

U-005-407.3

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**COMMENTS REVISED O.U. 3 ISA REPORT**

12-20-90

**OEPA/DOE-FMPC  
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LETTER**



State of Ohio Environmental Protection Agency

Southwest District Office

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Richard F. Celeste  
Governor

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December 20, 1990

Re: COMMENTS REVISED  
O.U. 3 ISA REPORT

Mr. Andrew P. Avel  
U.S. DOE FMPC  
P.O. Box 398705  
Cincinnati, Ohio 45239

Dear Mr. Avel:

Attached are Ohio EPA comments on the revised O.U. 3 Initial Screening of Alternatives report. Problems with this report include incomplete scooping of O.U. 3 and the continuing risk issues of DOE citing cleanup levels, action levels, acceptable levels that are inconsistent with CERCLA Guidance and the National Contingency Plan.

Please respond to those comments within 30 days. If you have any questions please contact me.

Sincerely,

Graham E. Mitchell  
DOE Coordinator

GEM/ycr

cc: Tom Winston, Ohio EPA  
Jack Van Kley, Ohio AG  
Catherine McCord, U.S. EPA  
Robert Owen, ODH  
Lisa August, GeoTrans

DEC 26 1990

E-11045

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## ATTACHMENT

COMMENTS ON DOE RESPONSE TO OEPA COMMENTS CONCERNING THE  
 SEPTEMBER 1990 INITIAL SCREENING OF ALTERNATIVES FOR OPERABLE  
 UNIT 3 AND THE NOVEMBER 1990 REVISION OF THE OPERABLE UNIT 3  
 ISA

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COMMENTS CONCERNING DOE RESPONSE TO USEPA AND OEPA COMMENTS (11/90)

1. Page 6, Comment 12: As noted numerous times by Ohio EPA in its review comments on this as well as previous operable unit ISA reports, it is the NCP that uses a point of departure of  $10^{-6}$  for lifetime excess cancer risk. CERCLA and the NCP are the driving regulatory frameworks for the investigation and cleanup of the FMPC, not the proposed RCRA Subpart S regulations. In light of this point of departure for evaluating site risks, the use of a preliminary goal of  $10^{-4}$  is inappropriate, backwards, and inconsistent with the NCP.
2. Page 8, Comment 14: This comment refers to changes which need to be made in the terminology used on page ES-6. While in its response to Ohio EPA's original comment, DOE stated that it agreed with the comment, it failed to make the necessary changes to page ES-6 in the revised report. The following change is needed in the second sentence of the first paragraph on page ES-6 of the revised report: "In Alternative 9, all perched groundwater that is extracted is routed to a treatment facility for treatment to levels consistent with Applicable or Relevant and Appropriate Requirements (ARARs) and other criteria to be considered (TBCs)."
3. Page 14, Comment 31: The response to this comment refers to uranium contamination results from trenching in the rubble mound at well 1032. It states these levels were "below action limits." Reference to "action limits" or "acceptable levels" (i.e., 30 ug/l of uranium in water or 50 mg/kg in soil) is premature since no such limits have been determined or agreed to by either Ohio EPA or USEPA. "Action limits" or "acceptable levels" for uranium (among other carcinogens) are to be based upon risk calculated from cancer slope factors as directed in the USEPA document Risk Assessment Guidance for Superfund. DOE was notified of the fact that these values were unacceptable at the October 30, 1990 teleconference

between DOE, USEPA and Ohio EPA. The actual measured contaminant levels should be reported (rather than stating that contamination is below "action limits") until such time as cleanup criteria are determined.

4. Page 14, Comment 32: Again, DOE's response refers to radiological contaminants in rubble mounds being above or below "acceptable levels." No acceptable levels have been determined, thus reference to such levels is inappropriate. DOE should specify actual contamination levels found so that this document may be valid when cleanup criteria have been set.
5. Page 19, Comment 50: DOE's response makes no sense. Is Ohio EPA to understand that a "study" of some sort is required in order to insert MCLGs into Table 2-1? MCLGs must be included in this table as they constitute legitimate TBCs for chemicals found in this operable unit which have MCLGs.
6. Page 19, Comment 51: The use of radionuclide-specific terms in Table 2-2 (perched groundwater) once the fate and transport modelling is complete is unacceptable. As the language in this table stands, it is misleading. Until radionuclide-specific RAOs are available, the statement made in the text of Table 2-2 should reflect that the RAO given for perched groundwater pertains solely to total uranium. (Although as noted on numerous occasions in the past, the use of 30 ug/l as an RAO for total uranium is unacceptable to Ohio EPA since it is not risk-based and represents a level of risk equal to  $2 \times 10^{-4}$ , which is not only above the  $10^{-6}$  point of departure dictated in the NCP but is also outside the acceptable risk range of  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ . This applies to DOE's Comment 52 as well.)
7. Page 22, Comment 55: If DOE wants to have a proposed cleanup level for total uranium in order to allow their design engineers to work with a reference cleanup level, then the level corresponding to the  $10^{-6}$  lifetime cancer risk level should be used as an appropriate starting point.
8. Page 24, Comment 61: Exposures must be calculated based on risk, not on dose, and done in a manner consistent with the NCP. This issue was discussed at the October 30, 1990 meeting/teleconference between DOE, USEPA, and Ohio EPA. Therefore, the use of the 50-year CEDE to estimate actual or potential exposures is unacceptable to this agency.
9. Page 31, Comment 83: The use of 35 pCi/g as a preliminary "acceptable level" is inappropriate because this level is not acceptable to Ohio EPA even on a preliminary basis. The use of this as the acceptable level throughout the text will result in the document becoming invalid when acceptable limits

are actually determined and agreed upon. This document will have to be revised or become outdated if acceptable levels are determined to be below the "preliminary" acceptable levels. Also, the document continually refers to contamination existing below "acceptable levels," not preliminary acceptable levels, a statement that is incredibly misleading. (A level of soil contamination that would be acceptable to Ohio EPA as a "preliminary acceptable level" would be a concentration of uranium in soil corresponding to the  $10^{-6}$  lifetime cancer risk.)

10. Page 34, Comment 91: The listing of areas on Table 6-1 as contaminated only if contamination is present "above allowable levels" is unacceptable. Contamination is contamination, regardless of whether it is present above an arbitrary level and a level upon which neither USEPA nor Ohio EPA have agreed. DOE does a major disservice to the public when it presents information in this kind of context. As noted above, an acceptable cleanup level for uranium to Ohio EPA is one which is equivalent to a  $10^{-6}$  lifetime cancer risk.
11. Page 37, Comment 98: Ohio EPA's original comment simply referenced the Nevada Test Site (NTS) as an example of an off-site disposal facility. DOE failed to respond to the obvious point of the comment. The fact is that any off-site facility, pre-existing or not, will have to be superior to any on-site disposal facility. An off-site disposal facility would not likely be approved if situated over a major sole-source aquifer in the close proximity of a large metropolitan center as is the FMPC. Thus such an off-site disposal facility would be superior to FMPC in terms of demographics, hydrogeology, and probably meteorology, resulting in its being more effective in the long-term protection of human health and the environment. DOE employs a "generic western site in Nevada" for the calculation of transportation distances for radiologically contaminated wastes (see page 5-1 in the revised document). This generic site would obviously be superior to FMPC for the long-term disposal of wastes due to its meteorology and geology. In addition, the fact that an off-site facility will provide superior long-term environmental and human health protection (and thus receive a higher score) is accepted by DOE in the Initial Screening of Alternatives for both Operable Units 1 and 4. DOE needs to maintain consistency in their scoring rationalization between operable units.
12. Page 38, Comments 102 and 103: Once again, NTS was only used as an example. Ohio EPA understands that NTS has not been selected as the off-site disposal facility. DOE failed to respond to the point of the comment. Any off-site disposal facility, pre-existing or not, most likely will not contain only waste from the FMPC. Maintenance and monitoring will

likely be required and already committed regardless of the presence of FMPC waste. Thus the maintenance and monitoring requirement for an off-site disposal facility should be lower than that of an on-site disposal facility resulting in a higher score for off-site disposal. The fact that an off-site disposal facility will require less monitoring and maintenance than an on-site disposal facility is accepted by DOE in its scoring of this alternative in the Initial Screening of Alternatives for Operable Units 1, 4, and 5. DOE needs to maintain consistency in their scoring rationalization between operable units.

13. Page 41, Comment 112: DOE did not respond to Ohio EPA's original comment. The comment asked DOE to note in the text whether or not compounds other than uranium (e.g., volatile organic compounds since mixed wastes were stored on the Plant 1 pad) were found to be present in soil samples collected in this area. If other compounds were detected, their concentrations should be provided in the text.
14. Page 43, Comment 118: See Comments 11 and 12 above.
15. Page 56, Comment 163: DOE's response to Ohio EPA's comment states that "This paragraph [second paragraph on Page 7-1 of Section 7.1] is rewritten to be consistent with specific responses to cleanup and source control criteria comments addressed in other chapters of the ISA." However, a check of the revised ISA report indicates that no change was made to the text in this paragraph.
16. Page 58, Comment 169: See Comments 11 and 12 above.

COMMENTS ON THE REVISED NOVEMBER 1990 ISA FOR OPERABLE UNIT 3General Comment

1. It appears that the issue of scoping of this operable unit is still a major problem. Because FMPC is an NPL site and materials stored on the Plant 1 Pad, Thorium Buildings, and other areas defined as Operable Unit 3, these materials must be covered under the CERCLA process. These materials have clearly resulted in releases to the environment. The ongoing RCRA characterization program is a very important part of this process. Nevertheless, it is likely that a large portion of this stored waste will be disposed of either onsite or offsite along with waste from other operable units. For these reasons this material must be a part of Operable Unit 3.

Specific Comments

1. Page ES-5, Table ES-1: As noted in the above comments and as noted in previous Ohio EPA comment letters pertaining to this as well as other operable unit ISA reports, the remedial action objectives for uranium as well as other chemicals found at the site in any media (groundwater, surface water, air, and soils) must be based upon the  $10^{-6}$  excess lifetime cancer risk as a point of departure for assessing the effectiveness of all alternatives. It is not sufficient to merely consider as acceptable any risk that may fall within the  $10^{-4}$  to  $10^{-6}$  risk range. It is also unacceptable to use 30 ug/l or 50 ppm as acceptable levels of total uranium in groundwater and soils, respectively. In addition, see Comment #6 above regarding DOE's responses to Ohio EPA comments on the September 1990 draft ISA report as it pertains to the RAOs identified in Table ES-1 for perched groundwater.
2. Page 1-18, bullet items at the bottom of the page: It is not apparent which quadrant encompasses the facilities listed at the bottom of the page. It is assumed these are carried over from the previous page's discussion of the southwest quadrant. If this is the case, it would be more clear if the sentence preceding the bullet items read "Other key facilities in the southwest quadrant are...."
3. Page 1-19, Section 1.4.3.3: An area listed as the "PCB Area" is present on Figure 1-4 in the northeast quadrant but is not discussed anywhere in the section covering this quadrant. A discussion of why this area is referred to as the PCB Area as well as contaminants present in this area should be included in Section 1.4.3.3.
4. Page 1-20, Table 1-2: Radium-226 should be included as a potential contaminant of Plant 8, since it was possibly involved in the handling, storing or processing of pitchblende

- ore or yellowcake. The metals dissolver should also be included in this table with radium-226 as a potential contaminant (see page 1-10, last sentence of the first paragraph).
5. Page 1-22, Section 1.4.3.4: Table 1-4 refers to the Plant 1 Ore Silos yet this area is not discussed within the section covering the northwest quadrant. DOE should include a discussion of these silos' contents and structural integrity.
  6. Page 1-24, Table 1-4: Radium-226 should be included as a potential contaminant of Plant 1, since it was possibly involved in the handling, storing or processing of pitchblende ore or yellowcake (see page 1-10, last sentence of the first paragraph). Under Plant 1 Ore Silos, it should be corrected to read Pitchblende Ore.
  7. Page 1-26, second paragraph: DOE's reference to radiological contaminants being below acceptable limits in the first and second rubble mounds is inappropriate. Reference to "action limits," "acceptable levels," or "clean-up levels" (i.e., 30 ug/l in water or 50 mg/kg in soil for uranium) is premature since no such limits have been determined by either Ohio EPA or USEPA as acceptable levels or action limits. Action limits/acceptable levels are to be based upon risks calculated from cancer slope factors as directed in the USEPA document Risk Assessment Guidance for Superfund. DOE was notified of the fact that these values were unacceptable at the October 30, 1990 teleconference between DOE, USEPA and Ohio EPA. Statements referencing "acceptable levels" which have not been approved only make this document susceptible to revision once approved (and potentially lower) cleanup criteria have been set. The actual measured contaminant levels should be reported until such time as cleanup criteria are determined.
  8. Page 1-26, last paragraph: This paragraph states that sampling and analysis have not been completed along the pipeline connecting the Clearwell and Manhole 175, but fails to discuss whether or not sampling is planned for this area. A discussion of this issue should be included here.
  9. Page 1-32, Section 1.4.6.2, first paragraph: The last sentence in this paragraph refers to "the clean-up level of 30 ug/l." Such a reference is totally inappropriate. Clean-up levels have not been determined and will not be determined until the baseline risk assessment is completed. DOE needs to refrain from assuming that clean-up levels will be based on those levels used at other DOE, non-CERCLA cleanups.
  10. Page 2-4, second paragraph, first sentence: The text should state whose interim policy is being referenced for the development of RAOs.

11. Page 2-5, Section 2.1.1, second paragraph: The use of 100 years as the period for current land-use exposures is ludicrous and inconsistent with standard future-use exposure scenarios.
12. Page 2-7, Table 2-1: Maximum Contaminant Level Goals (MCLGs) must also be included in this table under the category "chemicals or radionuclides in drinking water."
13. Page 2-8, Table 2-2: See Comment 6 under heading "COMMENTS CONCERNING DOE RESPONSES TO USEPA AND OEPA COMMENTS (11/90)" and Comment 1 under the heading "COMMENTS ON THE REVISED NOVEMBER 1990 ISA FOR OPERABLE UNIT 3."
14. Page 2-9, first paragraph: DOE needs make it clear in the text that radioactive contaminants are included in the RI/FS goal of basing chemical-specific risk-based RAOs on the  $1 \times 10^{-6}$  point of departure. This is not readily evident to the reader as the paragraph is written. Further, reference to proposed RCRA Subpart S regulations is irrelevant as the RI/FS is being conducted under CERCLA, and appropriate risk ranges, etc., are clearly spelled out in that law and its attendant regulations (i.e., the NCP). Therefore, all references to RCRA Subpart S in this context should be removed from the document.
15. Page 2-9, 2.1.4.1, first paragraph: After the October 30, 1990 teleconference between DOE, USEPA and Ohio EPA, it should be clear that cleanup levels for radionuclides must be developed based upon chemical-specific, risk-based levels under CERCLA and not upon the historical method of radiation dose. Thus, the sentence stating "The goal is to prevent contact with chemicals in the solid wastes that would result in cancer risks of...." should be changed to read "...contact with radionuclides and chemicals in ...." The text here also needs to mention that it is not sufficient to be within the  $10^{-4}$  to  $10^{-6}$  risk range, but that a  $10^{-6}$  risk must be used as the point of departure for determining acceptable risks. This document needs to be revised appropriately to reflect the above.
16. Page 2-9, Section 2.1.4.1, second paragraph: It is inappropriate for DOE to assume that the acceptable residual concentrations for uranium in surface soils will be 35 pCi/g. Cleanup levels will be based upon risk, not dose, thus the cleanup level is likely to differ from that presented in this paragraph. It should also be noted that this value has not been adopted for any Superfund site.

17. Page 2-10, Section 2.1.4.2, fourth paragraph: The cleanup level for uranium in groundwater will be based upon the baseline risk assessment and should not be assumed to be 20 pCi/l.
18. Page 2-11, Table 2-3: Table 2-3 should include selenium, fluoride, radium, and strontium. All of these have MCLs and have been found as contaminants at the FMPC.
19. Page 2-12, Table 2-4: For any and all carcinogenic compounds that do not have final MCLs (e.g., Aroclor-1254 and Aroclor-1260), DOE must consider the RAO to be the  $10^{-6}$  cancer risk level. In addition, for those compounds (carcinogens and noncarcinogens alike) listed in this table that have a non-zero MCLG, this MCLG must be considered as the RAO unless the value given in the table is lower than the MCLG. Two compounds listed in this table have both cancer Slope Factors and Reference Doses which should be used to derive carcinogenic and non-carcinogenic groundwater RAOs. However, the table only lists their respective cancer Slope Factor. These compounds include Bis (2-ethylhexyl) phthalate (RfD=0.002 mg/kg/d) and 1,1-Dichloroethane (RfD=0.1 mg/kg/d).

The proposed MCL for combined PCBs is 0.0005 mg/l. Thus, a concentration of 0.0005 mg/l for each specific Aroclor is not acceptable since a combination of different aroclors could result in a level that would exceed 0.0005 mg/l. Table 2-4 should be changed to better reflect this.

20. Page 2-14, third and fifth paragraphs: The allowable concentration for uranium in groundwater will be based upon the baseline risk assessment and should not be assumed to be 20 pCi/l. As has been noted numerous times by Ohio EPA, 20 pCi/l represents a lifetime cancer risk of  $2 \times 10^{-4}$  which is outside the  $10^{-4}$  to  $10^{-6}$  risk range specified in the NCP. It is also two orders of magnitude above the  $10^{-6}$  risk level which the NCP states should be used as the point of departure for determining remediation goals when ARARs are not available or are not sufficiently protective. Exposure levels must be calculated based upon risk, not dose. See previous comments on this and other related issues.
21. Page 3-4, first partial paragraph: DOE should define what constitutes "near-term containment interim action" as it applies to single layer caps that may be used at the site. Depending upon the type of action to be taken with respect to single layer capping of solid wastes, Ohio Administrative Code (OAC) 3745-27 (specifically OAC 3745-27-08 and 3745-27-11(G)(1) through (G)(3)) may still constitute state ARARs for this activity.

22. Page 3-4, Section 3.1.2: The multi-layer cap provides little protection from biointrusion by both burrowing mammals and insects. DOE should include biotic barriers into its cap designs.
23. Page 4-4, first paragraph: See Comment 20 regarding the use of 20 pCi/l as an allowable uranium criterion.
24. Page 4-7, Table 4-2: This table needs to be modified as noted in previous comments above since uranium limits must be based upon risk and obviously have yet to be determined and agreed upon by USEPA and Ohio EPA.
25. Page 4-13, Section 4.2.5, first paragraph: Stabilization options need to include vitrification not just cement-based and thermoplastic stabilization. Vitrification is included as an option in Figure 3-3 and Table 4-2 but is left out of the text here.
26. Page 4-14, first partial paragraph: See Comment 25.
27. Page 4-15, first full paragraph: See Comment 25.
28. Page 4-16, first full paragraph: See Comment 25.
29. Page 4-17, Section 4.2.10, first paragraph: See Comment 20.
30. Page 4-19, first partial paragraph: See Comment 25.
31. Page 4-19, next to last paragraph: See Comment 25.
32. Page 6-1: The need for suboperable unit C is not apparent, since FMPC has been switched over to funding solely for environmental restoration. It would seem that if environmental restoration is truly the goal at FMPC, then facilities such as Plant 2/3 which exist over gross contamination would be subject to D&D. DOE should incorporate suboperable unit C within suboperable unit D and schedule these facilities for D&D. Such action would expedite remediation at FMPC and reduce the risks associated with these buildings, their underlying soils, and their respective remedial alternatives.
33. Page 6-2, Table 6-1: The listing of areas on Table 6-1 (as well as subsequent Chapter 6 tables and figures which are based upon the areas listed in this table) as contaminated only if contamination is present "above allowable levels" is unacceptable. Contamination is contamination, regardless of whether it is present above an arbitrary level and a level upon which neither USEPA nor Ohio EPA have agreed. DOE does a major disservice to the public when it presents information in this kind of context. Ohio EPA finds it disturbing that

DOE acknowledges soils and groundwater containing chemical contamination as being contaminated when these chemicals are present above background (see, for example, page 6-28 in Section 6.2.1.2 and page 7-4, last paragraph), yet when contamination is of a radiological nature, as is the case for uranium, DOE only acknowledges that media are contaminated when its so-called "allowable levels" are exceeded. This table must either be modified to list all areas which have uranium contamination above background or else have a qualifier added to the table recognizing that the table only lists areas having uranium contamination above DOE's non-risk based "allowable levels."

In addition, Table 6-1 as well as the rest of the document fails to include areas which are contaminated with substances other than uranium in the suboperable units. These areas include, but are not limited to, the areas directly north of the Plant 1 shot blaster and the maintenance building (see Section 1). DOE must realize that areas which are not contaminated with uranium may still require cleanup based upon the levels of nonradiological contaminants. Under which suboperable unit will the potential uranium and thorium contamination at the quonset huts fall (see Section 1)?

34. Page 6-6, second full paragraph: It would not be necessary to import construction materials for an off-site disposal facility, only for the construction of an on-site disposal facility.
35. Page 6-6, fourth paragraph: Ohio EPA disagrees with the assumption that the long-term effects of on-site disposal are equivalent to off-site disposal. Throughout this document DOE fails to recognize any of the benefits of off-site disposal and consistently shows a bias for on-site disposal. The fact is that any off-site facility, pre-existing or not, will have to be superior to any on-site disposal facility. An off-site disposal facility would not be approved if situated over a major sole-source aquifer in close proximity of a large metropolitan center as is the FMPC. Thus, such an off-site disposal facility would be superior to FMPC in terms of demographics, hydrogeology, and probably meteorology, resulting in its being more effective in the long-term protection of human health and the environment.

DOE employs a "generic western site in Nevada" for the calculation of transportation distances for radiologically contaminated wastes (Page 5-1). This generic site would obviously be superior to FMPC for the long-term disposal of wastes due to its meteorology and geology, among other things. The fact that an off-site facility will provide superior long-term protection is accepted by DOE in the Initial Screening of Alternatives reports for both Operable Unit 1 and 4. DOE

needs to maintain consistency in their scoring rationalization between operable units. This comment applies to all alternatives which employ either off-site or on-site disposal and their respective scoring.

36. Page 6-7, third paragraph: Maintainability for both on-site and off-site disposal facilities should not be scored the same. Any off-site disposal facility, pre-existing or not, most likely will not contain only waste from the FMPC. Maintenance and monitoring will likely be required and already committed regardless of the presence of FMPC waste. Thus the maintenance and monitoring requirement for an off-site disposal facility should be lower than that of an on-site disposal facility resulting in a higher score for off-site disposal. The fact that an off-site facility will require less monitoring and maintenance than an on-site disposal facility is accepted by DOE in its scoring of the Initial Screening of Alternatives for Operable Units 1, 4, and 5. DOE needs to maintain consistency in their scoring rationalization between operable units. This comment applies to all alternatives which employ either off-site or on-site disposal and their respective scoring.
37. Page 6-62, first paragraph: The acceptable residual uranium level for Operable Unit 3 is not 50 ppm! Such levels have not yet been determined or agreed upon. See previous comments on this issue.
38. Page 7-1, third paragraph: As noted previously, uranium cleanup criteria have not been established and DOE should refrain from assuming such.
39. Appendix A: Why has the general format of federal and state ARARs and TBCs been changed from the earlier draft? This appendix is now inconsistent with ARAR discussions of the other operable units and TBCs are not even discussed. Review of ARARs under this new format is difficult at best. Consistency must be maintained. Also, state and federal ARARs/TBCs must be distinguished from each other as was done in the ISA reports for the other operable units.
40. Appendix A, page A-2, last sentence: Reference to Figure A-1 should be to Table A-1.
41. Appendix A, Table A-1:
  - A. Page A-3: OAC 3745-1-07 should be cited in its entirety, as this rule has potential applicability at the site for surface water uses in addition to public water supplies. Also, OAC 3745-1-07 contains acute and chronic aquatic criteria for more than those which DOE has referenced in this table. These additional chemical-specific criteria

are provided in the attached table and should be included in the ARARs section of this as well as other operable unit ISA reports.

- B. Page A-5: As noted in Ohio EPA comments on the September 1990 draft OU-3 ISA report, Ohio's air pollution control law (specifically ORC 3704.01 through 05) must be cited. Citing only 3704.03(E) is too limiting. In addition to those state air pollution regulations cited in Table A-1, OAC 3745-17-05, 07, and OAC 3745-21-07 should be cited.
- C. Secondary MCLs should be included as both state and federal TBCs in this table.
- D. Page A-12, Chemicals in Drinking Water (Solid Waste Facility): OAC 3745-27-10(F)(5) should be listed as a state of Ohio ARAR here.
- E. Page A-18: A location-specific state of Ohio ARAR which should be listed on this page is OAC 3745-27-07 (gives location criteria for solid waste disposal facilities).
- F. ORC 6111.04 (prohibits pollution of "waters of the state") must be included in Table A-1 as an action-specific state of Ohio ARAR. Also, ORC 3767 should be listed as another action-specific state ARAR (general nuisance prevention).

WATER QUALITY STANDARDS  
Toxic Substances

Procedure No. E2  
Revision No. 2  
Date Issued 11/2/87  
Effective Date 11/2/87  
Page 2 of 15

Water Quality Criteria Applicable to  
Inland Warmwater and Exceptional Warmwater Habitats.

Parameter (ug/l)	<u>Applies Outside Mixing Zone</u>		<u>Applies in Mixing Zone</u>
	Chronic Criterion	Acute Aquatic Criterion	Final Acute Value
Acenaphthene	67	67	134
Acetone	78,000	550,000	1,100,000
Ammonia-N	Table 7-3	Table 7-5	2 x Table 7-5
Aniline	0.22	5	10
Antimony	190	1,300	2,600
Arsenic	190	360	720
Benzene	560	1,100	2,200
Beryllium	Table 7-8	Table 7-9	2 x Table 7-9
Bis(2-ethylhexyl)phthalate	8.4	1,100	2,200
Bromoform	1,000	1,500	3,000
2-Butanone	7,100	160,000	320,000
Butyl benzyl phthalate	49	230	460
Cadmium	Table 7-8	Table 7-9	2 x Table 7-9
Carbon tetrachloride	280	1,800	3,600
Chlorine (total residual)	11	19	38
Chlorobenzene	26	590	1,180
Chloroform	79	1,800	3,600
2-Chlorophenol	9	200	400
Chromium (hex.)	10	19	38
Chromium (total)	Table 7-8	Table 7-9	2 x Table 7-9
Copper	Table 7-8	Table 7-9	2 x Table 7-9
Cyanide (free)	8.1	38	76
1,2-Dichlorobenzene	11	160	320
1,3-Dichlorobenzene	67	250	500
1,4-Dichlorobenzene	45	110	220
1,2-Dichloroethane	3,500	12,000	24,000
1,1-Dichloroethylene	78	1,500	3,000
1,2-Trans-Dichloroethylene	310	7,000	14,000
2,4-Dichlorophenol	18	200	400
Diethyl phthalate	120	2,600	5,200
Dimethyl phthalate	73	1,700	3,400
Di-n-butyl phthalate	190	350	700
2,6-Dinitrotoluene	42	950	1,900
Diethylamine	250	5,600	11,200
Ethylbenzene	62	1,400	2,800
Ethylene glycol	71,000	1,600,000	3,200,000
Fluoranthene	9	400	800

WATER QUALITY STANDARDS  
Toxic Substances

Procedure No. E2  
Revision No. 2  
Date Issued 11/2/87  
Effective Date 11/2/87  
Page 3 of 15

Water Quality Criteria Applicable to  
Inland Warmwater and Exceptional Warmwater Habitats (Continued).

Parameter (ug/l)	<u>Applies Outside Mixing Zone</u>		<u>Applies in Mixing Zone</u>
	Chronic Criterion	Acute Aquatic Criterion	Final Acute Value
Isophorone	900	6,000	12,000
Lead	30	a	2 x a
Mercury	0.2	2.2	4.4
Methylene chloride	430	9,700	19,400
Napthalene	44	160	320
Nickel	Table 7-8	Table 7-9	2 x Table 7-9
Nitrite (Sodium Nitrite)	120	490	980
Nitrobenzene	740	1350	2700
4-Nitrophenol	35	790	1,580
N-Nitrosodiphenylamine	13	290	580
Pentachlorophenol	b	c	2 x c
Phenol	370	5,300	10,600
Total Phenolics	10 (WQH) 1 (EWH)	---	---
Selenium	34	128	256
Silver	1.3	Table 7-9	2 x Table 7-9
Styrene	56	1250	2500
1,1,2,2-Tetrachloroethane	360	1,000	2,000
Tetrachloroethylene	73	540	1,080
Thallium	20	90	180
Toluene	1,700	2,400	4,800
1,2,4-Trichlorobenzene	77	150	300
1,1,1-Trichloroethane	88	2,000	4,000
1,1,2-Trichloroethane	620	2,000	4,000
Trichloroethylene	75	1,700	3,400
2,4,6-Trichlorophenol	3	16	32
Zinc	Table 7-8	Table 7-9	2 x Table 7-9

a Hardness dependent.  $AAC = e^{1.273[\ln(\text{hardness})]} - 1.46$ .

b pH dependent.  $CAC = e^{[1.005(\text{pH}) - 5.3799]}$ .

c pH dependent.  $AAC = e^{[1.005(\text{pH}) - 4.8725]}$ .