

**428**

**REMEDICATION OF THE FEED MATERIALS  
PRODUCTION CENTER - OPERABLE UNITS AND  
SCHEDULE**

**02/03/89**

**DOE-544-89  
DOE-ORO/USEPA  
14  
LETTER**



## Department of Energy

Oak Ridge Operations  
P.O. Box 2001  
Oak Ridge, Tennessee 37831-

428

February 3, 1989  
DOE-544-89

Mr. Basil G. Constantelos, Director  
Waste Management Division - 5H-12  
U. S. Environmental Protection Agency  
230 South Dearborn Street  
Chicago, Illinois 60604

Dear Mr. Constantelos:

### REMEDICATION OF THE FEED MATERIALS PRODUCTION CENTER - OPERABLE UNITS AND SCHEDULE

This letter responds to planning and scheduling recommendations provided by the USEPA in your letter of January 19, 1989.

The USEPA letter recommended revisions to the DOE proposals on operable units scheme, schedule, and interim remedial actions pending completion of the Remedial Investigation/Feasibility Study (RI/FS). In general, the DOE proposes that the operable units scheme be based on similarities between FMPC facilities versus geographic areas. This approach yields six operable units and provides for more efficient completion of higher priority operable units.

With regard to schedule, the DOE proposal results in completion of the RI/FS for the southern plume six months earlier than that proposed by the USEPA in your January 19, 1989 letter. The RI/FS for the Production Area will be completed consistent with the USEPA proposed schedule. Completion of the remaining four operable units will be extended from one to ten months based on relative priorities. The proposed schedule revisions are necessary due to substantial RI/FS scope increases incurred during 1988. The DOE considers that the proposed approach represents an aggressive yet achievable schedule which will best address the higher priority environmental concerns at the FMPC.

The DOE agrees that interim remedial actions are essential to demonstrate a commitment to ultimate clean-up of the FMPC site. Each of the three interim remedial actions proposed by the USEPA are addressed in the text. Also addressed are additional interim remedial actions being performed by the DOE.

## BACKGROUND

On December 9, 1988, the DOE transmitted to USEPA-Region 5, an updated master schedule for conduct of the FMPC Remedial Investigation/Feasibility Study. The updated schedule was presented in terms of six operable units which were described in the Feasibility Study Work Plan (transmitted for USEPA review and approval on August 15, 1988) and a seventh operable unit which was discussed with USEPA personnel during a December 13, 1988 meeting at the Feed Materials Production Center (FMPC).

The revised schedule indicated that RI/FS activities for the two highest priority operable units (South Plume and K-65 Silos) would proceed as originally scheduled in Revision 3 of the RI/FS Work Plan with projected issuance of the Records of Decision in the fall of 1990. Issuance dates for the Records of Decision for the remaining five operable units were extended by six to sixteen months, with operable units of higher relative concern receiving priority. The December 9, 1988 submittal explained that the schedule revisions were necessitated due to substantial RI/FS scope increases which occurred as a result of 1) negotiations with the USEPA to obtain approval of the RI/FS Work Plan and 2) progressive findings during the initial phase of the RI/FS which required the collection of additional field data.

A meeting was conducted at USEPA offices in Chicago, Illinois on December 22, 1988, to discuss those scope changes which resulted in the development of a revised master schedule. At the conclusion of the December 22nd meeting, it was agreed that a second meeting would be conducted on January 27, 1989 to reach agreement on the operable units and the schedule for the total RI/FS process. Prior to the January 27, 1989 meeting, on January 19, 1989, the DOE received from USEPA an evaluation of the DOE proposed operable units and the revised master schedule. The letter identified USEPA recommendations regarding the operable units scheme, schedule, and interim response actions.

The USEPA recommendations were discussed, in detail, at the January 27, 1989 meeting in Chicago. At the conclusion of that meeting, it was agreed that the DOE would provide a written response to EPA recommendations by February 3, 1989. A subsequent meeting was scheduled for February 22, 1989 at the USEPA Chicago offices to reach final agreement on the proposed operable units scheme and the schedule for completion of the RI/FS.

## DISCUSSION

The recommendations provided by the USEPA in the January 19, 1989 transmittal, can be categorized as follows: Operable Units Scheme, Schedule, and Interim Response Actions. For the sake of clarity, each of the categories is addressed separately, below.

### OPERABLE UNITS SCHEME

The concept of operable units, as presented in the "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA," was

developed to expedite Records of Decision on specific aspects of a site while studies continue on other components of the site. In accordance with the USEPA's guidance document for RI/FS's, operable units can be formulated around geographic areas, special problem areas, or progressive phases of a comprehensive effort. The four operable units proposed by the USEPA for the FMPC are generally aligned with geographic areas and a complete source-pathway-receptor combination associated with each area. The seven operable units previously developed by the DOE are best categorized by specific types of concerns and the categories of remedial actions which may ultimately be performed.

The selection of seven operable units by the DOE was the culmination of an extensive evaluation of the forty or so individual types of units at the FMPC in terms of six decision criteria. The final selection became focused on three criteria:

- o The type of unit (e.g.; a potential source of contamination versus an environmental receptor),
- o Similarities in the types of remedial action technologies potentially applicable to all units within an operable unit, and
- o The anticipated factors that will underlie the remedial action decision process (e.g., a risk-based clean-up level versus special physiochemical characteristics of the unit).

Specific reasons for the selection of the operable units have been presented in both the Feasibility Study Work Plan and the report on the development of alternatives (i.e. the Task 12 report) and are not repeated herein.

The respective advantages and disadvantages of the two proposed sets of operable units are summarized in Attachment 1. Based on this assessment of relative benefits, it is recommended that the RI/FS process continue on this course. One exception to this scenario is the DOE's recommendation that environmental media (Operable Unit 5) and the surface water courses (Operable Unit 6) be combined into a single operable unit. This combination will allow a direct integration of technical issues such as the relationship of the groundwater and soils media to the surface water media. A reduction in the number of RODs to be issued is a second advantage of this aggregation of all environmental media into a single operable unit.

## SCHEDULE

A careful review of the EPA's January 19th letter indicates a possible misinterpretation of DOE's proposed schedule. It appears that EPA has concluded that only two operable units are scheduled for the issuance of RODs prior to January 30, 1992. The source of this interpretation was likely the format of the schedule submitted by DOE in a letter dated December 9, 1988. In fact, only one operable unit (Operable Unit 5, Ground Water) was proposed for ROD completion in January, 1992. RODs for all other operable units were scheduled for earlier completion, as presented in Attachment 2.

As shown in Attachment 3, the operable unit schedules proposed by the DOE and USEPA are significantly different in only two cases - the K-65 Silos and the Waste Storage Area. These schedule variances are not considered significant in light of the technical complexities associated with the units and the interim remedial actions currently being pursued at both these facilities.

## INTERIM RESPONSE ACTIONS

The DOE agrees that interim remedial actions are essential. During the last four years, DOE has made significant progress on initiatives to address environmental, safety and health concerns at the FMPC. As presented in Attachment 4, over \$350 million has been spent on facilities, equipment and projects since 1985 to enhance environmental and safety systems at the facility. Many of these actions have included the implementation of source control measures affecting the proposed operable units. These projects include, but are not limited to, the following initiatives:

- o Installation of a stormwater retention system capable of collecting and holding stormwater from a 10-year, 24-hour storm event.
- o Interim closure of Waste Pit 4 with the installation of a multilayered cap to preclude stormwater infiltration.
- o Removal of thorium materials from the Plant 8 bins and silo.
- o Installation of dome caps and a polyurethane foam coating on the K-65 Silos.
- o Offsite shipment and disposal of over 37,000 drums of low-level radioactive waste.

These and other environmental improvements will continue throughout the course of the RI/FS.

The USEPA letter of January 19, 1989 stated that, "the imminent threat to human health and the environment necessitates an acceleration of the

schedule for some operable units or commitments on interim remedial actions measures." In concert with this statement, the letter contained three recommendations for interim response actions. For completeness, each of the USEPA recommended interim response actions are addressed separately below.

#### Recommended Interim Response Action 1: K-65 Silos

**USEPA Recommendation:** No interim response actions are required if structural analysis concludes that the K-65 tanks are stable. If the tanks are unstable, additional interim response actions will have to be implemented.

**DOE Response:** The K-65 Silos were constructed in the early 1950s to contain the residues from processing of radium bearing ores from the Belgian Congo. These ores contain radium which limits radon gas through radioactive decay. Due to DOE's concern regarding the stability of the silo domes' stability, the structural integrity of the domes was evaluated and found to be questionable in 1985. The area in question was the top, center portion of the domes which might fail if subjected to improper loading conditions. To address this concern, caps were installed over the center portions of the K-65 Silo domes early in 1986. The caps serve to distribute any load (e.g., due to snow) to the outer regions of the domes which are stronger and less likely to fail. They also ensure that the integrity of the silos will be maintained, even if the central portion of a silo dome were to collapse. If the central region of a dome were to collapse, that area would remain covered by the dome cap and the silo would remain closed to the atmosphere.

In July 1986, DOE and USEPA Region 5 entered into the Federal Facilities Compliance Agreement (FFCA). Within the CERCLA section of this document, the USEPA and DOE agreed that the DOE would take actions to limit radon emanations from the K-65 Silos. It was further agreed that the DOE would investigate the K-65 Silos and their contents as part of an RI/FS to be conducted in accordance with CERCLA regulations.

The investigation of the K-65 Silos and their contents is now underway as part of the ongoing RI/FS. In addition, actions have been taken and are continuing in an effort to minimize radon emanations from the silos. In December 1987, a weatherproof foam coating was applied to the silo domes to further protect them from the elements. Although offsite radon emissions have never exceeded the present EPA accepted limits of 4 picoCuries per liter for residential basements, foaming has decreased emissions to less than 1 picoCurie per liter at the FMPC boundary. Radon concentrations for plant workers nearest the K-65 Silos were reduced to less than 4 picoCuries per liter.

Consistent with the agreements made in the FFCA, interim actions to further limit emissions from the K-65 Silos are continuing. The DOE has completed a quantitative analysis to show the positive benefits of installing a 4-foot thick sand layer over the materials contained in the silos. This sand layer will substantially reduce emissions of radon gas and the levels of

direct gamma radiation emitted through the silo domes. This action has the added benefit of isolating the materials presently in the silos, even in the unlikely event of a total dome collapse.

A letter describing interim remedial actions and final remediation of the K-65 residues, including the silos and adjacent silo areas, was transmitted to the USEPA on January 10, 1989. Near-term activities discussed in the letter include actions taken to date with regard to meeting the FFCA and the planned addition of sand to the silos to achieve further reductions in radon emissions and reduce gamma radiation. A work plan to install the sand layer in the silos will be submitted to the USEPA in on March 15, 1989. Included in the submittal will be the results of a second structural evaluation which demonstrates the continued integrity of the silos during and following the installation of sand.

The DOE considers that the above interim actions are needed to ensure that the silos and their contents will not represent an imminent threat to human health or the environment pending the completion of an RI/FS.

#### Recommended Interim Response Action 2: South Groundwater Plume

USEPA Recommendation: The DOE should collect and treat the southern contaminant plume. A Work Plan for this interim response action is due on June 30, 1989.

DOE Response: The DOE has taken and is taking "assessment" and "removal" actions in the region known as the Southern Plume. The DOE considers that these actions are appropriate to ensure that there is no imminent threat to human health or the environment pending the completion of an RI/FS and initiation of final remedial actions. This position has been supported by two other independent agencies.

Under a cooperative agreement with DOE, sampling and analysis of over 300 off-site wells was conducted by the Ohio Department of Health (ODH) beginning February 1985. This work confirmed that off-site groundwater containing above background concentrations of uranium appears to be confined to a narrow area along Paddy's Run Road, just south of the FMPC (i.e., the region known as the southern plume). Above background concentrations of uranium were detected in three off-site wells and one cistern. Two of these wells are not used as sources of drinking water but provide water for industrial processes only. The third well has been locked and an alternate drinking water source supplied. In January 1989, the ODH reported its findings. The water quality measurements taken by the ODH did not detect the presence of any levels of radioactivity in the vicinity of the FMPC which would represent a threat to the health and safety of nearby residents.

In November 1988, the Ohio EPA also sampled drinking water in the region surrounding the FMPC. The Ohio EPA sampled drinking water from forty-one public wells within 10 miles of the FMPC site. The Ohio EPA announced in early December that its tests of 41 wells providing public water supplies

near the FMPC revealed no higher-than-normal concentrations of radioactive materials in groundwater.

In addition to the above studies performed by independent agencies, the DOE is continuing assessment efforts to insure that an imminent threat to human health and the environment does not exist pending completion of the RI/FS and initiation of the ultimate remedial actions for the South Plume operable unit. In this regard, the DOE is compiling available groundwater monitoring data from reports generated during the past eight years. Using that data, the DOE will prepare a map showing all known well locations within a 1-1/2 mile diameter area in the region of the southern plume. The DOE will complete this inventory of homeowner wells through a private mailing to homeowners. From this well inventory, the DOE will select a representative sample of homeowner wells near the Southern Plume. Samples from the selected wells will be analyzed for total and isotopic uranium. Following this sampling, the DOE plans to monitor selected wells on a periodic basis to ensure that there are no substantial changes in the level of uranium concentrations.

In addition to the above, the DOE is continuing RI/FS activities for the Southern Plume operable unit. At present, the DOE has five wells installed in the region of the Southern Plume. The flow distribution and depth of the plume are, at present, not well defined. The DOE considers that data to be obtained from ten additional wells being installed in this program are essential to the determination of either interim or final remedial actions for the plume. Actions taken prior to the availability of sufficient data could revise flow distribution in the region and effectively worsen the situation. In summary, the DOE considers that the preferred course of action which will best ensure the continued health and safety of the public is to proceed with the RI/FS in accordance with the proposed schedule.

The DOE considers that the ultimate remedial action in this region can be expedited through close coordination between DOE and USEPA. In this regard, if immediately following the collection of data from the ten additional wells, the DOE and USEPA can reach agreement on 1) the ultimate clean-up criteria for the southern plume and, 2) the types of remedial actions to be considered, the scope of the Feasibility Study can be substantially reduced. This would allow for streamlining of the RI/FS and ROD processes and would provide for early initiation of engineering design activities for remedial actions. I would like to discuss a potential strategy for this approach during our February 22, 1989 meeting.

#### Recommended Interim Response Action 3: Remaining On-Site Areas

USEPA Recommendation: Interim Response Actions: (1) pump grossly contaminated groundwater from under the Production Area; and (2) test all underground wastewater lines, below grade sumps, and tanks for leakage. Work Plan for Interim Response Action is due September 30, 1989.

DOE Response: Part 1 of the above recommendation requests a generic work plan to correct environmental deficiencies discovered during the course of

the RI/FS in the Production Area. The DOE considers that a generic work plan may not be optimal due to substantial differences among facilities in the Production Area. The DOE therefore proposes the following as an alternate approach to ensure that environmental concerns discovered in the Production Area are quickly assessed and that necessary interim remedial actions are initiated.

As RI/FS data are gathered for any facility in the Production Area, the DOE plans to perform a preliminary assessment of the data in terms of either a current release or threat of a release to the underlying aquifer. The assessment will also consider potential threat to human health or the environment. Based on the results of this preliminary assessment, a facility specific interim remedial action plan will be prepared for EPA review and approval.

The DOE plans to perform a preliminary assessment for Plant 6 and to submit the interim remedial action plan to USEPA by June 30, 1989. This plan should serve as a model through which the DOE and USEPA can reach agreement on objectives, content, and scope of this and future interim remedial action plans for other facilities. As stated above, the DOE will perform similar preliminary assessments as RI/FS data are gathered for other facilities in the Production Area.

With regard to Part 2 of the USEPA request, the DOE considers that these testing activities do not represent interim response actions. Actions for assessing infiltration from underground lines and underground tanks are already included in the Facilities Testing Work Plan (Section 4) which was submitted for USEPA approval on November 18, 1988. In addition, the proposed boring locations identified in the work plan were biased to assess existing environmental conditions in the vicinity of sumps which represent potential environmental concerns. An evaluation of these items is considered to be within the scope of the RI/FS Facilities Testing Work Plan currently undergoing EPA review.

#### SUMMARY & CONCLUSIONS

This letter addresses USEPA recommendations regarding 1) an operable units scheme, 2) an RI/FS schedule and 3) interim remedial actions pending completion of RI/FS activities.

In general, the DOE proposes that the operable units scheme be based on similarities between FMPC facilities versus geographic area. This approach yields six operable units and provides for more efficient completion of higher priority operable units.

With regard to schedule, the DOE proposal contained herein results in completion of the RI/FS for the Southern Plume six months earlier than that proposed by the USEPA in your January 19, 1989 letter. The RI/FS for the Facilities and Suspect Areas operable unit will be completed consistent with the USEPA proposed schedule. Completion of the remaining four

operable units will be extended from one to 10 months based on relative priorities.

The DOE agrees that interim remedial actions are essential to demonstrate a commitment to ultimate cleanup of the FMPC site. Each of the three interim remedial actions proposed by the USEPA are addressed in the text. Also addressed are additional interim remedial actions being performed. Based on the progressive finding of the RI/FS, additional interim remedial actions will be considered and reviewed with the USEPA.

The DOE remains committed to the expeditious completion of the RI/FS and initiation of ultimate remedial actions. I look forward to our meeting on February 22, 1989 to reach closure on these critical RI/FS items.

Sincerely,

  
J. A. Reafsnyder  
Site Manager

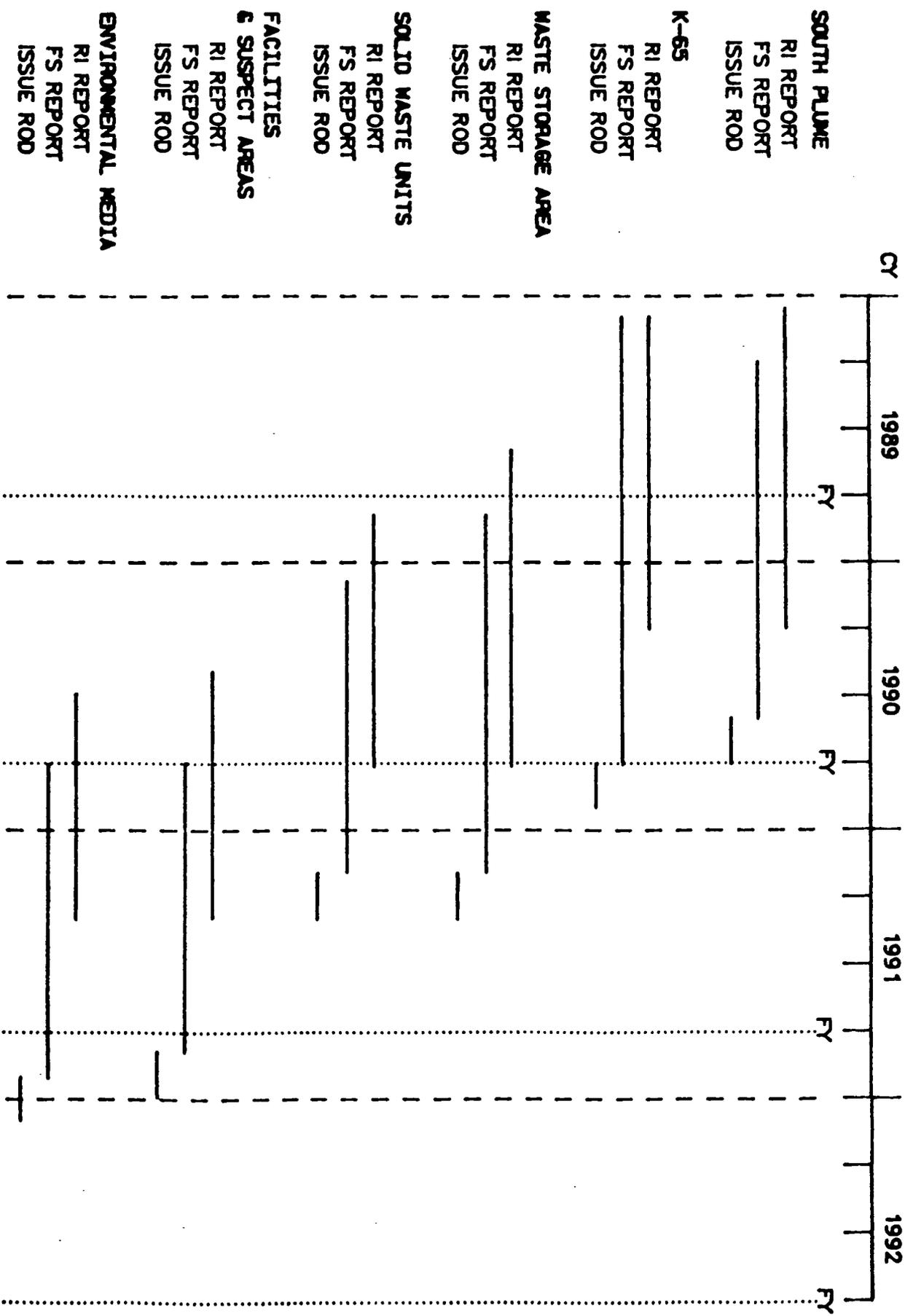
cc: C. McCord, USEPA  
G. Mitchell, OEPA  
R. Shank, OEPA  
M. B. Boswell, WMCO  
L. C. Bogar, WMCO  
S. L. Bradley, WMCO  
J. Craig, DOE  
R. Lenyk, ASI

**ATTACHMENT  
(TO OPERABLE UNITS SCHEME)**

<b>DECISION FACTOR</b>	<b>SIX OPERABLE UNITS (DOE PROPOSAL)</b>	<b>FOUR OPERABLE UNITS (U.S. EPA PROPOSAL)</b>
Consistency of Remedial Action Alternatives	Major factor in selection process to promote efficiency and technical specialties. Task 12 report supports selection.	Multi-media operable units would require consideration of full range of technology types; consolidation of technical expertise compromised.
ROD Schedule	Similarity of units would promote common schedule within an operable unit.	Operable unit schedule dictated by latest schedule among individual units, which could vary considerably.
Number of RODS	6	4
Program Management	Concise operable unit teams due to technical similarities.	Single operable unit could require extensive teams to address all issues.
Applicable Regulations and Standards	Generally consistent across an operable unit; consideration can be focused.	Single operable unit could require consideration of full range of regulatory issues.
Direct Integration of Total Source-Pathway-Receptor System	Only an indirect consideration of interrelationships allowed. Could lead to over-design and similar inefficiencies in project formulation.	Major factor in selection process to allow a systems approach.
Flexibility in Shifting Emphases	Flexibility easily accommodated. Already demonstrated by break-out of south plume and shifting of south field from "suspect area" to "solid waste unit".	Transfer of a single, prioritized unit could compromise underlying concept of complete source-pathway-receptor system.

# OPERABLE UNIT RI AND FS REPORT SCHEDULE

2/3/89 RI/FS SCHEDULE REVISION



## R/IFS SCHEDULE COMPARISON TABLE

DOE OPERABLE UNIT	EPA OPERABLE UNIT	DOE PROPOSED COMPLETION DATE (ROD)	EPA RECOMMENDED COMPLETION DATE (ROD)	DIFFERENCE BETWEEN DOE AND U.S. EPA PROPOSED SCHEDULES
1 WASTE STORAGE AREA	3 WASTE PIT AREA	APRIL 30, 1991	SEPTEMBER 30, 1990	+7 MONTHS
2 SOLID WASTE UNITS	2,3 WASTE PIT AREA & SOUTH FIELD AREA	APRIL 30, 1991	SEPTEMBER 30, 1990 (2) MARCH 30, 1991 (3)	+7 MONTHS +1 MONTH
3 FACILITIES & SUSPECT AREAS	4 PRODUCTION AREA	DECEMBER 30, 1991	JANUARY 30, 1992	-1 MONTH
4 SPECIAL FACILITIES	1 K-66 SILOS	NOVEMBER 30, 1990	JANUARY 30, 1990	+10 MONTHS
5 ENVIRONMENTAL MEDIA INCLUDING SURFACE WATER	2,4 SOUTH FIELD & PRODUCTION AREA	JANUARY 30, 1992	MARCH 30, 1991 (3) JANUARY 30, 1992 (4)	+10 MONTHS NO CHANGE
6 SOUTH PLUME	2 SOUTH FIELD & GREAT KIAMO RIVER	SEPTEMBER 28, 1990	MARCH 30, 1991	-6 MONTHS

## Attachment 4

The FMPC has spent \$350 million over the past four years on actions for facility enhancements in order to prevent any deterioration of the environment. These actions have been focused in the areas of solid waste management and water and an environmental control system.

Specific solid waste initiations include projects involving the K-65 Silos. Dome caps were placed on the silos in 1986. An exterior polyurethane foam coating was applied to the silos in 1987. A radon treatment system was constructed in support of the foam application and a videotaping of the interior of the silos was completed in 1987. Previously, a tower-mounted closed circuit TV system for continuous remote surveillance was installed. The cost of these actions was \$1.05 million.

Other solid waste management actions include the ongoing repackaging of thorium, from the Plant 8 silo and bins. These actions have cost \$1.6 million to date. Another action involves the interim closure of Pit 4, which will be completed in the spring of 1989 when a flexible membrane cover will be installed. The cost of this project has been \$1.16 million and is in response to the FFCA. Also, the FMPC has implemented an aggressive program to ship backlog waste material to our disposal site and has been successful in reducing the inventory by 37,547 drum equivalents over the past two years at a cost of approximately \$6 million.

In the area of stormwater and wastewater management, the FMPC has completed several projects, most notably the installation of a new flexible membrane liner in the Bionitrification Surge Lagoon (BSL) and an expansion of the Stormwater Retention Basin. Both of these projects were completed in response to the Ohio EPA Director's Findings and Orders (DFO).

Construction and installation of the BSL liner was completed September, 1988. An expansion to the Stormwater Retention Basin (SWRB) to contain a 10-year, 24-hour storm event was completed December 30, 1988. The expansion of the SWRB provides a capability for collecting the runoff from the heaviest 24-hour rainfall that is likely to occur over a ten-year period. As required by the DFOs, a contingency plan of actions to minimize impacts to Paddy's Run due to the SWRB expansion was completed October, 1987. The SWRB Expansion Project and the BSL Liner Replacement Project cost a total of \$2 million.

Other actions taken to mitigate the contamination from runoff water include the installation of curbing around the perimeter of storage pads. This project consisted of installation of curbing around the perimeter of the Plant 1 Pad, connecting a discharge pipe with the storm sewer, construction of a pad extension with concrete curbing and installation of a new underground drainage system consisting of piping and concrete catch basins. All process area runoff water from this pad is now directed to the Stormwater Retention Basin system. The Plant 1 Pad Project was completed November 22, 1988 at a cost of \$295,000.

New state of the art air emission control equipment for particulate and fume control have been installed and are presently budgeted throughout the 1980's and 1990's as part of the sitewide capital improvement program with a total estimated cost in excess of \$35 million.

Four new warehouses have been constructed to provide more safe and stable storage for uranium metal intermediates and products. The total cost for the four completed warehouses is \$5.1 million.