Texas Commission on Environmental Quality

CHECKLIST WORKSHEET

MSW CME CHECKLIST B DETECTION MONITORING

Reg Ent Name :_____ **Date :**_____

Add ID_____ **Investigator Name**_____

Item No	Description	Answer	Citations	Notes
	SECTION A: GROUNDWATER MONITORING SYSTEMS (330.403)			
1	Has a groundwater monitoring system been installed that consists of a sufficient number of monitoring wells, installed at appropriate locations and depths to yield representative groundwater samples from the uppermost aquifer?		330.403(a)	
2	Are background monitoring wells installed to allow determination of the quality of background groundwater that has not been affected by leakage from a unit?		330.403(a)(1)	
3	Does the point of compliance monitoring system include monitoring wells installed to allow determination of the quality of groundwater passing the point of compliance and to ensure the detection of groundwater contamination in the uppermost aquifer?		330.403(a)(2)	
4	Has owner/operator obtained executive director approval to operate a multi-unit groundwater monitoring? Identify TCEQ approval date.		330.403(b)	
5	Has the executive director approved an alternative design for a groundwater monitoring system in accordance with 330.403(c) that uses other means in conjunction with monitoring wells to ensure detection of groundwater contamination in the uppermost aquifer from a solid waste management unit? Date of TCEQ approval.			
6	Are all parts of the groundwater monitoring system operated and maintained so that they perform at least to design specifications through the life of the groundwater monitoring program?		330.403(d)	
7	Was the groundwater monitoring system, including the number, spacing, and depths of monitoring wells or other sampling points, designed and certified by a qualified groundwater scientist? Was the groundwater monitoring system certification submitted within 14 days of c ertification?		330.403(e)	
8	Was the groundwater monitoring system certification approved by the executive director prior to construction of the system?		330.403(e)	
9	Is the design of the monitoring system based on site-specific technical information?		330.403(e)(1)	
	SECTION B: GROUNDWATER FATE AND TRANSPORT MODELING AND NOTIFICATION			
10	Has owner/operator elected to use an applicable multi-dimensional fate and transport numerical flow model in accordance with 330.403(e)(2) that considers site-specific characteristics of groundwater flow as well as dispersion and diffusion of possible contaminants in the materials of the uppermost aquifer?			

CHECKLIST WORKSHEET

MSW CME CHECKLIST B DETECTION MONITORING (Cont)

10A	Does the model have supporting docum entation that establishes its ability to represent groundwater flow and contaminant transport, as needed?		330.403(e)(2)(A)	
10B	Does the model have a sound set of equations based on accepted theory representing groundwater movement and contaminant transport?		330.403(e)(2)(B)	
10C	Does the model have numerical solution methods that are based on sound mathematical principles and supported by verification and checking techniques?		330.403(e)(2)(C)	
10D	Is the model calibrated against site-specific field data?		330.403(e)(2)(D)	
10E	Does the model have a sensitivity analysis to measure its response to changes in the values of major parameters, error tolerances, and other parameters?		330.403(e)(2)(E)	
10F	Does the model show mass-balance calculations, where necessary?		330.403(e)(2)(F)	
10G	Is the model based on actual field or laboratory measurements, or equivalent methods, that document the validity of chosen parameter values?		330.403(e)(2)(G)	
11	Has owner/operator notified the executive director,and any local pollution agency with jurisdiction that has requested to be notified, in writing of changes in facility construction, or operation, or changes in adjacent property that affect, or are likely to affect, the direction and rate of groundwater flow and the potential for detecting groundwater contamination from a solid waste management unit, and that may require the installation of additional monitoring wells or sampling points?		330.403(e)(3)	
	SECTION C: MONITOR WELL CONSTRUCTION SPECIFICATIONS (330.421)			
12	Monitor Well Construction. Does monitor well construction provide for maintenance of the integrity of the bore hole, collection of representative groundwater samples from the water-bearing zone(s) of concern, and prevention of migration of groundwater and surface water within the bore hole?		330.421(a)	
13	Was the monitoring well(s) drilled by a Texas-licensed driller with installation and development supervised by a licensed professional geoscientist or engineer familiar with the area geology?		330.421(a)(1)(A)	
14	Was the well drilled by a method that will allow installation of the casing, screen, etc., and that will not introduce contaminants into the bore hole or casing?		330.421(a)(1)(B)	
15	Was the diameter of the boring at least four inches larger than the diameter of the casing?		330.421(a)(1)(C)	
16	Was a log of the boring made by or under the supervision of a licensed professional geoscientist or engineer familiar with the area geology, and was the log sealed, signed, and dated by the licensed professional?		330.421(a)(1)(D)	

CHECKLIST WORKSHEET

MSW CME CHECKLIST B DETECTION MONITORING (Cont)

17	Is the well casing two to four inches in diameter, National Science Foundation-certified PVC Schedule 40 or 80 pipe, flush-thread, screw joint (no glue or solvents), PTFE (such as Teflon) tape or O-rings in the joints, with no collar couplings?		330.421(a)(2)(A)	
18	Is the top of the casing at least two feet above ground level? Was the casing cleaned and packaged at the place of manufacture? Is the casing free of ink, labels, or other markings? Is the casing and screen centered in the hole? Is the top of the casing protected by a cap or screw-plug seal?		330.421(a)(2)(A)	
19	Is the cap vented to prevent buildup of gases and designed to prevent moisture from entering the well?		330.421(a)(2)(A)	
20	Is the screen compatible with the casing, generally of the same material, and constructed without any glues or solvents? Does the well screen exclude field-cut slots?		330.421(a)(2)(B)	
21	Is a blank-pipe sediment trap installed below the screen?		330.421(a)(2)(B)	
22	Is a bottom cap placed on the bottom of the sediment trap?		330.421(a)(2)(B)	
23	Did owner/operator ensure that the sediment trap does not extend through the lower confining layer of the water-bearing zone being tested?		330.421(a)(2)(B)	
	SECTION D: MONITOR WELL FILTER PACK AND CASING			
24	Did owner/operator ensure that the screen opening is not larger than the smallest fraction of the filter pack?		330.421(a)(2)(B)	
25	Does the filter pack, placed between the screen and the well bore, consist of prepackaged, inert, clean silica sand or glass beads?Does the filter pack extend from one to four feet above the top of the screen?		330.421(a)(2)(C)	
26	Did owner/operator ensure that open stockpile sources of sand or gravel were not used to construct the filter pack?		330.421(a)(2)(C)	
27	Was the annular seal placed on top of the filter pack and is it at least two feet thick? (If a bentonite-grout casing seal is used in the well bore, then it may replace the annular seal.)		330.421(a)(2)(D)	
28	Was a casing seal placed on top of the annular seal to prevent fluids and contaminants from entering the bore hole from the surface? Does the casing seal consist of a commercial bentonite grout or a cement-bentonite mixture?		330.421(a)(2)(E)	
29	Is the top of the casing seal between five and two feet from the surface?		330.421(a)(2)(E)	
30	Was high-quality structural-type concrete placed from the top of the casing seal (two to five feet below the surface) continually to the top of the ground to form a pad at the surface?		330.421(a)(3)	
	SECTION E: MONITOR WELL SURFACE PAD AND SECURITY			
31	Is the formed surface pad at least six inches thick and not less than four feet square, or five feet in diameter? Does the pad contain sufficient reinforcing steel to ensure its structural integrity?		330.421(a)(3)	

CHECKLIST WORKSHEET

MSW CME CHECKLIST B DETECTION MONITORING (Cont)

32	Does the top of the pad slope away from the well bore to the edges to prevent ponding of water around the casing or collar?		330.421(a)(3)	
33	Was a steel protective pipe collar placed around the casing "stickup" to protect it from damage and unwanted entry? Was the collar set at least one foot into the surface pad during its construction?		330.421(a)(4)	
34	Does the top of the collar have a lockable hinged top flap or cover?		330.421(a)(4)	
35	Is a sturdy lock installed, maintained in working order, and kept locked when the well is not being bailed/purged of sampled?		330.421(a)(4)	
	SECTION F: MONITOR WELL DEVELOPMENT ANI ADDITIONAL ISSUES			
36	Is the well number or other designation marked permanently on the protective steel collar?		330.421(a)(4)	
37	Is a protective barrier installed where monitoring wells are likely to be damaged by moving equipment or are located in heavily traveled areas?		330.421(a)(5)	
38	Unusual Conditions. Where monitoring wells are installed in unusual conditions, were all aspects of the installation approved in writing in advance by the executive director?		330.421(b)	
39	Development. After installation, was the monitoring well developed to remove artifacts of drilling, and to open the water-bearing zone for maximum flow into the well?		330.421(c)	
	SECTION G: MONITOR WELL ELEVATION SURVE LOGS AND DAMAGED AND UNUSED WELLS			
40	Upon completion of the monitoring well, was the location of the well and all appropriate elevations associated with the top-well equipment surveyed by a registered professional surveyor?		330.421(d)	
41	Was the elevation surveyed to the nearest 0.01 foot above mean sea level (with year of the sea-level datum shown)?		330.421(d)	
42	Was the point on the well casing for which the elevation was determined permanently marked on the casing?		330.421(d)	
43	Was the location given in terms of the latitude and longitude at least to the nearest tenth of a second, or accurately located with respect to the landfill grid system?		330.421(d)	
44	Were monitoring well installation and construction details submitted on forms available from the TCEQ completed and submitted within 60 days of well completion?		330.421(e)	
45	At the same time, was a copy of the detailed geologic log of the boring, a description of development procedures, any particle size, or other sample data from the well, and a site map drawn to scale showing the location of all monitoring wells and the point of compliance submitted to the executive director?		330.421(e)	
46	Was a copy of all forms required by other agencies submitted to the commission?		330.421(e)	

CHECKLIST WORKSHEET

MSW CME CHECKLIST B DETECTION MONITORING (Cont)

47	Damaged Wells. Did owner/operator ensure that any monitoring well that is damaged to the extent that it is no longer suitable for sampling was reported to the executive director, who may make a determination about whether to repair or replace the well?		330.421(f)	
48	Has owner/operator properly abandoned and plugged any monitoring well that was no longer used?		330.421(g)	
49	Was the operation performed after obtaining prior authorization in writing from the executive director?		330.421(g)	
	SECTION H: DETECTION MONITORING PROGRAI FOR TYPE I LANDFILLS (330.407)			
50	Does the detection monitoring program monitor for all constituents listed in 330.419 at least semiannually during the active life of the facility and the closure and post-closure care period?		330.407(a)	
50A	Did owner/operator establish background groundwater quality by collecting and analyzing for the constituents listed in 30 TAC 330.419 a minimum of four statistically independent samples from each background and point of compliance well?		330.407(a)(1)	
50B	Was the initial background sampling for a well completed on a quarterly basis, unless an alternative schedule was approved by the executive director?		330.407(a)(1)	
50C	Upon completion of background monitoring and during background updates, did owner/operator evaluate the background data to ensure that the data are representative of background groundwater constituent concentrations unaffected by waste management activities, or other sources of contamination?		330.407(a)(1)	
50D	Was the evaluation documented in a report and submitted to the executive director before the next subsequent groundwater monitoring event following the updated background period?		330.407(a)(1)	
50E	Was at least one sample from each background and point of compliance well collected and analyzed during each subsequent semiannual sampling event?		330.407(a)(1)	
50F	Has the executive director specified an appropriate alternative frequency (no less than annually) for repeated sampling and analysis of the constituents listed in 30 TAC 330.419 during the active life and the closure and post-closure care period? Alternative frequency specified?			
50G	For the purpose of establishing background groundwater quality, has the executive director agreed to consider analytical data acquired prior to the effective date of 30 TAC Chapter 330 in addition to the data required in subsection 330.407 and in 330.409(b)? Date TCEQ agreed to consider date?			
	SECTION I: SSI DETERMINATION			
51	Not later than 60 days after each sampling event, did owner/operator determine whether there had been a statistically significant increase (SSI) over background of any tested constituent at any monitoring well?		330.407(b)	

CHECKLIST WORKSHEET

MSW CME CHECKLIST B DETECTION MONITORING (Cont)

52	If there had been an SSI, did owner/operator notify the executive director, and any local pollution agency with jurisdiction that had requested to be notified, in writing within 14 days of this determination?		330.407(b)	
53	If an SSI over background of any tested constituent at any monitoring well occurred, did owner/operator immediately place a notice in the operating record describing the increase and establish an Assessment Monitoring Program meeting the requirements of 330.409 within 90 days of the date of the notice to the executive director, except as provided in the following two items?		330.407(b)(1)	
54	If an SSI over background of any tested constituent at any monitoring well occurred, did owner/operator elect to submit the results of resampling as appropriate for the statistical method being used within 60 days of determining the SSI to confirm or disprove the determination?		330.407(b)(2)	
55	If an SSI over background of any tested constituent at any monitoring well occurred and owner/operator had reasonable cause to think that a source other than a landfill unit caused the contamination, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality, did owner/operator elect to submit a report providing documentation to this effect?		330.407(b)(3)	
56	Did owner/operator notify the executive director, and any local pollution agency with jurisdiction that has requested to be notified, in writing within 14 days of determining an SSI over background at the compliance point that owner/operator intends to make a demonstration under 330.407(b)(3)?		330.407(b)(3)(A)	
57	Within 90 days of determining an SSI, did owner/operator submit a report to the executive director, and any local pollution agency with jurisdiction that has requested to be notified, that demonstrates that a source other than a monitored landfill unit caused the contamination, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality?		330.407(b)(3)(B)	
58	Was the report prepared and certified by a qualified groundwater scientist?		330.407(b)(3)(B)	
59	Did owner/operator ensure that the groundwater sample was not filtered for constituents addressed by the demonstration prior to laboratory analysis?		330.407(b)(3)(C)	
60	Did owner/operator continue to monitor in accordance with the detection monitoring program?		330.407(b)(3)(D)	
61	If owner/operator did not make a demonstration satisfactory to the executive director within 90 days after the date of the notice to the executive director, did owner/operator initiate an assessment monitoring program?		330.407(b)(4)	
	SECTION J: GROUNDWATER MONITORING REPC			

CHECKLIST WORKSHEET

MSW CME CHECKLIST B DETECTION MONITORING (Cont)

62	Did owner/operator submit an annual detection monitoring report within 90 days after the facility's last groundwater monitoring event in a calendar year that included the following information determined since the previously submitted annual report?		330.407(c)	
62A	Date of last groundwater monitoring event in calendar year and date of annual detection monitoring report submittal?			
63	Did the report include a statement regarding whether an SSI has occurred over background values in any well during the previous calendar year period and the status of any SSI events?		330.407(c)(1)	
64	Did the report include the results of all groundwater monitoring, testing, and analytical work obtained or prepared under the requirements of the permit, including a summary of background groundwater quality values, groundwater monitoring analyses, statistical calculations, graphs, and drawings?		330.407(c)(2)	
65	Did the report include the groundwater flow rate and direction in the uppermost aquifer, and include all applicable documentation?		330.407(c)(3)	
66	Did the report include a contour map of piezometric water levels in the uppermost aquifer based at a minimum upon concurrent measurement in all monitoring wells, and include all data or documentation used to establish the contour map?		330.407(c)(4)	
67	Did the report include recommendation for any changes?		330.407(c)(5)	
68	Did the report include any other items requested by the executive director?		330.407(c)(6)	
69	If owner/operator determined that the detection monitoring program no longer satisfied the requirements of 30 TAC 330.407, did owner/operator, within 90 days of this determination, submit an application for a permit amendment or modification to make any appropriate changes to the program?		330.407(d)	
69A	Date of determination and date of permit amendment/modification submittal?			