CHECKLIST FOR REVIEW OF FEDERAL RCRA PERMIT APPLICATIONS

SECTION D. PROCESS INFORMATION - SURFACE IMPOUNDMENTS

Section and Requirement		Federal Regulation	Review Consideration[a]	Location in Application[b]	See Attached Comment Number[c]
D-4	Surface Impoundments				
D-4a	List of Wastes	270.17(a)	Provide list of all hazardous waste placed, or to be placed, in surface impoundments.		
D-4b	Liner System Exemption Requests	270.17(b)			
D-4b(1)	Exemption Based on Existing Portion	270.17(b)(1); 264.221(c)	Existing portions of surface impoundments with waste in place on November 8, 1994, and having only vertical expansion are exempted from liner system requirements. New units, lateral expansion of existing units, and replacement units at existing facilities are not exempt. Provide plan indicating limits of existing portions.		
D-4b(2)	Exemption Based on Alternative Design and Location	270.17(b)(1); 264.221(d)			
D-4b(3)	Exemption for Replacement Surface Impoundments	270.17(b); 264.221(f)			
D-4c	Liner System, General Items	270.17(b)(1)	Provides discussion of the following items that apply to liner system as a whole.		
D-4c(1)	Liner System Description	270.17(b)(1)	Provide detailed description of liner system, demonstrating that any flow of liquids into and through liners will be prevented. The liner system includes liner foundation, bottom composite liner, leachate detection system, top synthetic liner, and any protective layer placed to protect top synthetic liner.		
D-4c(2)	Liner System Location Relative to High Water Table	270.17(b)(1), (3); 264.221(a)	Provide geological cross sections showing groundwater levels with seasonal		

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SECTION D. PROCESS INFORMATION - SURFACE IMPOUNDMENTS

Section and Requirement		Federal Regulation	Review Consideration[a]	Location in Application[b]	See Attached Comment Number[c]
			fluctuations and liner foundation elevations.		
D-4c(3)	Load on Liner System	270.17(b)(1); 264.221(a)(1),(b)	Provide results of calculations defining maximum loads or stresses that will be placed on liner system.		
D-4c(4)	Liner System Coverage	270.17(b)(1); 264.221(a)(1), (b)	Demonstrate that liner system will be installed to cover all surrounding earth likely to be in contact with waste or leachate.		
D-4c(5)	Liner System Exposure Prevention	270.17(b)(1); 264.221(a)(1), (b)	Demonstrate that liner system will not be exposed to elements, or that if exposed, exposure will not result in unacceptable degradation of system.		
D-4d	Liner System Foundation				
D-4d(1)	Foundation Description	270.17(b)(1); 264.221(a)(2)	Describe foundation for liner system, including materials, and indicate bearing elevations and any load-bearing embankments placed to support liner system.		
D-4d(2)	Subsurface Exploration Data	270.17(b)(1); 264.221(a)(2)	The engineering characteristics of liner system foundation materials should be verified through subsurface explorations. Provide information to fully describe these efforts.		
D-4d(3)	Laboratory Testing Data	270.17(b)(1); 264.221(a)(2)	Provide index testing results to classify site materials and lab test data to evaluate engineering properties of foundation materials. Provide references to standard test procedures.		

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SECTION D. PROCESS INFORMATION - SURFACE IMPOUNDMENTS

Section and Requirement		Federal Regulation	Review Consideration[a]	Location in Application[b]	See Attached Comment Number[c]
D-4d(4)	Engineering Analyses	270.17(b)(1); 264.221(a)(2)	Provide engineering analyses based on subsurface exploration and laboratory testing data. Include discussion of methods used, assumptions, copies of calculations, and appropriate references.		
D-4d(4)(a)	Settlement Potential	270.17(b)(1); 264.221(a)(2)	Provide estimates of total and differential settlement of liner system foundation.		
D-4d(4)(b)	Bearing Capacity	270.17(b)(1); 264.221(a)(2)	Provide analysis of allowable bearing capacity of liner system foundation.		
D-4d(4)(c)	Potential for Excess Hydrostatic or Gas Pressure	270.17(b)(1); 264.221(a)(2)	Provide estimates of potential or bottom heave or blow-out of liner system or line foundation due to unequal hydrostatic or gas pressures.		
D-4e	Liner System, Liners				
D-4e(1)	Synthetic Liners	270.17(b)(1); 264.221(a),(c)	For each synthetic liner in system or under consideration, provide the following general information: thickness; type; material; brand name; and manufacturer.		
D-4e(1)(a)	Synthetic Liner Compatibility Data	270.17(b)(1); 264.221(a)(1)	Provide summary and discussion of test results and conclusions as to suitability of synthetic liner based on liner/waste compatibility testing.		
D-4e(1)(b)	Synthetic Liner Strength	270.17(b)(1); 264.221(a)(1)	Provide data showing that synthetic liners, including seams, have sufficient strength after exposure to waste and waste leachate.		
D-4e(1)(c)	Synthetic Liner Bedding	270.17(b)(1); 264.221(a)(2)	Demonstrate that sufficient bedding will be provided above and below the synthetic		

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SECTION D. PROCESS INFORMATION - SURFACE IMPOUNDMENTS

Section and Requirement		Federal Regulation	Review Consideration[a]	Location in Application[b]	See Attached Comment Number[c]
			liners to prevent rupture during installation and operation. Synthetic membrane of bottom composite liner should be placed directly on soil portion.		
D-4e(2)	Soil Liners	270.17(b)(1); 264.221(a); (c)(1)	Describe soil portion of bottom composite liner, including classification, thickness, hydraulic conductivity, and material specifications.		
D-4e(2)(a)	Material Testing Data	270.17(b)(1); 264.221(c)	Provide complete results for index tests, laboratory and/or in situ permeability tests, strength tests, consolidation tests, and shrink-swell properties of soil liner material. Discuss potential for dispersion and piping of soil due to flow of liquid through soil liner layer.		
D-4e(2)(b)	Soil Liner Compatibility Data	270.17(b)(1); 264.221(a)(1)	Provide complete results of permeability testing of soil liner material using representative of leachate from surface impoundment.		
D-4e(2)(c)	Soil Liner Strength	270.17(b)(1); 264.221(a)(1)	Demonstrate that soil liner has sufficient strength to support loads/stresses computed in item D-4c(3).		
D-4f	Liner System, Leachate Detection System	270.17(b)(1); 264.221(c)(2)			
D-4f(1)	Systems Operation and Design	270.17(b)(1); 264.221(c)(2),(4)	Describe design features of leachate detection system and how system will function to detect any leakage through either liner in timely manner.		

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SECTION D. PROCESS INFORMATION - SURFACE IMPOUNDMENTS

Section and Requirement		Federal Regulation	Review Consideration[a]	Location in Application[b]	See Attached Comment Number[c]
D-4f(2)	Drainage Material	270.17(b)(1); 264.221(c)(2)(ii)	Describe leachate detection system drainage material.		
D-4f(3)	Grading and Drainage	270.17(b)(1); 264.221(c)(2)	Indicate slopes of leachate detection system and provide contour plan for system along with plan showing layout and spacing of piping system and any sumps, pumps, etc. Demonstrate that leak detection system is appropriately graded to assure that leakage at any point in liner system is detected in timely manner.		
D-4f(4)	System Compatibility	270.17(b)(1); 264.221(c)(2)(iii)			
D-4f(5)	System Strength				
D-4f(5)(a)	Stability of Drainage Layers	270.17(b)(1); 264.221(c)(2)(iii)	Demonstrate that drainage layer of leachate detection system has sufficient soil-bearing capacity to support loads. Provide calculations showing that drainage layer placed on sloped surfaces of surface impoundment or foundations will be stable during construction.		
D-4f(5)(b)	Strength of Piping	270.17(b)(1); 264.221(c)(2)(iii)	Demonstrate that pipes used in piping systems have sufficient strength to support loads as computed in item D-4c(3).		
D-4f(6)	Prevention of Clogging	270.17(b)(1); 264.221(c)(2)(iv)			
D-4f(7)	Liquid Removal	270.17(b)(1);	Indicate fate of collected leachate, which is		

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Section and Requirement		Federal Regulation	Review Consideration[a]	Location in Application[b]	See Attached Comment Number[c]
		264.221(c)(2)(v), (c)(3)	considered hazardous waste.		
D-4f(8)	Location Relative to Water Table	270.17(b)(3); 264.221(c)(4)			
D-4g	Liner System, Construction and Maintenance				
D-4g(1)	Material Specifications	270.17(b)(1); 264.221(a)			
D-4g(1)(a)	Synthetic Liners	270.17(b)(1); 264.221(a)	Provide detailed material specifications for specific synthetic liner(s) to be used.		
D-4g(1)(b)	Soil Liners	270.17(b)(1); 264.221(a)	For soil liners constructed of borrowed material, provide specifications; for soil liners using in-place soil, provide specifications to be used to assure that all existing materials meet requirements of liner design.		
D-4g(1)(c)	Leachate Detection System	270.17(b)(1); 264.221(a)	Provide material specifications for drainage layer material, filter fabric or filter layer, piping, and sumps.		
D-4g(2)	Construction Specifications				
D-4g(2)(a)	Liner System Foundation	270.17(b)(1); 264.221(a)	For installed foundations, provide construction specifications of foundation installation procedures. For units that use the in-place material for liner system foundation, provide construction specifications for preparation.		
D-4g(2)(b)	Soil Liner	270.17(b)(1); 264.221(a),(a)(2	Describe procedures for installing soil liner.		

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Section and Requirement		Federal Regulation	Review Consideration[a]	Location in Application[b]	See Attached Comment Number[c]
		)			
D-4g(2)(c)	Synthetic Liners	270.17(b)(1); 264.221(a); 264.226(a)(1)	Provide construction specifications for placement of synthetic liners.		
D-4g(2)(d)	Leachate Detection System	270.17(b)(1); 264.221(a)	Provide construction specifications for placement of leachate detection system components, including drainage layers, piping, filter layers, sumps, pumps, etc.		
D-4g(3)	Construction Quality Assurance (CQA) Program	270.17(b)(1),(4); 270.30(k)(2); 264.19; 264.226(a)	Provide complete details of CQA program to be used during construction of liner system to assure that it is built as designed.		
D-4g(4)	Maintenance Procedures for Leachate Detection System	270.17(b)(1); 264.221(a)	Describe anticipated maintenance activities that will be used to assure proper operation of leachate detection systems throughout surface impoundment's expected life.		
D-4g(5)	Liner Repairs During Operations	270.17(b)(1); 264.221(a)	Describe methods that will be used to repair any damage to liner that occurs while surface impoundment is in operation (such as a drag line ripping the liner during cleaning operations).		
D-4h	Action Leakage Rate	270.17(b)(5); 264.222			
D-4h(1)	Determination of Action Leakage Rate	270.17(b)(5); 264.222(a)	Identify action leakage rate for surface impoundment units subject to liner system provisions of 264.221(c) and 264.221(d).		
D-4h(2)	Monitoring of Leakage	270.17(b)(5);			

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Section and Requirement		Federal Regulation	Review Consideration[a]	Location in Application[b]	See Attached Comment Number[c]
		264.222(b)			
D-4i	Leakage Response Action Plan	270.17(b)(5); 264.223			
D-4i(1)	Response Action	270.17(b)(5); 264.223(a)			
D-4i(2)	Leak and/or Remedial Determinations	270.17(b)(5); 264.223(b),(c)			
D-4i(3)	Notifications	270.17(b)(5); 264.223(b)			
D-4j	Prevention of Overtopping	270.17(b)(6); 264.221(g)	Describe design and/or operating procedures that will protect against impoundment overtopping/overflow.		
D-4j(1)	Design Features	270.17(b)(6); 264.221(g)	Describe design features used to prevent overtopping, such as spillways or weirs for flow-through systems, automatic or manual controls, and sensors and alarms.		
D-4j(2)	Operating Procedure	270.17(b)(6); 264.221(g)	If operating procedures are instrumental to preventing overtopping, describe those procedures.		
D-4j(3)	Overtopping Prevention	270.17(b)(6); 264.221(g)	Unless foolproof controls are used to prevent overtopping, provide results of calculations showing that adequate freeboard will be available following 100-year, 24-hour storm event.		
D-4j(4)	Freeboard Requirements	270.17(b); 264.221(g)	Freeboard requirements associated with normal and extreme wind activity should be determined unless automatic controls are		

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Section and Requirement		Federal Regulation	Review Consideration[a]	Location in Application[b]	See Attached Comment Number[c]
			used and freeboard equals or exceeds 2 feet.		
D-4j(5)	Outflow Destination	270.17(b); 264.221(g)	Describe fate of liquids released through flow control devices. Identify location to which waste would be moved in event of emergency.		
D-4k	Dike Stability				
D-4k(1)	Engineer's Certification	270.17(d); 264.226(c)			
D-4k(2)	Dike Design Description	270.17(b)(7); 264.221(h)	Provide data and/or drawings specifying design layout of the dikes and their components, including materials of construction. Determine capability of dikes to withstand failure from expected static and dynamic loadings and effects of erosion.		
D-4k(3)	Erosion and Piping Protection	270.17(b); 264.221(h)	Demonstrate that dikes are designed and constructed to minimize erosion and piping, and to prevent failure due to excessive erosion. Describe procedures for correcting erosion problems identified during unit's operating life.		
D-4k(4)	Subsurface Soil Conditions	270.17(b)(7); 264.221(h)	Engineering characteristics of dike foundation materials should be verified through testing and subsurface explorations, as necessary. These explorations may include: test borings; test pits or trenches; in situ tests; and geophysical exploration methods.		

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Section and Requirement		Federal Regulation	Review Consideration[a]	Location in Application[b]	See Attached Comment Number[c]
D-4k(5)	Stability Analysis	270.17(b); 264.221(h)	Describe stability analyses and results for the following conditions, as appropriate: foundation soil bearing failure of settlement; failure in dike slopes; failure of impoundment cut slopes; build-up of hydrostatic pressure due to failure of drainage system, dike cover, and liner; and rapid drawdown.		
D-4k(6)	Strength and Compressibility Test Results	270.17(b); 264.221(h)	Provide results of strength and consolidation tests on dike materials together with description of sampling procedures and test methods.		
D-4k(7)	Dike Construction Procedures	270.17(b); 264.221(h)	Describe methods to be used to construct dikes at new units.		
D-4k(8)	Dike Construction Inspection Program	270.17(b); 264.221(h)	Describe inspection, monitoring, sampling and testing methods, and frequencies to be used during dike construction to assure that new dikes meet design requirements.		
D-4l	Special Waste Management Plan for Surface Impoundments Containing Wastes F020, F021, F022, F023, F026, and F027	270.17(i); 264.231(a)			

Notes:

[a] Considerations in addition to the requirements presented in the regulations.

[b] For each requirement, this column must indicate one of the following: NA for not applicable, IM for information missing, or the exact location of the information in the application.

[c] If application is deficient in an area, prepare a comment describing the deficiency, attach it to the checklist, and reference the comment in this column.