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August 16, 1994

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Re Draft Text for Chapter 5, Pond Water Management IM/IRA

Dear Georgene and Gail

Attached is draft text for Chapter 5 *"Evaluation and Selection of Physical Control Alternatives for Pond Water Management,"* as you requested

We understand that this draft text will be forwarded to the U S Environmental Protection Agency (EPA) and the Colorado Department of Health (CDH) for their review Although this draft text provides a good description of the alternatives that will be evaluated, and the criteria used in the evaluation process, many sections of Chapter 5 have yet to be written, and the current text may be less complete than expected by regulatory personnel We highly recommend that your cover letter to the agencies note the limitations of the current text, and the fact that significant revisions will occur prior to completion of the final draft document

Pertaining to potential revisions to Chapter 5, we held a brief internal review meeting this morning, and identified three specific areas of improvement we would like to make These are as follows

1 A seventh alternative, the No Additional Action alternative, should be added to meet the requirements of Comprehensive Environmental Response, Compensation and Liability Act

2 Introductory text on assumptions or limitations of each of the alternatives should be moved out of the description section and placed in the evaluation section

3 Each alternative description should describe the monitoring program that is appropriate to the alternative, or that makes the alternative workable For example, Alternatives 1, 2, and 3 presumes that the current full suite pre-discharge monitoring scheme which results in the 32- to 38-day discharge cycle will continue, and Alternatives 4 and 5 presume that a less intensive monitoring scheme will be employed for flow-through discharge operations

We believe that these changes will significantly improve the readability of Chapter 5 Unless directed otherwise, we will begin making these changes to the text, and will forward revised copies of Chapter 5 to you for your review

As always, if you have any questions or concerns regarding the above, please call us at your earliest convenience

Sincerely,

WRIGHT WATER ENGINEERS, INC

By Eric W Mende, P E
Senior Project Engineer

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CHAPTER 5

SCREENING AND EVALUATION OF PHYSICAL CONTROL ALTERNATIVES FOR POND WATER MANAGEMENT

This chapter describes the process used to evaluate and select viable physical control alternatives for pond water management, Administrative controls (i e , monitoring programs, procedures, and operational protocols) and their justification are detailed in Chapter 4 Section 5 1 gives descriptions of the 6 alternatives evaluated Section 5 2 describes the criteria and methodology used in the evaluation process, and documents the evaluation results Proposed physical controls, and the reasoning behind their selection as the preferred alternative, are described in Section 5 3

In evaluating physical control alternatives, and selecting appropriate evaluation criteria, certain assumptions must be made that apply to water sources influent to the ponds that drive the need for and use of physical control measures The assumptions for water sources follow

1 Discharges from the wastewater treatment plant (WWTP) must comply with the effluent limitations established by the National Pollutant Discharge Elimination System (NPDES) permit For this document, it is assumed the new permit will require WWTP discharges to comply with numeric limits based on water quality standards established by the Colorado Water Quality Control Commission (WQCC) Based on historic effluent water quality data, and the documented high level of compliance that is routinely achieved by the Rocky Flats Environmental Technology Site (RFETS) WWTP, it is assumed that physical controls associated with WWTP effluents are necessary to protect discharges to Segment 4 from "upsets" prior to installation of influent/effluent tankage scheduled under other programs rather than as routine measures to control effluent water quality

2 Under current Clean Water Act (CWA) regulations, most industries are required to apply for "general" or "individual" stormwater-related NPDES permits [1] These permits generally require the implementation of Best Management Practices (BMPs) to prevent pollutants from entering stormwater prior to their being discharged to receiving waters, and apply specific monitoring requirements to stormwater discharge points

   RFETS has applied for, but has not yet received, a new NPDES permit for stormwater This preliminary draft permit issued by the U S Environmental Protection Agency (EPA) contains six stormwater discharge points, covering all stormwater outfalls from the Industrial Area of the plant site [2] For this document, it is assumed stormwater discharges from the Industrial Area will be subject to the aforementioned BMP-level controls and monitoring requirements only, consistent with expected NPDES permit requirements No numeric stream standards will apply to these discharges

Through its existing Spill Prevention, Control, and Countermeasures (SPCC)/ BMP Plan,[3] RFETS has identified and implemented many BMPs and other control measures recommended by the EPA and the State of Colorado It is assumed that these measures will limit the likelihood that significant pollution of pond water will occur from spills to stormwater

3 Consistent with stormwater provisions of the preliminary draft NPDES permit, the evaluation of physical control measures assumes that specific numeric limits for water quality will not apply to buffer zone runoff, prior to this runoff entering the pond system This runoff will be managed using a combination of stormwater BMPs required by the NPDES permit and the recommendations of the 1993 Rocky Flats Watershed Management Plan (WMP)[4] The WMP provides BMPs level guidance on the use of pesticides at RFETS, the protection of wetlands and habitat, mechanical weed control, and erosion control Such erosion control measures will help to stabilize soils and reduce the amount of eroded material which will enter the ponds

4 Current water quality data (*see* Chapter 2) does not justify the need for permanent diversion or other immediate physical control measures for discharges from springs, seeps, and localized stormwater runoff originating from Individual Hazardous Substance Sites (IHSSs) Administrative controls in the form of coordinated monitoring programs and integration of pond water management with ongoing OU 5 and OU 6 RFI/RI activities, and other non-OU source identification/characterization/interim actions are assumed to be adequate to identify new or worsening water quality problems from these sources Immediate response actions, if needed in the future, are undefinable at this time and final remediation of these water sources are addressed by other plans such as the IM/IRAs for Operable Units (OUs) 5 and 6

5 RFETS conducts discharges from the OU 1 and OU 2 IM/IRA treatment systems in accordance with the criteria established by the specific OU 1 and OU 2 Applicable or Relevant and Appropriate Requirements (ARARs) These discharges, which are influent to the pond systems, are assumed to generally meet their respective ARARs Additional physical controls to specifically address OU discharges are not considered as part of this document

6 This document assumes that interpond transfers, releases from an upstream pond to a downstream pond, and off-site discharges from the ponds will be subject to both physical controls (retention behind dams) and administrative controls (monitoring requirements, discharge criteria) However, emergency conditions that have health and safety ramifications or that threaten damage or destruction of physical controls, although not anticipated, may require emergency transfers or discharges, and take precedence over administrative controls and normal operational protocols Conditions warranting emergency transfers or discharges are detailed in Standard Operation Procedures (SOPs) and the Emergency Preparedness Implementation Plan (EPIP) [5]

It is important to note that it is not possible for this or any other document to ensure upstream physical and administrative control measures will guarantee that water sources influent to the ponds will comply with discharge standards Therefore, the goal of the evaluation process is to select physical control options that effectively manage water quality in the ponds

5 1 DESCRIPTION AND EVALUATION OF ALTERNATIVES

This section describes the physical control alternatives and corresponding and monitoring programs for pond water management selected for evaluation as part of this IM/IRA Alternatives are described in terms of a systematic approach to water management reflective of the manner in which water can be discharged to off-site locations All of the alternatives assume that off-site discharges will continue, zero discharge alternatives were not evaluated

There are two basic ways in which water can be discharged The first, known as batch discharge, involves collecting inflows in one or more ponds over a period of time, isolating this water from additional inflows, and discharging the accumulated volume of water as a distinct batch The second manner of conducting discharges, known as flow-through, results in discharges on a relatively continuous basis, depending on precipitation and other hydrologic considerations

The first alternative discussed in this section describes the No Additional Action alternative Alternatives 2, 3, and 4 describe various systematic options for conducting batch discharges Alternatives 4 and 5 describe two alternatives for conducting flow-through discharges Alternative 6 is a hybrid alternative which includes both batch discharges and flow-through discharges on a seasonally adjusted basis All the alternatives described and evaluated in this section are short-term in nature, consistent with the intent of an interim measure Although long-term water management alternatives are not identified or evaluated within this document, the effect each alternative has on long-term clean-up objectives at RFETS is considered in the evaluation process

Each of the alternatives assumes that existing facilities (i e , ponds, pipelines, treatment facilities, etc) will remain in place, and improvements required by other programs (NPDES, IA IM/IRA) will be implemented Of particular note, the alternative evaluation process of the next section assumes off-channel tankage for WWTP upsets included in the IA IM/IRA will be installed, and therefore lists these tanks as current system components for the alternatives In addition, the evaluation process assumes that footing drain and other monitoring required by the IA IM/IRA will be implemented

Another important assumption is that RCRA containment requirements will not apply to existing or new treatment facilities and piping, or for the ponds themselves, although RCRA containment requirement may apply to waste sludges or other waste streams generated as a result of treatment

5 1 1 No Additional Action Alternative

The No Additional Action alternative represents current operational facilities, monitoring programs, and protocols This alternative can be categorized as a batch discharge scenario, with exceptions In general, stormwater and other flows are held in Ponds B-5 and A-3 until sufficient volume is accumulated to warrant batch release of these ponds to Pond A-4 After filling of A-4 is completed, water in Pond A-4 is sampled for a full suite of analytes, and held until analytical results are received and CDH concurs on the water being acceptable for discharge Discharges then take place over a discreet 7- to 10-day period and discontinued when Pond A-4 levels drop below 20 percent A new discharge cycle (release A-3/B-5, sample A-4, discharge A-4) generally begins almost immediately

Analytical turnaround time combined with limitations on drawdown rate for Ponds A-4, B-5, and C-2 and limitations of effective operating capacity for Ponds A-4 and B-5 result in a batch discharge cycle of between 32 and 38 days Seasonal hydrologic conditions combined with the limitations on operating capacity (based on dam safety considerations) routinely require short circuiting of the batch discharge cycle By "short circuiting" the batch cycle, what is meant is that inflow and dam safety considerations, generally on Pond B-5, require Pond B-5 and/or Pond A-3 to be transferred to Pond A-4 while Pond A-4 is continuing to discharge True batch mode operations, including pre-discharge sampling of this water is not possible in this condition

Of 18 Pond A-4 discharges between September 1991 and June 1994, only 8 occurred as isolated batch discharges Of the remaining 10 discharges, 7 occurred with a concurrent B-5 transfer during some portion of the discharge cycle, and 3 discharges were conducted with concurrent Pond B-5 and Pond A-3 transfers

Compliance sampling on the discharge from Pond A-4 indicates no contaminants escaped the site due to this mode of operation However, assuming the no action alternative is rejected, it can only be for two reasons (1) the concept of concurrent transfer and discharge is unacceptable because of unknown water quality <u>prior to</u> discharge, or (2) upstream monitoring and control programs are inadequate to provide a "comfort level" on the quality of water released in this manner

The alternatives that follow attempt to address these concerns by either identifying improvements to physical facilities that will allow true batch discharge to occur, or by improving monitoring programs to provide assurance that flow-through operations can be conducted safely

5 1 2 Alternative 1 Continued Batch Discharge with Phased-In Pond Capacity Increases

This alternative involves detaining stormwater runoff, wastewater treatment plant effluent, and other inflows in Ponds A-3 and B-5, transferring Ponds A-3 and B-5 to Pond A-4 for isolation and pre-discharge sampling, and releasing the isolated volume in Ponds A-4 and C-2 downstream once sampling results are received This alternative closely resembles current operations This alternative evaluates whether strengthening of the dams to increase safe operating capacity will eliminate the need to short circuit the batch discharge cycle

Current System Components

- Pond A-3 operating capacity 12 4 Mgal, 100%
- Pond B-5 operating capacity Normal - 12 0 Mgal, 50%, Maximum - 15 6 Mgal, 65%
- Pond A-4 operating capacity Normal - 16 3 Mgal, 50%, Maximum - 21 1 Mgal, 65%
- Pond C-2 operating capacity Normal - 11 4 Mgal, 50%, Maximum - 14 7 Mgal, 65%
- Maximum drawdown rates for Ponds A-4, B-5, and C-2 are one foot per day
- Maximum drawdown rate for Pond A-3 is three feet per day
- Maintain interior ponds for emergency control of potentially contaminated stormwater
- Maintain current treatment systems at Ponds A-4 and C-2 in standby mode
- 500,000-gallon off-channel tankage for WWTP upsets
- Pre-discharge sampling continued at Pond A-4
- 32- to 38-day discharge cycle
- 212 water quality parameters analyzed prior to release

Required Changes and Improvements

- Expand the capacity (i e , raise the dam height) of the terminal ponds, and/or

- Structurally modify dams to consistently retain a maximum capacity of 80 percent for greater length of time (minimum 45 days), and/or
- Increase drawdown capability to safely exceed the current one foot per day restriction
- Install new piezometers and inclinometers and ties into real-time monitoring network

5 1 3 Alternative 2. Continued Batch Discharge with Phase-In Water Consumptive

This alternative has the same general description as described above for Alternative 1, with the exception that instead of strengthening the dams to retain higher volumes, this alternative reduces volumes by implementing consumptive uses such as spray evaporation, spray irrigation, wetlands enhancement, recycling, or new evaporation ponds Evaluation of this alternative will determine if any one of these consumptive uses, or a combination of these consumptive uses, will allow batch discharge operations to be conducted within the constraints of safe operating capacities, seasonal hydrologic conditions, and water quality considerations

Current System Components

- Pond A-3 operating capacity 12 4 Mgal, 100%
- Pond B-5 operating capacity Normal - 12 0 Mgal, 50%, Maximum - 15 6 Mgal, 65%
- Pond A-4 operating capacity Normal - 16 3 Mgal, 50%, Maximum - 21 1 Mgal, 65%
- Pond C-2 operating capacity Normal - 11 4 Mgal, 50%, Maximum - 14 7 Mgal, 65%
- Spray evaporation system at Pond A-2
- Discharge of excess water will be consistent with Alternative 1 (batch discharge)
- Maximum drawdown rates for Ponds A-4, B-5 and C-2 are one foot per day
- Maximum drawdown rate for Pond A-3 is three feet per day
- Maintain interior ponds for emergency control of potentially contaminated stormwater
- 500,000-gallon off-channel tankage for WWTP upsets
- Pre-discharge sampling continued at Pond A-4
- 32- to 38-day discharge cycle
- 212 water quality parameters analyzed prior to release

Required Changes and Improvements

- Construct spray evaporation systems at interior and terminal ponds to reduce the volume of water requiring discharge during optimal conditions (April through October)

- Construct spray irrigation systems in appropriate locations to further reduce the amount of water within the pond management system
- Recycle stormwater for reuse, and/or
- Construct new wetlands or evaporation ponds
- New upstream monitoring
- More frequent ambient pond monitoring

5 1 4 Alternative 3 Continued Batch Discharge with Phased-In Direct Discharge of WWTP Effluent

The general description of this alternative is the same as Alternative 2, with the exception that instead of controlling routine volumes via consumptive uses, retained volumes will be controlled by removing wastewater treatment plant effluent from the pond system, and discharging it directly to Segment 4 below the ponds Evaluation of this alternative will determine whether removing WWTP effluents from batching requirements at Pond A-4 will allow all other inflows to the pond system to be batched, given the constraints of current operating capacities, seasonal hydrologic conditions, and water quality considerations

Current System Components

- Pond A-3 operating capacity 12 4 Mgal, 100%
- Pond B-5 operating capacity Normal - 12 0 Mgal, 50%, Maximum - 15 6 Mgal, 65%
- Pond A-4 safe operating capacity Normal - 16 3 Mgal, 50%, Maximum - 21 1 Mgal, 65%
- Maximum drawdown rates for Ponds A-4 and B-5 are one foot per day
- Maximum drawdown rate for Pond A-3 is three feet per day
- Maintain interior ponds for emergency control of potentially contaminated stormwater
- 500,000-gallon off-channel tankage for WWTP upsets
- Pre-discharge sampling continued at Pond A-4
- 32- to 38-day discharge cycle for stormwater
- 212 water quality parameters analyzed prior to release

Required Changes and Improvements

- Extend WWTP discharge pipe to outfall below Pond A-4 (or B-5) Coordinate pipeline construction with installation of WWTP effluent tanks under the IA IM/IRA
- Install real-time analytical monitoring equipment for indicator parameters on the WWTP

5 1 5 Alternative 4 Flow-through Treated Discharge with Phased in Treatment Upgrades

Under this alternative, stormwater inflows, WWTP effluent, and other inflows will flow continuously to Ponds B-5 and A-4 In addition, water in Pond B-5 will be continuously pumped to Pond A-4 depending on the available capacity of Pond A-4 Water in Pond A-4 will be continuously pumped through the existing treatment system and discharged to Segment 4 Treatment system upgrades at Pond A-4, specifically for metals and radionuclides, will be phased in over time Evaluation of this alternative will determine treatment system components, and treatment system throughput capacity necessary to maintain safe pond levels given the constraints imposed by seasonal hydrologic conditions

Current System Components

- Water treatment system at Pond A-4 consisting of primary filtration (10 μm), secondary filtration (0 5 μm), and Granular Activated Carbon (GAC) Maximum flow rate is 1200 gpm
- Pumps and transfer pipelines from Ponds B-5 and C-2 to Pond A-4
- Pond A-4 safe capacity Normal - 16 3 Mgal, 50%, Maximum - 21 1 Mgal, 65%
- Maintain interior ponds for emergency control of identified spills and WWTP upsets
- 500,000-gallon off-channel tankage for WWTP upsets

Required Changes and Improvements

- Upgrade treatment capabilities at A-4 site for metals, radionuclides, non-GAC organics, and/or water quality parameters
- Upgrade treatment site for secondary containment
- Construct separate facilities for storage of sludges, used media, and other consumables contaminated with low level radioactivity and/or RCRA wastes
- Install transfer pipelines from Ponds A-1, A-2, B-1, and B-2 to Pond A-4 treatment facility
- Implement new upstream monitoring
- Specify turbidity limitations for transfers to Pond A-4

5 1 6 Alternative 5 Flow-through Untreated Discharge with Phased in Real-time Monitoring

This alterative involves controlled flow-through of stormwater, wastewater treatment plant effluents, and other inflows to Ponds A-4, B-5, and C-2, and continuously monitored discharges from the outlet works of Ponds A-4 and B-5, and possibly Pond C-2 under normal, routine operating conditions Pond C-2 may be discharged directly, or pumped to Pond A-4 for discharge Under this alternative, "flow-through will be discontinued during unattended periods (nights/weekends) during storm events, and if spills occur Holding periods and turbidity limits for transfers will be specified to ensure that stormwater has sufficiently settled to minimize soil and sediment transport Real-time analytical equipment for selected indicator parameters would be installed at various locations throughout the pond system to provide early detection and response to potential water quality problems, and early response, such that suspect water is captured and retained as far upstream as possible Evaluation of this alternative will determine whether real-time analytical equipment is available for the contaminants of concern and whether the equipment is sensitive enough to ensure that discharge water quality will achieve the performance goals established for this Decision Document Analytical monitoring of discharge water quality would continue to be conducted to ensure the reliability of the real-time monitoring system

Current System Components

- Pumps and transfer pipelines from Ponds B-5 and C-2 to Pond A-4
- Existing dams and outlet works
- Maintain interior ponds for emergency control of potentially contaminated stormwater
- 500,000-gallon off-channel tankage for WWTP upsets
- Current network of real-time monitors for flow and water quality parameters upstream of the A-1 and B-1 Bypasses and on discharge pipe from Pond A-4 Real-time pond level monitors at Ponds A-4, B-5, and C-2 Real-time piezometer monitors at Pond B-5

Required Changes and Improvements

- Install real-time analytical systems and upgrades to the current telemetry network to monitor the major influent streams (WWTP, A-1 Bypass, B-1 Bypass) and final discharges from Ponds A-4 and B-5, and possibly Pond C-2, for alpha radioactivity volatile organics, metals, inorganic contaminants, as well as pH and other traditional water quality parameters
- Install appropriate system alarms at attended control panel locations

5 1 7 Alternative 6 Seasonally Adjusted Flow-through Discharge/Batch Discharge

This alternative involves conducting batch discharge operations similar to those described in Alternative 1 during most times of the year, and conducting flow-through operations similar to those described in Alternative 5 during high flow periods (generally the months of March, April, and May) Evaluation of this alternative will determine the seasonal hydrologic conditions that warrant flow-through operations, given the constraints imposed by safe pond capacities, performance goals for water quality, and the desire to conduct batch operations during most times of the year

Current System Components

- Pond A-3 operating capacity 12 4 Mgal, 100%
- Pond B-5 operating capacity Normal - 12 0 Mgal, 50%, Maximum - 15 6 Mgal, 65%
- Pond A-4 operating capacity Normal - 16 3 Mgal, 50%, Maximum - 21 1 Mgal, 65%
- Pond C-2 operating capacity Normal - 11 1 Mgal, 50%, Maximum - 14 7 Mgal, 65%
- Maximum drawdown rates for Ponds A-4, B-5, and C-2 are one foot per day
- Maximum drawdown rate for Pond A-3 is three feet per day
- Maintain interior ponds for emergency control of potentially contaminated stormwater
- Maintain current treatment systems at Ponds A-4 and C-2 in standby mode
- Pumps and transfer pipelines from Ponds B-5 and C-2 to Pond A-4
- Current network of real-time monitors for flow and water quality parameters upstream of the A-1 and B-1 Bypasses and on discharge pipe from Pond A-4 Real-time pond level monitors at Ponds A-4, B-5, and C-2 Real-time piezometer monitors at Pond B-5
- 500,000-gallon off-channel tankage for WWTP upsets
- Pre-discharge sampling continued at Pond A-4 except during flow-through period
- 32- to 38-day discharge cycle
- 212 water quality parameters analyzed prior to release

Required Changes and Improvements

- Expansion of the real-time analytical network to monitor flow and water quality parameters on transfers from Pond B-5 to A-4, and releases from Pond A-3 to Pond A-4, WWTP effluent, and discharges from Pond C-2 or Pond A-4

5 2 EVALUATION OF ALTERNATIVES

Seven criteria were selected against which all alternatives have been evaluated Six of the criteria were assigned weighting factors (either a 1 or a 2) to reflect the relative importance of each criteria The seventh criteria, cost, received no weighting factor, reflecting its use as a tie-breaker between substantially equal alternatives

Each alternative also received a numeric ranking of 1 to 5 for each of the six criteria The summation of ranking times weighting factor for each of the six criteria yielded a total score for the alternative Total scores were compared to determine a preliminary ranking of alternatives Figure 5 is an evaluation matrix which shows the results of the preliminary ranking process Each alternative was then analyzed for implementability, environmental impact, and cost The Preferred Alternative (Section 5 3) was selected as the best combination of all of the above considerations

5 2 1 Evaluation Criteria

This section describes the criteria and methodology used to screen and evaluate potential physical control measures for pond water management The methodology employed in the evaluation process incorporates statutory criteria from Section 121 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)[6] as promulgated by EPA in the National Contingency Plan (NCP) into site-specific criteria for pond water management which reflect the goals and objectives of this document Statutory criteria are listed and described in Section 5 2 1 1 Site-specific criteria and their correlation to statutory criteria are listed and described in Section 5 2 1 2

5 2 1 1 Statutory Criteria

The document *Guidance on Preparing Superfund Decision Documents*, by the EPA Office of Solid Waste and Emergency Response (OSWER), Directive 9355 3-02[7], and associated fact sheets describes nine criteria to be used in the analysis of alternatives for interim remedial actions
The nine criteria are composed of two threshold criteria, five primary balancing criteria, and two modifying criteria These criteria, and the critical questions considered by regulatory reviewers to evaluate whether these criteria are met, are listed below

Threshold Criteria

1 Overall Protection of Human Health and the Environment

- Does the alternative provide adequate protection?

- Are risks eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls to levels that are protective of human health and environment?

2 Compliance with Benchmarks

- Does the alternative meet all ARARs selected for and applicable to this IM/IRA Decision Document or, if appropriate, provide the grounds for invoking a waiver?

Primary Balancing Criteria

3 Long-Term Effectiveness and Permanence

- Does the alternative maintain reliable protection of human health and the environment over time, after clean-up levels have been met?

(Note This criteria has limited applicability because it is not generally considered by EPA to be relevant to a temporary measure implemented as an interim action, however, the degree to which the option is consistent with and supports long-term actions is a key consideration)

4 Reduction of Toxicity, Mobility, or Volume through Treatment

- What is the anticipated performance of the treatment technologies for each treatment alternative?

5 Short-Term Effectiveness

- Does the alternative have any adverse impacts on human health and the environment during the construction and implementation period?
- Can mitigation techniques minimize adverse effects?
- What are the methods that will achieve protection, and how long will it be until protection is achieved?

6 Ability to Implement

- Is the alternative technically and administratively feasible?
- Are the services and materials available for a particular option?

7 Cost

- What are the present worth, capital, and operation and maintenance (O&M) costs for the alternative?

Modifying Criteria

8 State/EPA Acceptance

- Are regulatory agency comments and concerns addressed?
- Do the regulatory agencies accept the selected recommended remedy?

9 Community Acceptance

- Are the public's comments and concerns addressed?

(Note Specific responses to public and agency comments are addressed in the Responsiveness Summary section of the Final IM/IRA Decision Document)

5 2 1 2 Site-Specific Criteria

Site-specific criteria focus the evaluation and selection process on alternatives that are directly applicable to pond water management and the goals and objectives of this IM/IRA Criteria associated with the defined scope, goals, and objectives of this IM/IRA Decision Document are as follows

1 Achieves Segment 4 Standards for Off-Site Discharges

This criterion evaluates the ability of the alternative to ensure that water discharged from the RFETS pond system to downstream locations meets all relevant WQCC water quality standards assigned to Segment 4 of Big Dry Creek The relative ranking of the alternatives for this criterion takes into consideration the importance of particular constituents (i e , plutonium versus iron), and the ability to detect particular constituents at the level of the standard prior to discharge A weighting factor of 2 is assigned to reflect the importance of protection of human health and aquatic life via established water quality use classifications and standards specific ARARs and, through their adoption by the WQCC, are considered to be protective of human health and the environment.

2. Ensure Protection of Functional Ecologies

This criterion evaluates the ability of each alternative to minimize stress on existing aquatic and terrestrial ecologies and comply with the Endangered Species Act (ESA), Fish and Wildlife Coordination Act, and other laws enacted to protect native populations and habitat. Since a formal Biological Assessment must be conducted to assess ecological impacts of the selected alternative(s), the relative rankings of the alternatives for this criterion only consider ecological impacts in terms of a conceptual comparison between competing alternatives. A weighting factor of 2 is assigned to this criterion to reflect the fact that protection of the environment via compliance with ecologically-based environmental laws carries equal weight to protection of human health and aquatic via water quality standards.

The ESA and other ecologically-based environmental laws which ensure protection of functional ecologies are ARARs for pond water management and this document. This site-specific criterion relates to both Threshold Criteria 1 and 2.

3 Maintain Safety and Security of Dam Structures

This criterion evaluates the ability of the alternative to maintain acceptable factors of safety for the dams against the retained volume of water and short-term and long-term residence time. The relative ranking for each alternative takes into consideration that higher retained volumes and longer residence times increase the relative risk of structural damage to the dams, up to and including catastrophic dam failure A weighting factor of 2 is assigned to this criterion to reflect the large potential consequences to life, property, and the environment from a partial or complete dam failure.

The site-specific criteria relates to Threshold Criteria 1 and Primary Balancing Criteria 3. Consideration of dam safety during pond water management operations is essential in reducing overall risks to downstream environments In addition, maintaining these structures in good condition provides reliable, long-term protection against contaminant releases during the life of clean-up operations at RFETS.

4 Maximize Terminal Pond Capacity for Stormwater Collection

This criteria evaluates the ability of each alternative to capture, retain, and otherwise attenuate flow rates of off-site discharges of high storm events by minimizing the likelihood of spillway overflow conditions due to high initial (e g , pre-storm event) storage volumes The relative ranking takes into consideration the ability of Ponds A-3, A-4, B-5, and C-2 to retain the 100-year storm event A weighting factor of 1 is assigned to this criterion to reflect the low probability of large storm events have the highest potential to transport potentially contaminated sediments and cause damage due to erosion and flooding

This criteria relates to Threshold Criteria 1 and Primary Balancing Criteria 4 and 5 Controlling sediment transport is protective of human health and environment, while controlling flood flows prevents short-term adverse impacts It is also well recognized that short-term retention of storm flows essentially treats stormwater through settling of suspended solids, thereby reducing sediment mobility and improving water quality

5 Maximize Pond Capacities to Contain Spill Events

This criterion evaluates the ability of each alternative to capture and retain known spill events, minimize the number of affected ponds and the affected volume of water potentially requiring treatment, and ultimately to prevent off-site release of contaminants The relative ranking takes into consideration maximum credible spill scenarios and travel times in light of spill prevention and control programs and BMPs currently in place A weighting factor of 1 is assigned to this criterion to reflect the low probability of a major spill and large storm event occurring simultaneously but recognizes the severe public and regulatory consequences of spilled contaminants leaving RFETS property

This criterion relates to Threshold Criteria 1 and Primary Balancing Criteria 5 Maximizing spill capacity reduces overall risk to public health and the environment by reducing the probability of a spill reaching downstream locations and provides effective short-term mitigation of adverse impacts until treatment can be implemented

6 Minimize Contaminant Migration

This criterion evaluates the ability of each alternative to identify and isolate waters containing elevated levels of environmental contaminants (<u>not</u> spills--see Criterion 5), minimize the affected volume of water requiring treatment, and minimize the potential spread of existing environmental contamination both on-site and off-site The relative ranking takes into consideration the desire to treat the existing contaminant as close to its source as possible, avoid the creation of additional or expanded IHSSs, and minimize waste generation A weighting factor of 1 is assigned to this criterion to reflect the desire to avoid creating larger, more complex or additional clean-up sites and minimize long-term clean-up costs

This criterion relates to Threshold Criteria 1 and Primary Balance Criteria 3 Minimizing contaminant migration through appropriate engineering and institutional controls downstream environments provides effective long-term benefits to public health and the environment

7 Minimize Capital and Operating Costs

This criteria evaluates the level of costs associated with implementing specific pond water management alternatives No weighting factor is assigned to this criterion and no ranking of alternatives is assigned on the basis of cost This criterion is used only as a tie-breaker between alternatives which are substantially equal based on other evaluation criteria

5 2 2 Alternative Ranking Scheme

Numeric ranking of each alternative against individual evaluation criteria ranges from 1 (low) to 5 (high) In assigning a ranking number to an individual alternative, increasing values represent increasing confidence that the specific criteria can be achieved, irrespective of the performance of other alternatives against the same criteria In other words, more than one alternative can have the same ranking for a particular criteria, and some ranking numbers may not be represented at all

In assigning ranking numbers, the following approach was used

Ranking of 1 Evaluation indicates the criterion can probably be achieved less than 10 percent of the time

Ranking of 2 Evaluation indicates the criterion can probably be achieved approximately 25 percent of the time

Ranking of 3 Evaluation indicates the criterion can probably be achieved approximately 50 percent of the time

Ranking of 4 Evaluation indicates the criterion can probably be achieved approximately 75 percent of the time

Ranking of 5 Evaluation indicates the criterion can probably be achieved approximately 90 percent of the time

5 2 3 Evaluation Results

The alternatives are evaluated from a hydrologic perspective to ascertain their potential effects on the flow regime in Walnut Creek downstream of Pond A-4 and the water level fluctuation in the ponds A summary of the flow regime and pond fluctuations is presented in Table   A discussion of each of the alternatives is contained below

5 2 3 1 Evaluation of Hydrologic Aspects of Alternatives

For Alternative 1, water will be released to Walnut Creek downstream of Pond A-4 for a 7- to 10-day period every 35 days The normal release rate is between one and two million gallons per day (approximately 1 5 to 3 1 cfs) The total volume released is approximately 13 million gallons every 35-day cycle There are no planned releases between batching cycles Pond levels will fluctuate significantly under this scenario Pond levels increase during the storage portion of the batching cycle and then decrease during the release portion of the cycle

For Alternative 2, water will be released to Walnut Creek downstream of Pond A-4 for a 7- to 10-day period every 35 days The total volume of water released will be smaller than the other alternatives because of the consumptive use of the spray evaporation system The evaporative spray system will consume approximately gallons per day This will result in a reduced release rate of approximately between and million gallons per day There are no planned releases to Walnut Creek downstream of Pond A-4 between batching cycles Pond levels will fluctuate under this scenario They will increase during the storage portion of the batching cycle and then decrease during the release portion of the cycle The fluctuations will be smaller than those experienced in the other options consisting of batch discharge because of the consumptive use of the water

Under Alternative 3, water will be released to Walnut Creek downstream of Pond A-4 at a constant rate of approximately 160,000 gallons per day (0 25 cfs) plus greater releases for a 7- to 10-day period every 35 days The release rate during the batch release will be approximately between 0 5 and 1 5 million gallons per day (approximately 0 75 to 2 5 cfs) Pond levels will fluctuate under this scenario The pond level fluctuation, however, will be less noticeable than other batch release alternatives

Under Alternative 4, there will be a continuous discharge averaging approximately 400,000 gallons per day (approximately 0 6 cfs) to Walnut Creek downstream of Pond A-4 The fluctuation of pond levels will be much less in this scenario than in any of the alternatives that entail batching cycles Additionally, the pond levels will be at a generally lower level than during any of the batch cycle alternatives

The hydrologic regime in Walnut Creek downstream of Pond A-4 will be the same for Alternative 5 as Alternative 4 There will be a constant discharge of approximately 400,000 gallons per day (approximately 0 6 cfs) released to Walnut Creek The pond levels will fluctuate far less than in any of the batching scenarios and they will be maintained at a lower level than any of the batching alternatives

In Alternative 6, water would be released to Walnut Creek downstream of Pond A-4 for a 7- to 10-day period every 35 days for approximately 9 months of the year During the spring runoff (generally, March, April, and May) water would be released more often and may be released on a continuous basis Pond levels will fluctuate significantly during the portion of the year where a batching cycle is used During the portion of the year where there is a flow-through system, the pond levels will not fluctuate as greatly but the pond levels will be maintained at a relatively high level