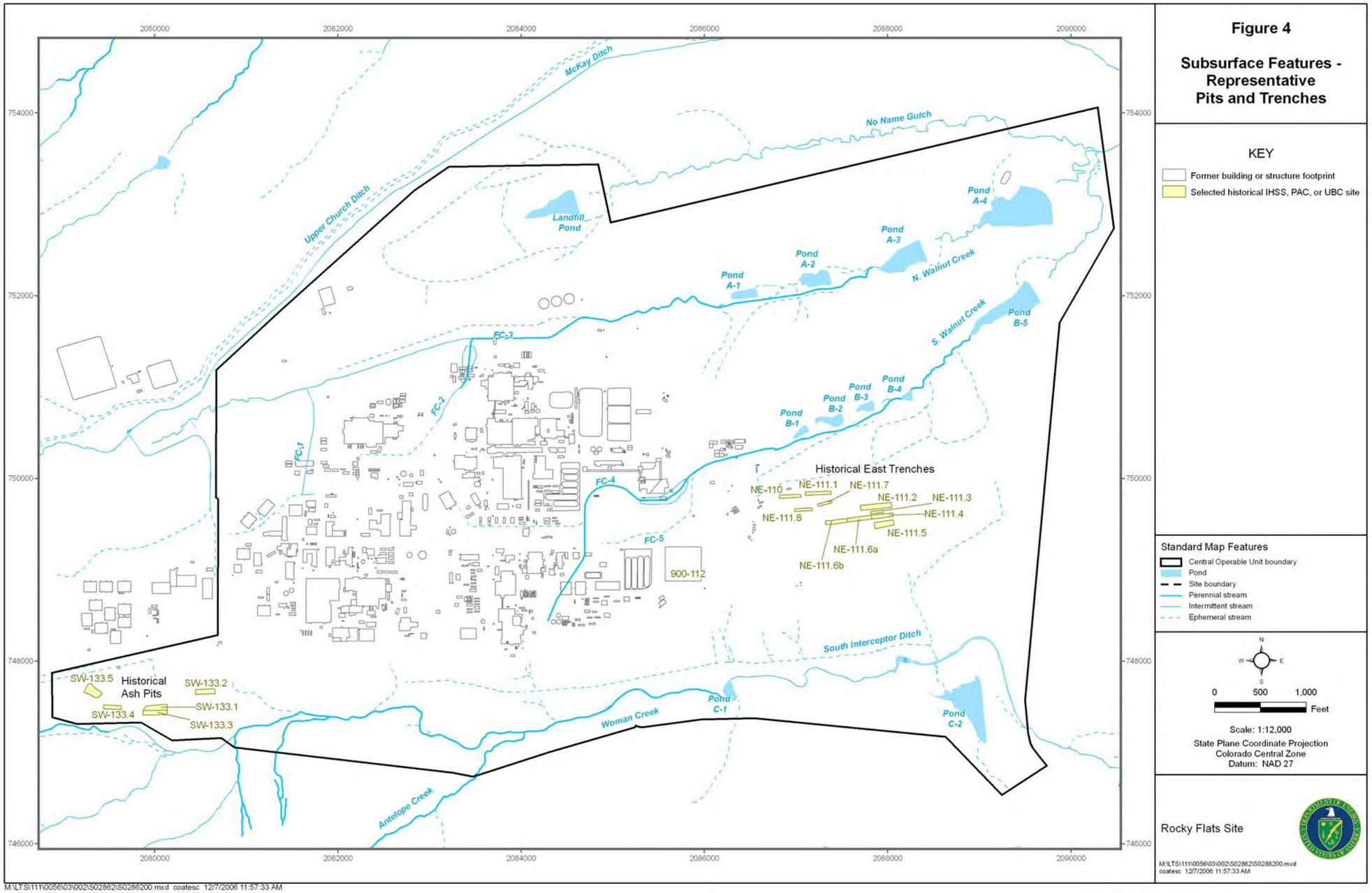
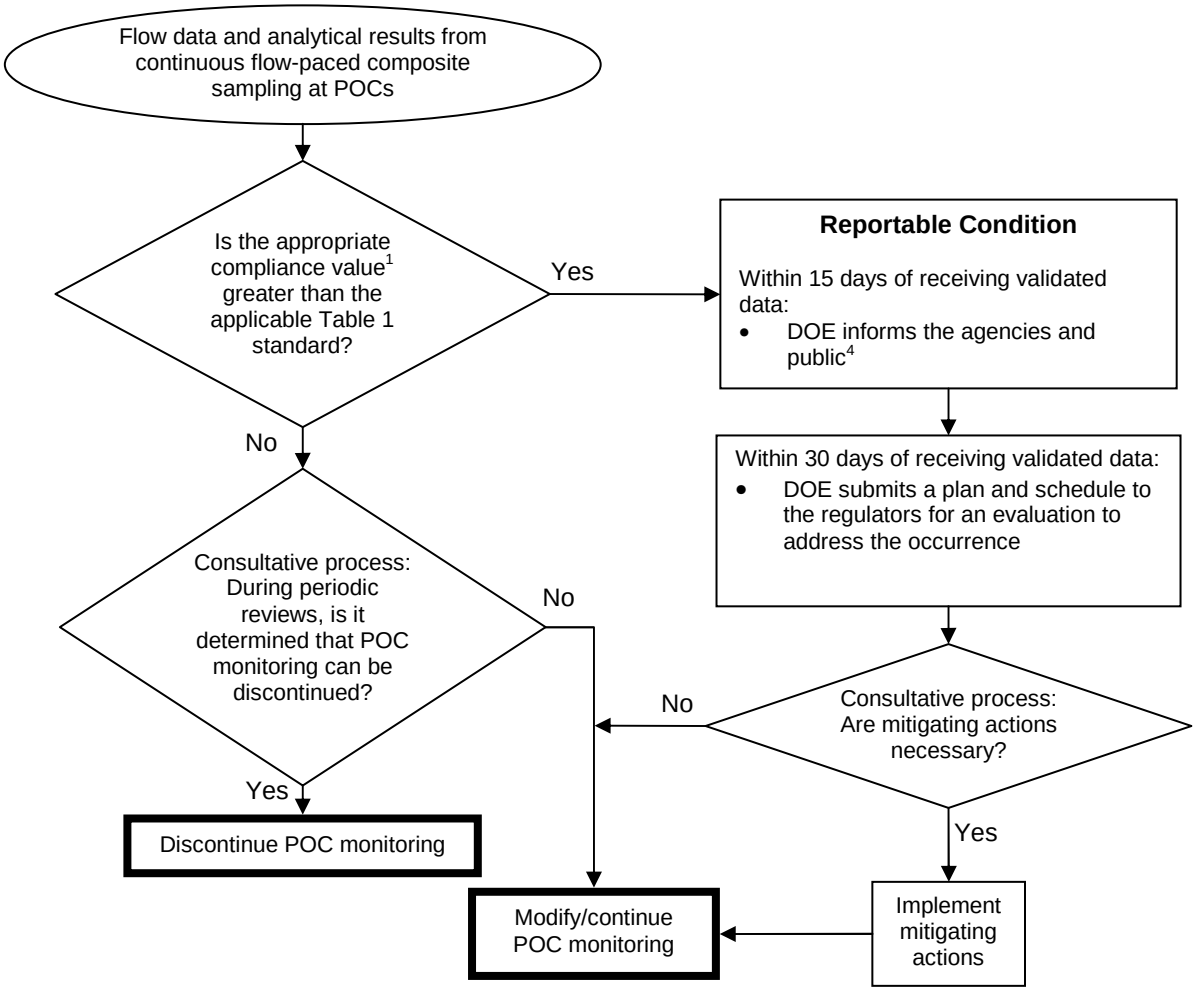


Figure 4. Subsurface Features – Representative Pits and Trenches



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

[1] Appropriate Compliance Values by locations and analytes (see Table 2 for reference)

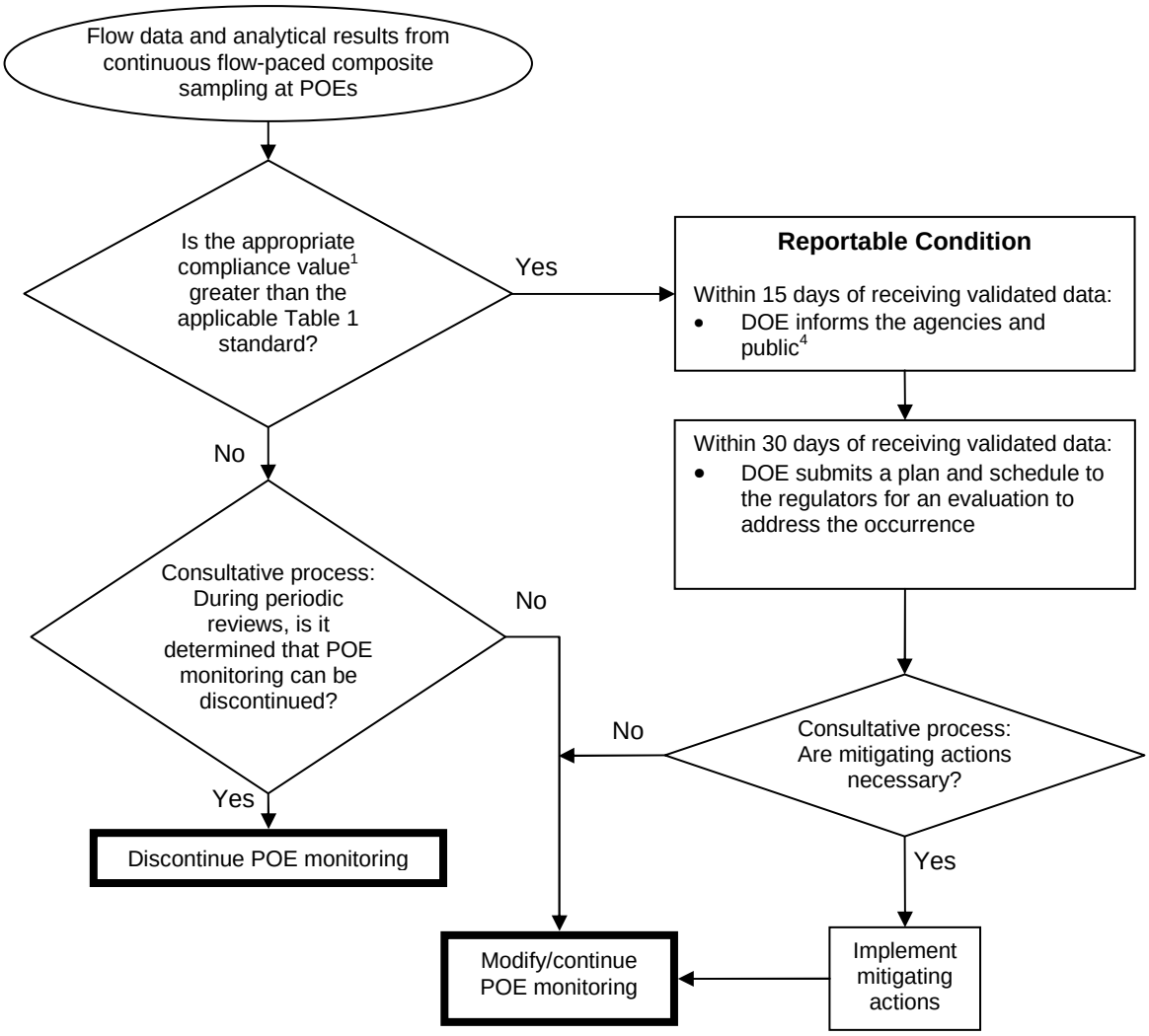
- All Indiana Street POCs:
  - plutonium, americium, uranium → 30-day average[2]
- All Terminal Pond POCs:
  - plutonium, americium, uranium → 12-month rolling average[3]
- Walnut Creek at Indiana Street POCs:
  - nitrate → 85th percentile of 30-day averages[3] for previous calendar year
- Walnut Creek Terminal Pond POCs:
  - nitrate → 12-month rolling average[2]

[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 carboy 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 carboy 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, CDPHE, and USFWS
Public: Cities of Broomfield, Northglenn, Thornton, and Westminster; Rocky Flats Stewardship Council (RFSC)

Figure 5. Points of Compliance



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

[1] Appropriate Compliance Values by analytes (see Table 2 for reference)

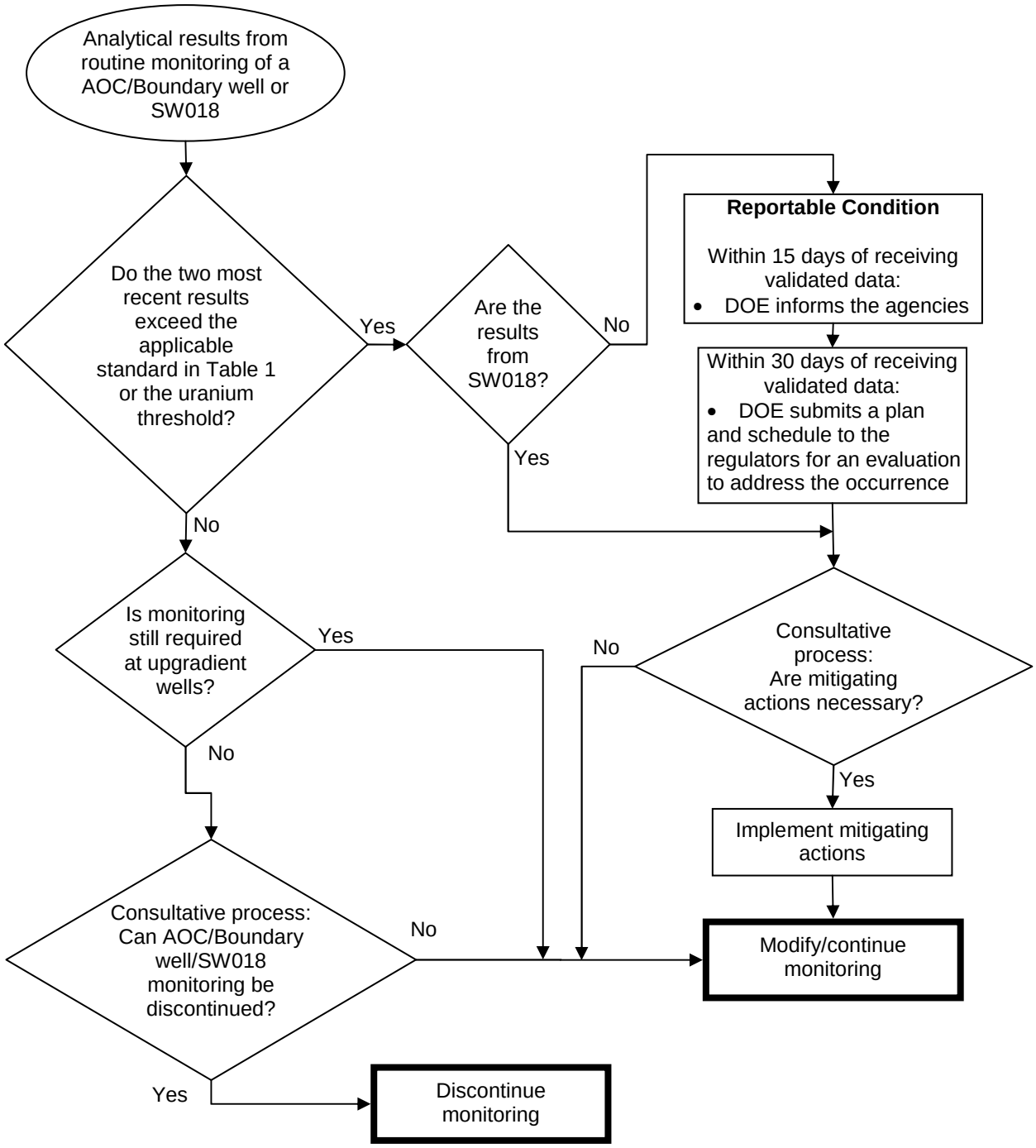
- plutonium, americium, uranium → 12-month rolling average[2]
- dissolved Cd and Ag, total Be and Cr → 85th percentile of 30-day averages[3] for previous calendar year

[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 carboy 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 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 carboy 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, CDPHE, and USFWS
Public: Cities of Broomfield, Northglenn, Thornton, and Westminster; Rocky Flats Stewardship Council (RFSC)

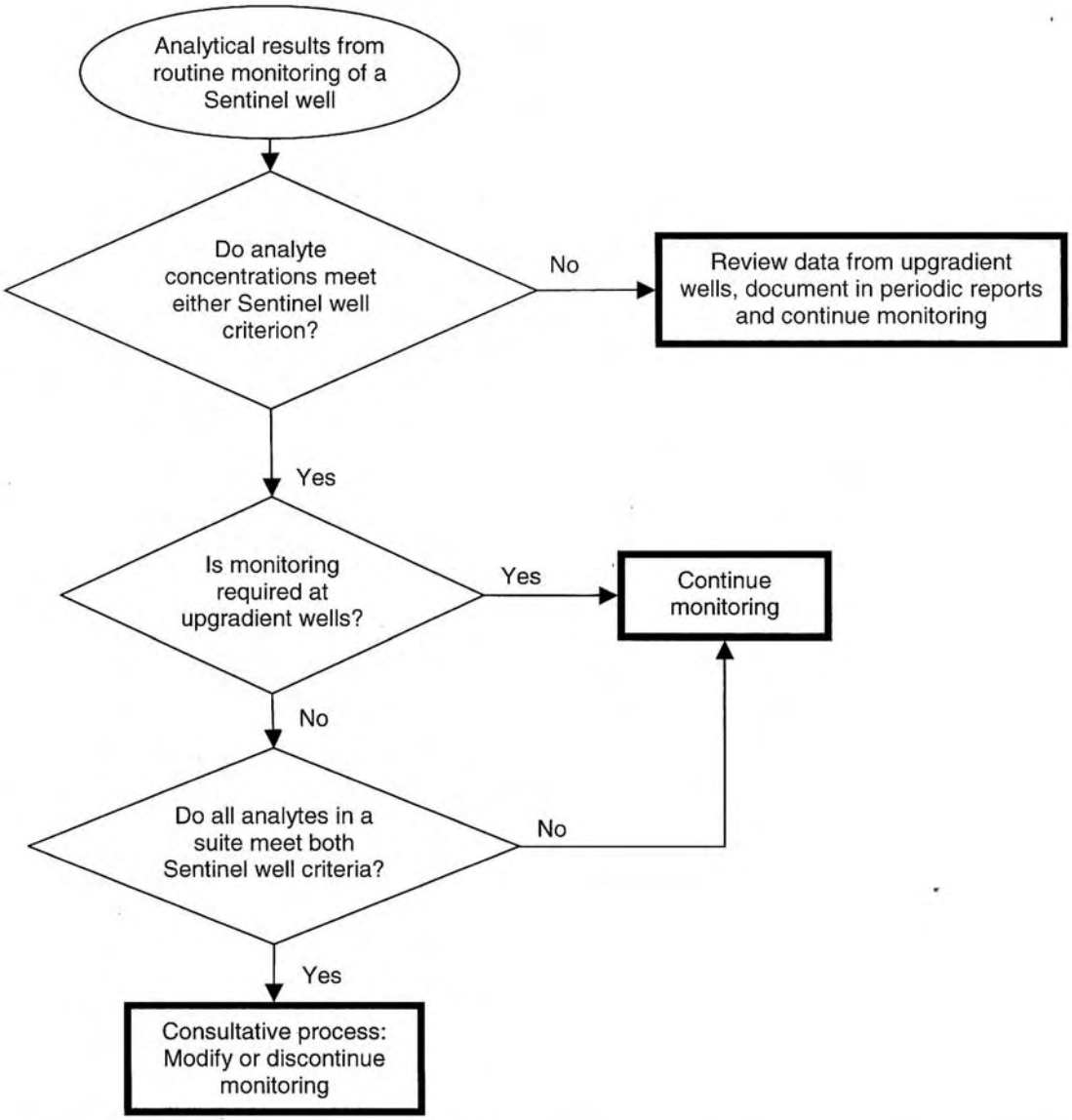
Figure 6. Points of Evaluation



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.
- Boundary wells are sampled once each year; see Table 2. These wells are not part of the remedy, but are a component of operational monitoring.
- Decisions related to uranium in ground water are based upon a 16 ug/L threshold for Boundary wells (basis: the 11 pCi/L standard) and a 120 ug/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, Boundary Wells, and SW018



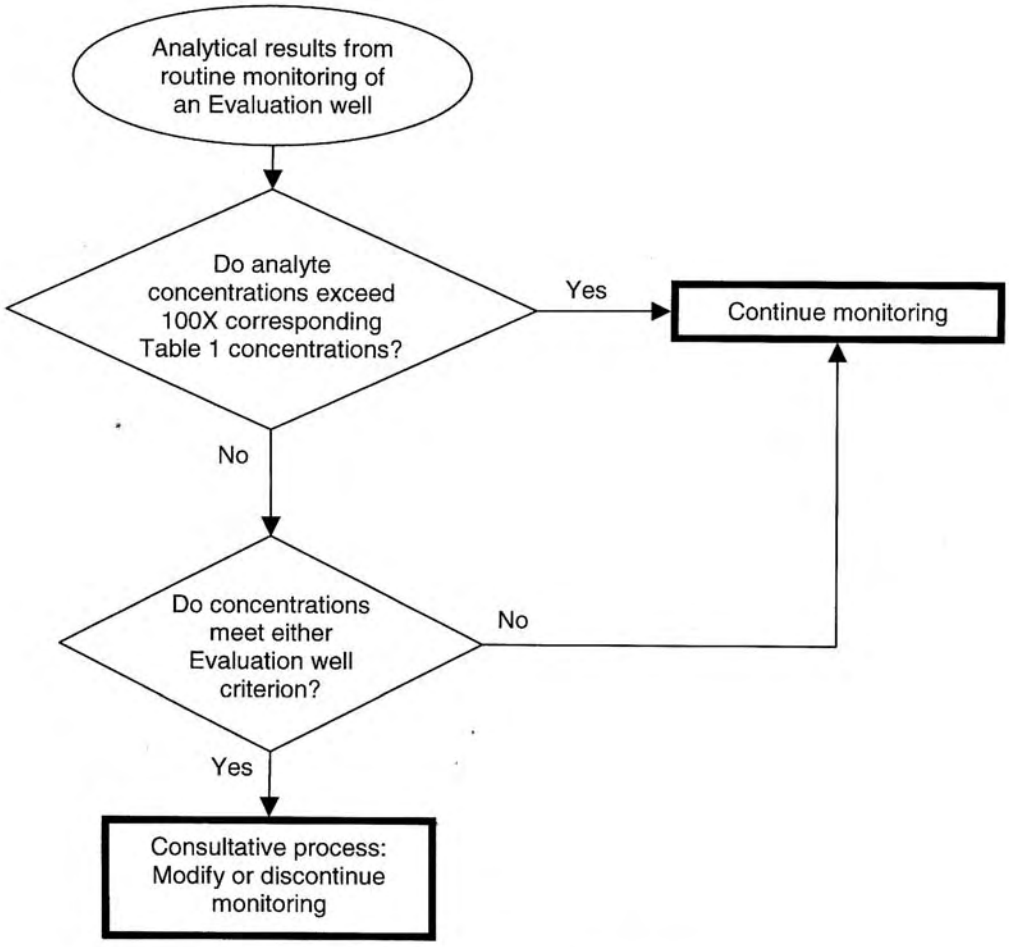
Notes: see Fig. 1 and Tables 1 and 2 for locations, standards, and sampling criteria.

- Sentinel wells are sampled twice each year; see Table 2.
- Decisions related to uranium are based upon a 120 ug/L threshold for 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.

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 2x120 ug/L or the highest calendar year 2005 concentration, whichever is higher.
2. Analyte concentrations exhibit an indeterminate or statistically-significant *decreasing* trend at the 95% confidence level.

Figure 8. Sentinel Wells



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 85th percentile concentration of an analyte *is less than or equal to* the corresponding concentration in Table 1, or, for uranium, 240 ug/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

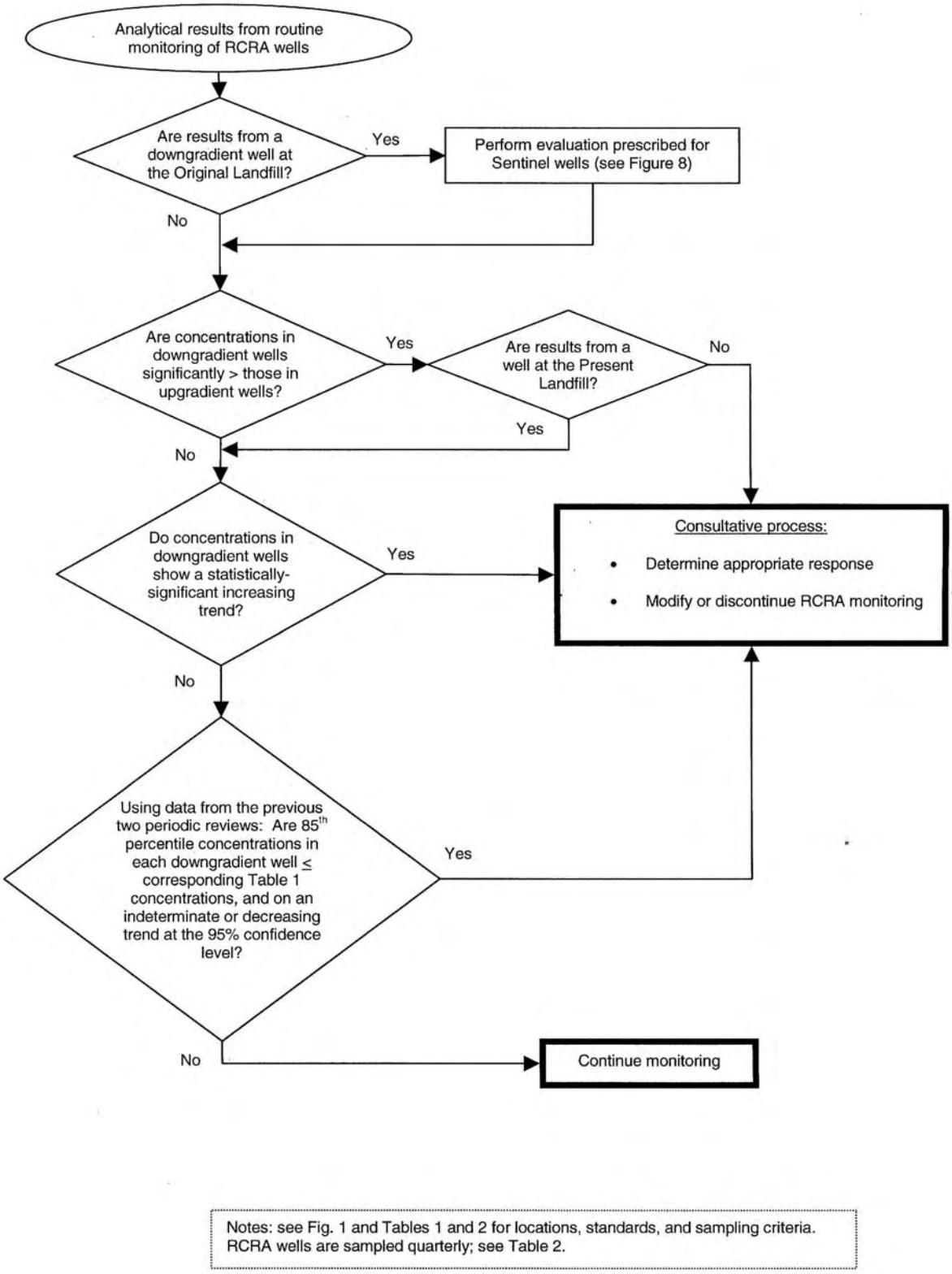


Figure 10. RCRA Wells

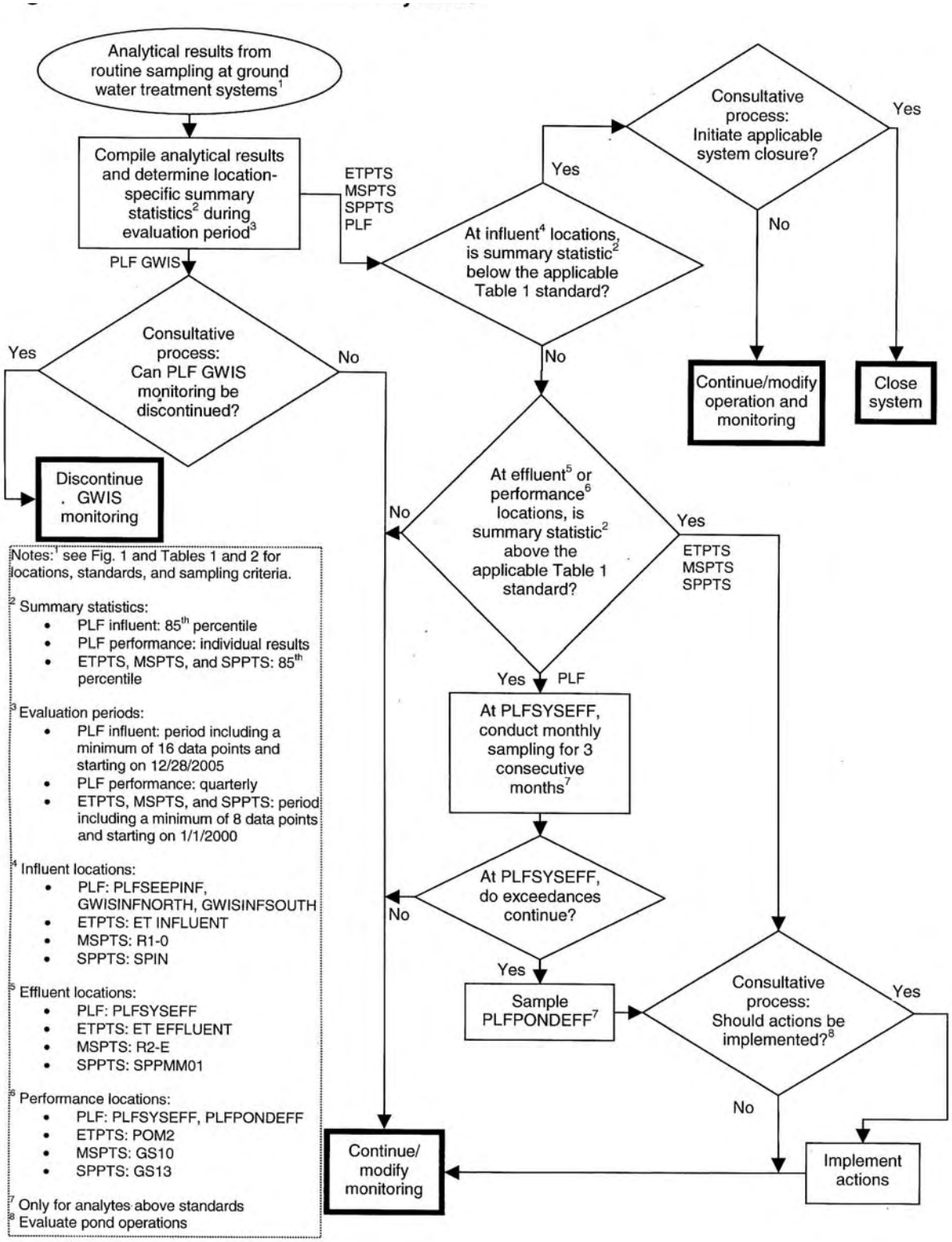


Figure 11. Groundwater Treatment Systems

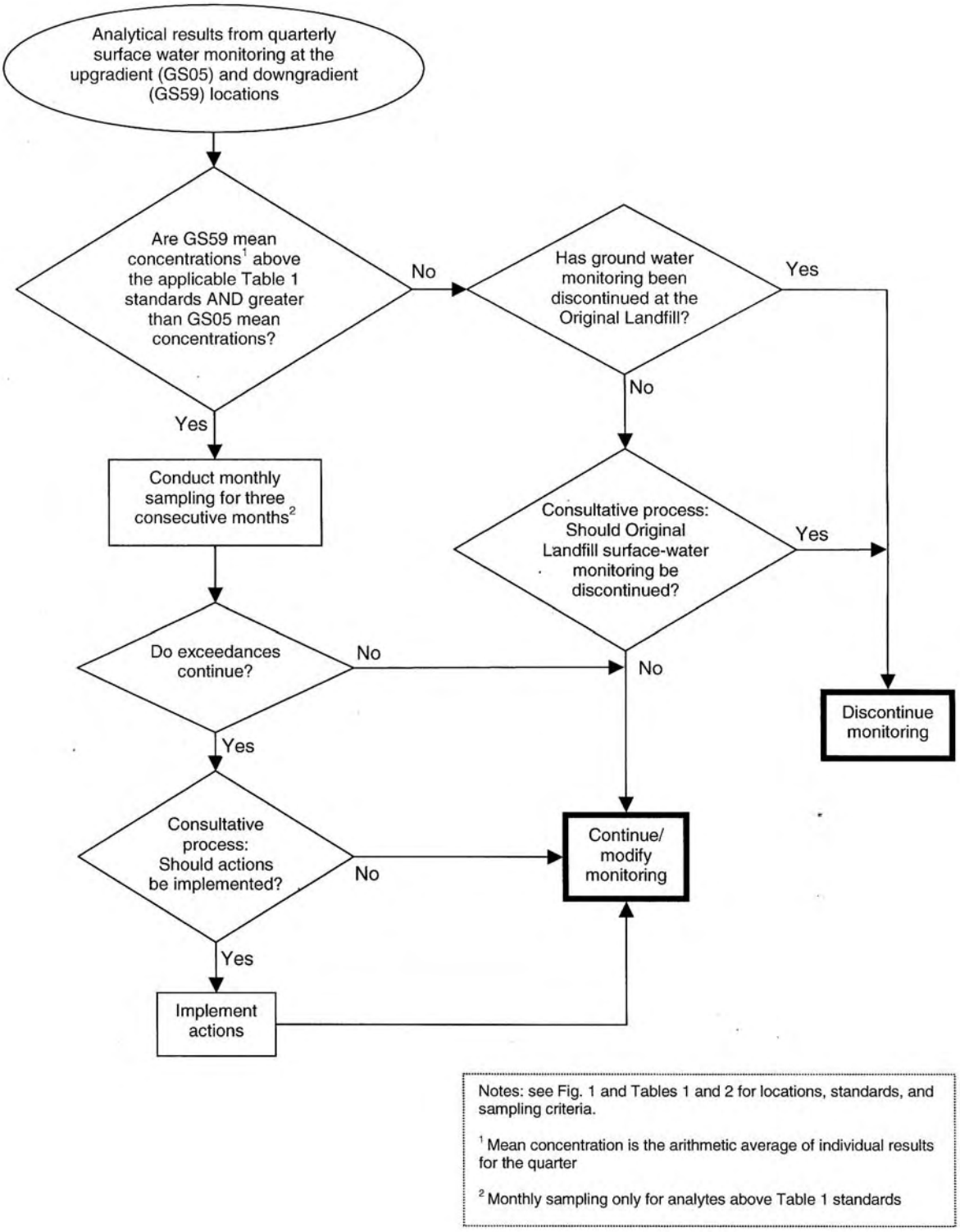


Figure 12. Original Landfill Surface Water

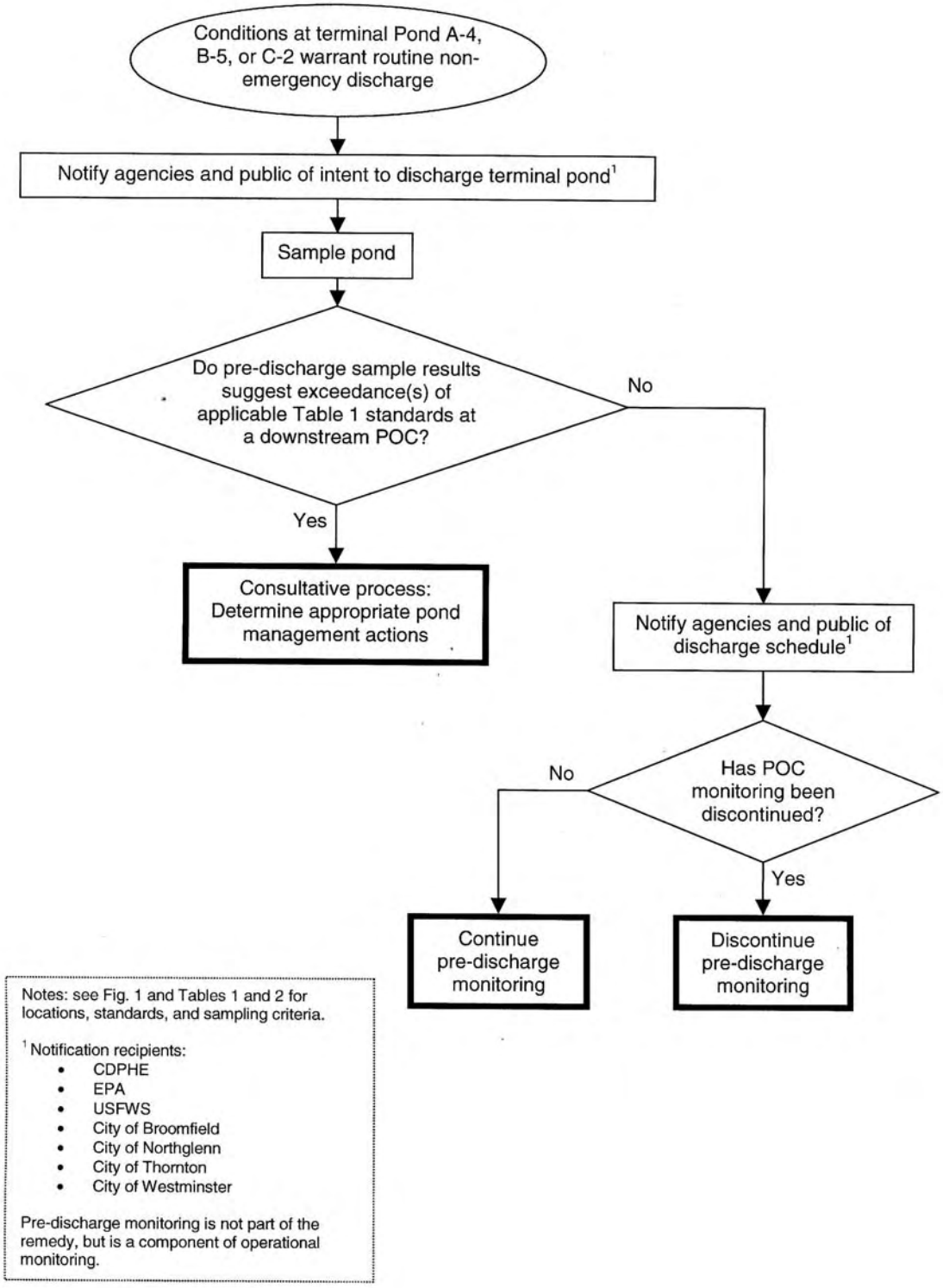


Figure 13. Pre-discharge Pond Sampling