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**RESPONSE TO OHIO ENVIRONMENTAL  
PROTECTION AGENCY COMMENTS ON THE  
RESOURCE CONSERVATION AND RECOVERY  
ACT GROUNDWATER MONITORING PLAN**

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RESPONSE**



**Department of Energy**  
**Fernald Environmental Management Project**  
P.O. Box 398705  
Cincinnati, Ohio 45239-8705  
(513) 738-6357

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Mr. James A. Saric, Remedial Project Director  
U. S. Environmental Protection Agency  
Region V - 5HR-12  
230 South Dearborn Street  
Chicago, Illinois 60604

Mr. Graham E. Mitchell, DOE Coordinator  
Southwest District Office  
Ohio Environmental Protection Agency  
40 South Main Street  
Dayton, Ohio 45402-2086

Mr. Saric and Mr. Mitchell:

**RESPONSE TO OHIO ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE RESOURCE  
CONSERVATION AND RECOVERY ACT GROUNDWATER MONITORING PLAN**

Reference: Letter, DOE-549-92, R. E. Tiller to J. A. Saric and G. E. Mitchell, "Transmittal of The RCRA Groundwater Monitoring Plan," dated December 20, 1991

The Resource Conservation and Recovery Act (RCRA) Groundwater Monitoring Plan (GMP) was submitted to the Ohio Environmental Protection Agency (OEPA) on December 20, 1991 for review and approval (Reference). The Department of Energy (DOE) has developed the RCRA GMP in an effort to integrate regulatory requirements for RCRA and Comprehensive Environmental Response Compensation and Liability Act (CERCLA) groundwater monitoring. The Fernald Environmental Management Project (FEMP) began installing the proposed monitoring wells for phase I of the RCRA GMP in October, 1992.

The OEPA provided a list of comments on the GMP to the DOE on July 1, 1992. Enclosure 1 contains responses to the comments. Enclosure 2 is a package which contains Revision 1 of Volume 1 of the RCRA GMP. Revision 1 reflects the responses to the comments. The revisions to the plan have been highlighted for review convenience. No binder has been provided for Volume 1. Please replace your current package with this revised package and replace the binder cover sheets with the new cover sheets contained in Enclosure 2. Volume 1 has been further modified by the temporary omission of a glacial overburden monitoring network. The FEMP has recognized that the complexity of the glacial overburden system requires additional characterization to aid in the selection of appropriate monitoring locations and depths.

An accelerated compilation and interpretation of glacial overburden data is underway that will provide the information necessary to develop an appropriate monitoring plan. An addendum to the RCRA GMP, which will include a revised Appendix A to Volume 2, will be provided to address the revised monitoring requirements and appropriate action levels for the glacial overburden. However, until the revised glacial overburden network is selected, the FEMP is monitoring the existing glacial overburden monitoring locations identified in the RCRA GMP Rev. 0. Installation of the glacial overburden network is expected to occur before October, 1993.

If there are any questions, please contact Ed Skintik at (513) 738-6660.

Sincerely,



James J. Fiore  
Acting Manager

FN: Skintik

Enclosures: As Stated

cc w/encl.:

K. A. Hayes, EM-424, Trev II  
Administrative Record, FERMCO

cc w/o encl.:

R. Bendula, OEPA-SWDO  
P. Pardi, OEPA-SWDO  
A. K. Bomberger, FERMCO/52-5  
R. D. Bowser, FERMCO/52-5

# Enclosure 1

## Responses to OEPA Comments on The RCRA GMP

Comment 1: Page 4, sec 2.1, para 1; Whenever hazardous waste regulations are cited, DOE should cite the applicable OAC regulations and not the 40 CFR regulations. The hazardous waste program at the FEMP is a state lead program, not federal. Though OAC 345-65-90 through 94 closely mirror 40 CFR at times, they do differ.

Response: The DOE will incorporate the comment

Action: The text will be changed exactly as requested.

Comment 2: Page 4, sec 2.2, para 2; It is unclear as to what purpose the comparison to Maximum Contaminant Levels (MCLs) serves. If it is to see if MCLs have been exceeded, then the practice is acceptable. However, if the FEMP is proposing that MCLs are to be used as an action level, then that is not acceptable. A different action level may be able to be used, however MCLs are not appropriate. The MCLs are levels which are used as tools to determine the relative risk to human health posed by a single compound of a given concentration. The MCLs by no means represent levels which can be used to determine the limits of groundwater contamination.

Response: The DOE agrees that the MCLs are not necessarily the appropriate action levels. The RCRA GMP will be revised to utilize Preliminary Remediation Goals (PRGs) as action levels that will be used to determine the limits of groundwater contamination in the Great Miami Aquifer. The PRGs are calculated based on methods presented in the Risk Assessment Guidance for Superfund (RAGs) and presented in the FEMP Site-wide Characterization Report. The appropriate action levels for perched groundwater found in the glacial overburden are currently being evaluated. A future addendum to the RCRA GMP will be submitted to address the monitoring of the glacial overburden.

Action: Table 8.1 has been changed to Table 9.1 and revised to identify the new action levels for the Great Miami Aquifer and those constituents that will require tracking if detected. In addition the following text will be added to section 9.1 of the RCRA GMP.

"The Great Miami Aquifer RCRA GMP action level for parameters that have a PRG will be established as follows:

1. For a constituent with detectable concentrations in background groundwater the action level will be the background 95 % upper tolerance limit (UTL) plus the PRG.

2. For constituents that do not have detectable concentrations in background groundwater the action level will be the PRG.
3. If the constituent is not detectable in background groundwater and the PRG is less than the method detection limit then the PRG will be the method detection limit.

A PRG based on the RAGs guidance cannot be established if a reference dose factor for a parameter is not available. Several constituents included in the RCRA GMP do not have established reference dose factors. The action levels for those parameters have been established as follows:

1. The action level for constituents occurring in background groundwater that have no PRG is the 95% UTL of the constituents background concentration.
2. The action level for constituents not detected in background groundwater that have no PRG is the Maximum Contaminant Level (MCL), if an MCL has been promulgated. If no MCL is available for the constituent, then the RCRA GMP action level will be the method detection limit.

Analytical data collected through the RCRA Monitoring Program will be evaluated by comparing quarterly results to the action levels. The Great Miami Aquifer action levels for parameters to be sampled as part of this plan are listed in Table 8.1. The comparison to action levels will be completed on a quarterly basis when all of the analytical results are available for the sampling round. Comparisons will be made using laboratory sample results and the applicable action levels. Validated sample results will be used for the comparison to action levels when the validation program is implemented."

**TABLE 9.1**

**RCRA GMP ACTION LEVELS FOR THE  
GREAT MIAMI AQUIFER**

<b>CHEMICAL</b>	<b>ACTION LEVEL (ppm except where noted)</b>	<b>TAKEN FROM:</b>	<b>TRACKING REQUIRED</b>
1,1,1-Trichloroethane	0.001	Method Detection Limit	yes
1,1-Dichloroethane	0.7	PRG, no background	yes
1,2-Dichloroethane	0.001	Method Detection Limit	yes
1,1-Dichloroethene	0.001	Method Detection Limit	yes
trans-1,2-Dichloroethene	0.1	PRG, no background	yes
1,2-Dichloroethene (Total)	0.03	Method Detection Limit	yes
Acetone	0.7	PRG, no background	yes
Benzene	0.001	PRG, no background	yes
Carbon Disulfide	0.7	PRG, no background	yes
Chloroform	0.006	PRG, no background	yes
Methylene Chloride	0.01	Method Detection Limit	yes
Tetrachloroethane	0.001	Method Detection Limit	yes
Toluene	1.0	PRG, no background	yes
Trichloroethene	0.003	PRG, no background	yes
Vinyl Chloride	0.005	Method Detection Limit	yes
Aluminum	0.303	Background UTL	no
Arsenic	0.392	Background UTL + PRG	yes
Barium	1.447	Background UTL + PRG	yes
Beryllium	0.004	Background UTL + PRG	yes
Cadmium	0.011	Background UTL + PRG	yes
Calcium	136	Background UTL	no
Chromium	0.079	Background UTL + PRG	yes
Chloride	250	MCL	no
Cobalt*	0.02	PRG, no background	yes
Copper	1.00	MCL	no
Fluoride	2.00	MCL	no
Iron	4.13	Background UTL	no
Gross Alpha*	24.3 (pCi/l)	Background UTL	no
Gross Beta*	38.3 (pCi/l)	Background UTL	no

CHEMICAL	ACTION LEVEL (ppm except where noted)	TAKEN FROM:	TRACKING REQUIRED
Lead	0.056	Background UTL + PRG	yes
Magnesium	47.0	Background UTL	yes
Manganese	0.965	Background UTL + PRG	yes
Mercury	0.003	Background UTL + PRG	yes
Nickel	0.126	Background UTL + PRG	yes
Nitrate	10.0	MCL	no
Phenols	0.061	Background UTL	no
Radium 226+228**	3.82 (pCi/l)	Background UTL + 2xPRG	yes
Selenium	0.17	Background UTL + PRG	yes
Silver	0.034	Background UTL + PRG	yes
Sodium	100	Background UTL	no
Sulfate	250	MCL	no
Uranium	0.022	Background UTL + PRG	yes
Vanadium	0.084	Background UTL + PRG	yes
Zinc	1.109	Background UTL + PRG	yes

Note: Background data taken from Shandon Background in Table M-6 of the Site-wide Characterization Report, Appendix M.

The PRG values were taken from the Site-wide Characterization Report.

Method detection limits are based on the analytical method used for each parameter.

\* The background UTL for these parameters was determined through the use of RCRA GQAPP assessment monitoring program data.

\*\* The action level for Radium 226+228 was generated by determining a combined UTL background value and adding the PRG for Radium 226 and the PRG for Radium 228. The PRGs for these parameters happen to be the same (0.2).

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Comment 3: Page 26, sec 4.4, para 1; This section indicates that the "clay interbed" is continuous throughout the site. This should be revised to state that the 4000 series wells are installed....underlying the clay interbed where encountered.

Response: The DOE will incorporate the comment.

Action: The text will be changed exactly as requested.

Comment 4: Page 26, sec 5.1, bullet 3; This section should be revised to reflect the presence of volatile organics in the Test Pit wells installed by Dames and Moore. These wells have since been abandoned due to poor construction.

Response: The DOE will incorporate the comment. The Dames and Moore monitoring wells around Waste Pit 4 have been plugged and abandoned.

Action: The third bullet will be revised as follows;

"Volatile organic compounds were detected consistently in only two monitoring wells (MW-15s and MW-19tp). Volatile organics detected in Monitoring Well MW-15s are; 1,1,1-Trichloroethane and 1,1-Dichloroethane. Volatile organics detected in Monitoring Well MW-19tp are; 1,1-Dichloroethane, Methylene Chloride, 1,1,-Trichloroethane, cis-1,2-Dichloroethene, Bromoform, and Chloroethene. Concentrations of organic compounds identified in these monitoring wells ranged from less than 1 part per billion (ppb) to less than 30 ppb."

Comment 5: Page 35, Table 6.0; The DOE must identify the sources for the hydraulic conductivities.

Response: The source for the hydraulic conductivity is the draft RI/FS 1990 Groundwater Report (ASI/IT, 1990).

Action: A sentence will be added to the text identifying that the hydraulic conductivity data was taken from the Draft RI/FS 1990 Groundwater Report (ASI/IT, 1990).

Comment 6: Page 41, sec 7.0, para 3; Protective casings should be installed on all monitoring wells. If DOE should have a monitoring well which they believe the protective casing should not be installed on, the approval should be obtained from Ohio EPA.

Response: The DOE will incorporate the comment.

Action: The reference to exceptions on a case by case basis will be removed. The text will no longer provide any reason for not installing protective casings.

Comment 7: Page 43, sec 7.0.1, para 2, bullet 3; A sample should be obtained from any water which is to be added to the borehole and analyzed for all constituents of concern. Water samples should be obtained from the effluent end of the hose for each day of drilling in order to detect any contamination associated with the water source, tank, or hose.

Response: The DOE will incorporate the comment.

Action: The above comment will be incorporated into the document in section 7.0.1, para 2, bullet 2

Comment 8: Page 46, Table 7.1; Temperature should be added to the list.

Response: The DOE will incorporate the comment.

Action: The text will be changed to add temperature to the list.

Comment 9: Page 47 sec 7.2.2, para 2; This comment states that [groundwater] sampling events occur over a long period of time (months). The purpose of a groundwater sampling program for both RCRA and CERCLA is to obtain geochemical data that can be used to both define current conditions and to identify trends which can indicate contaminant sources and predict future migration. The only way to do this is to gather data which represents "snapshots" of groundwater conditions. Because groundwater conditions are extremely variable with time, it is important to gather all samples during a single event within a narrow span of time. If sampling is spread out over several months, then significant changes can occur during the event. When the results of these sampling events are compared to each other as though they are from the same sampling population, then incorrect correlations are made. The situation can be described as comparing apples and oranges. While the samples may be related hydrogeologically, they are not linked geochemically. As a result, DDAGW recommends that the sampling standard operating procedures (SOP) be modified so that all monitoring wells can be sampled within the same week and that all water elevations are obtained within a 48 hour period. Ohio EPA recognizes that this will present logistic problems, however, it must be done in order to provide useful data. Sampling efforts will have to be coordinated so that personnel will be able to sample all wells within this period of time. Additionally, sampling teams will have to be equipped with identical equipment so that mechanical variation will be minimized. It will also be important that sampling equipment be calibrated against each other to further minimize mechanical variation.

Response: The sampling plan identified in the RCRA GMP calls for intra-well comparisons only. Each monitoring wells results will be compared to the established action levels to determine if the concentration is above an acceptable range. Each monitoring wells results will also

be analyzed using summary statistics and trend analysis to determine the behavior of concentrations in the monitoring well. A "snapshot in time" approach to monitoring is important if results from monitoring wells are to be compared to each other. For intra-well comparisons it is more important that the sampling for each quarter occur on or near the same date so that seasonal effects do not interfere with comparisons. The sampling strategy in the RCRA GMP was established such that each Great Miami Aquifer line of compliance monitoring network will be sampled in one weeks time (weather and other natural causes permitting).

Action: No change to the RCRA GMP is required.

Comment 10: Page 57, sec 7.2.6.6, para 1; Hydrochloric Acid and sodium Thiosulfate should be used as preservatives for the volatile organic compound (VOC) samples.

Response: The DOE will incorporate the need to use hydrochloric acid as a preservative where needed. Sodium thiosulfate is not necessary because chlorine is not a constituent of concern in the aquifer.

Action: A bullet will be added that indicates:

Hydrochloric acid will be used as preservatives for the volatile organic compound samples where necessary.

Comment 11: Page 62, sec 8.0; This section should state that Ohio EPA and DOE are currently developing a program for the electronic transfer of data, and that once the final program is adopted all data will also be transmitted as part of the RCRA, RI/FS Program.

Response: The DOE is working toward electronic transfer of data to the OEPA, and will continue to do so. The DOE would like to continue these efforts until the final program is available and the system is operating acceptably before making formal commitments. Once the system is available for use, an addendum to the RCRA GMP will be drafted to include an electronic transfer clause.

Action: No change to the RCRA GMP is required at this time. A future addendum to the plan will be added as explained in the response.

Comment 12: Page 62, sec 8.1, para 2; All monthly groundwater elevations should be evaluated, not just the months with RCRA sampling.

Response: The DOE will incorporate the comment.

Action: The text will be changed exactly as requested.

Comment 13: Page 63, sec 8.1, para 1; This section of the report references the July 27, 1990 Federal Register 55 "Corrective Action for Solid Waste Management Units at Hazardous Waste Management Facilities; Proposed

Rule". This proposed rule has not been ratified and is not in effect, making it inappropriate to solely base a ground water monitoring program on. Additionally, page 30814, #2 Trigger for Corrective Measure Study, Column 1, para 2, sentence 3, states : "Many hazardous wastes, such as some of the wastes listed in 40 CFR 261.32, are not specific constituents at all, but rather are complex mixtures comprised of many constituents." Sentence 4 goes on to state: "EPA believes that it would not be feasible in most cases to set action levels for such wastes." It is DDAGW's interpretation of this rule that the U.S. EPA is limiting the proposed action level's application to single constituent plumes. Further evidence of this interpretation is page 30804, B-Cleanup Goals for Corrective Action, Column 2, para 2: "To be protective of human health, EPA believes that cleanup levels for carcinogens must be equal to or below an upper bound excess lifetime cancer risk level of 1 in 10000. As proposed today, cleanup levels would be selected within the upper bound  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$  risk range during the selection of remedy process; however, remedies at the more protective end of the range would ordinarily be preferred. For non-carcinogens, cleanup levels would be set a level at which adverse effects would not be expected to occur.

The DDAGW recommends using the lower of either the Preliminary Remediation Goals as stated in the Risk Assessment Guidance For Superfund (RAGS) part B or the Corrective Action for Solid Waste Management Units at Hazardous Waste Management Facilities; Proposed Rule as the action limits for the groundwater monitoring program. Neither the RAGS nor the proposed rule take into account the additive risk of any of the contaminants; it is DDAGW's understanding that this will be determined in the risk assessment portion of the RI/FS. However, while this unknown total health risk exists, DDAGW recommends using the lowest accepted limits possible to be reasonable protective of human health and the environment.

Response: See response to comment #2.

Action: See action to comment #2

Comment 14: Page 63, sec 8.1, para 6; The DOE should state how "normal" standard deviation will be determined. Many of these wells have been impacted by facility operations, therefore determination of "normal" standard deviation by using skewed data will produce a skewed standard deviation.

Response: The method for determining standard deviation for a monitoring well will be added to the text. It is important to note that the RCRA GMP does not identify the determination of a standard deviation for the entire population of monitoring wells, but for individual monitoring wells only.

Action: The method for determining standard deviation for a monitoring well will be added to the text as follows:

"The standard deviation will be calculated by the following formula:

$$s = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}}$$

Where;

n = number of observations

x<sub>i</sub> = each observation

$\bar{x}$  = average of observations

If non-detects are present in the population then one half of the detection limit will be used as the observation value."

Comment 15: Page 63, Sec 8.1, para 6; The DOE does not include any tests for normality for the data. The data must be tested for normality to determine which statistical tests can be used. The DOE cannot pre-determine the type of test to be used in this document. Instead, DOE should outline how they will determine which method will be used.

Response: Specific statistical methods were identified in the GMP to provide an indication of the level of analysis to be performed. The statistical methods listed were not intended to be all inclusive. Because the statistical analysis is based on population sizes and many other factors, a standard set of methods cannot be defined for every situation. The DOE has provided outlines for the determination of how statistical methods were chosen in previous RCRA Annual Reports, and will continue to do so.

Action: The text will be modified to include a discussion of testing for normality as follows:

"A test for normality will be performed on the data; the skewed test or Shapiro/Welkes test are preferred."

Comment 16: Page 68, sec 8.2; As stated above in comment 11, DOE should discuss measures which are being taken to transmit data electronically. This document should state when data will be transmitted.

Response: See response to comment #11.

Action: See action to comment #11.

Comment 17: Page 38, sec 6.1, para 7; The DOE should go into greater detail describing how the CERCLA program will "kick in" once contamination is documented. This should include, but not limited to; frequency of monitoring well installation, timing of installation, addition and deletion of parameters etc.

Response: Should quarterly monitoring per the RCRA GMP indicate that an action level has been exceeded, the FEMP will determine the rate and extent of contaminant migration. The FEMP believes that sufficient wells exist on the FEMP property to estimate the extent of contamination should a "triggering" of the action levels occur at the downgradient boundary of either the Waste Pit Area or Production Area. The FEMP does not anticipate the need to install additional monitoring points to document the extent of on-property contamination. If however, a "trigger" occurs at the facility property boundary the FEMP anticipates the use of the hydropunch or other sampling methods, as necessary, to determine the extent of contamination.

As agreed upon with the USEPA and OEPA and documented in the RI/FS Risk Assessment Work Plan Addendum (June 12, 1992) the FEMP does not anticipate additional field activities to document the extent of essential human nutrients that are toxic only at high concentrations.

Action: The above assessment methodology will be added to the text as follows:

"For the Great Miami Aquifer, when quarterly monitoring results indicate that an action level has been exceeded, the FEMP will determine the rate and extent of contaminant migration. The FEMP believes that sufficient wells exist on the FEMP property to estimate the extent of contamination should a "triggering" of the action levels occur at the downgradient boundary of either the Waste Pit Area or Production Area. The FEMP does not anticipate the need to install additional monitoring points to document the extent of on-property contamination. If however, a "trigger" occurs at the facility property boundary, the FEMP anticipates the use of the hydropunch or other sampling methods, as necessary, to determine the extent of contamination. Once the extent of contamination has been determined off-property, a monitoring point will be located at the downgradient boundary of the plume to monitor changes over time.

As agreed upon with the U.S.EPA and OEPA and documented in the RI/FS Risk Assessment Work Plan Addendum (June 12, 1992), the FEMP does not anticipate additional field activities to document the extent of essential human nutrients that are toxic only at high

concentrations. The parameters that will not trigger additional field activities will be identified in Table 9.1.

The rate of migration in the Great Miami Aquifer will be estimated using Darcy's law for groundwater flow. Groundwater flow is a conservative estimate of migration rates because most constituents migrate at slower rates than groundwater due to attenuation and retardation factors. Diffusion may cause theoretical migration rates that are slightly faster than groundwater movement, but the magnitude of this effect is small compared to FEMP groundwater velocities. The effort to determine the rate of migration under the RCRA GMP is preliminary because the CERCLA process currently assessing the site will develop rates of migrations for all contaminants of concern. The purpose of the RCRA GMP rate of migration determination is to provide a prompt and conservative estimate of contaminant migration."

Comment 18: General Comment; The DOE should state exactly how the RI/FS will satisfy OAC 3745-65-90 through 94.

Response: See response to comment 17.

Action: See actions for comment 17.

Comment 19: General Comment; It is possible that the proposed monitoring network will identify the need for additional monitoring wells. The DOE should include language in this document to state how these data gaps will be filled in the future, if they should be identified.

Response: See response to comment 17.

Action: See actions for comment 17.