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Department of Energy

Ohio Field Office
Fernald Area Office
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MAY 09 2001

Mr. James A. Saric, Remedial Project Manager
United States Environmental Protection Agency
Region V-SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

DOE-0560-01

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

OPERABLE UNIT 5 - EXCEEDANCE OF 20 PPB URANIUM DISCHARGE LIMIT TO THE GREAT MIAMI RIVER - APRIL 2001

Enclosed for your information is the Final Event Report concerning the high uranium discharge to the Great Miami River on April 25, 2001 that resulted in the Fernald Environmental Management Project (FEMP) exceeding the monthly average limit of 20 ppb defined in the Operable Unit 5 (OU5) Record of Decision (ROD). The monthly average for April 2001 was 24.3 ppb. The enclosed report pinpoints the cause to be an upset in the Advanced Waste Water Treatment (AWWT) Phase II clarifier. However, while several possible causes are offered, no definitive cause for the clarifier upset has been determined.

In accordance with the Operations and Maintenance Master Plan for the Aquifer Restoration and Wastewater Project (April 1999), the Department of Energy (DOE) is committed to notifying the United States Environmental Protection Agency (USEPA) when an exceedance of the 20 ppb discharge standard occurs.

Recycled and Recyclable

MAY 09 2001

Should you have any questions regarding this matter, please contact John Kappa at (513) 648-3149 or Robert Janke at (513) 648-3124.

Sincerely,

Johnny Reising

FEMP:Kappa

Johnny W. Reising
Fernald Remedial Action
Project Manager

Enclosure: As Stated

cc w/enclosure:
R. J. Janke, OH/FEMP
J. Kappa, OH/FEMP
K. Nickel, OH/FEMP
T. Schneider, OEPA-Dayton (three copies of enclosure)
G. Jablonowski, USEPA-V, SRF-5J
F. Bell, ATSDR
M. Schupe, HSI GeoTrans
R. Vandegrift, ODH
F. Hodge, Tetra Tech
AR Coordinator, Fluor Fernald Inc./MS78

cc w/o enclosure:
K. Chaney, EM-31/CLOV
N. Hallein, EM-31/CLOV
A. Tanner, OH/FEMP
D. Brettschneider, Fluor Fernald, Inc./MS52-5
D. Carr, Fluor Fernald, Inc./MS2
M. Frank, Fluor Fernald, Inc./MS90
T. Hagen, Fluor Fernald, Inc./MS65-2
W. Hertel, Fluor Fernald, Inc./MS52-5
S. Hinnefeld, Fluor Fernald, Inc./MS31
M. Jewett, Fluor Fernald, Inc./MS52-2
F. Johnston, Fluor Fernald, Inc./MS52-5
U. Kumthekar, Fluor Fernald, Inc./MS52-2
T. Walsh, Fluor Fernald, Inc./MS46
ECDC, Fluor Fernald, Inc./MS52-7

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AEDO Log No.
01-04-264

Final Report No.

Final Event Report

Fernald Environmental Management Project — Fluor Daniel Fernald, Inc.

(Name of Facility)

1. System, Bldg., or Equip: AWWT TREATMENT SYSTEMS - PARSHALL FLUME MONITORING STATION

2. Plant Area: AS ABOVE

3. Description of Occurrence:

a. Initial Conditions: 24 HOUR COMPOSITE FOR 04/25/01 AT THE PARSHALL FLUME REPORTED AS 297ppb URANIUM

b. Initiating Event: CLARIFIER UPSET IN THE AWWT PHASE II SYSTEM STARTING ON SECOND SHIFT, 04/25/01

c. Incident Description: SEE ATTACHED

4. Immediate Actions Taken and Results: AWWT PHASE II SYSTEM SHUTDOWN FOR EVALUATION

5. Description of Cause(s): SEE ATTACHED

Cathe Glassmeyer 5/7/01

Analysis Performed by: CATHY GLASSMEYER Comp. Date: 05/02/01

6. Evaluation (by Project/Program Manager):

Signature: Date: 5/7/01

7. Corrective Actions:

1. INSTALL TURBIDITY METERS 06/2002

Target Completion Date: Comp. Date:

2.

Target Completion Date: Comp. Date:

3.

Target Completion Date: Comp. Date:

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8. Impact on Environment, Safety and Health: HIGH URANIUM DISCHARGE OF 297ppb ON 04/25/01 CAUSED THE MONTHLY FLOW RATED AVERAGE FOR APRIL TO EXCEED 20ppb (24.3ppb)

9. Lessons Learned: THE PROJECT HAS DISCUSSED INSTALLING TURBIDITY METERS AS A EARLY WARNING OF PROBLEMS WITHIN THE TREATMENT SYSTEM. WE SHOULD HAVE FOLLOWED UP AND STARTED THE PLANNING PROCESS FOR INSTALLATION.

10. Signatures:

Approved by: for M. Jewett Date: 5/7/01

Division Vice President Telephone No:

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Event 01-04-264 Exceeding 20 ppb at the Parshall Flume on April 25, 2001

The monthly uranium concentration limit for discharge to the Great Miami River (GMR) is 20 parts per billion (ppb). The actual monthly average concentration for April 2001 was 24.3 ppb.

The monthly exceedence was a result of an event which occurred on April 25, 2001. On that date, the uranium concentration in water discharged from the Parshall Flume was 297 ppb. Analysis of all plant activities for the day indicated that the cause of the elevated uranium concentration was the Advanced Wastewater Treatment (AWWT) Phase II system. The twenty-four hour composite uranium concentration from the Phase II system for April 25 was 344 ppb and solids were observed in the sample collected for uranium analysis. A small quantity of solids was observed in the Parshall Flume twenty-four hour composite sampler. These high solids from the Phase II system caused the high uranium in water discharged from the site as well as an NPDES noncompliance for TSS. All other treatment system uranium concentrations were less than 35 ppb and no solids were observed in any of the samples analyzed for uranium.

Discussions with AWWT Shift Supervisors and a review of logbooks indicated that the flow through the Phase II system began to drop off around 9:00 p.m. on April 25. The Control Room Operator's logbook reported that the carbon and multimedia filters all required backwashing at that time. The operators and supervisor began to walk down the system to determine the cause of the problem. When they reached the Phase II system clarifier, tank 161, they observed sludge flowing over the weir. The supervisor immediately instructed the Control Room Operator to shut down the Phase II system. The operators backwashed all the Phase II multimedia and carbon filters and the ion exchange vessels.

The supervisor and operators continued to examine the system to determine the cause of the clarifier upset. One of the supervisors commented in the logbook that the clarifier looked "like a pond that went through a seasonal turnover" because the surface was covered with floating solids and a scum layer. This was unusual because earlier in the shift when the operator performed his routine rounds of the clarifier, he noted that the clarifier was clear on the roundsheet. The clarifier had changed from clear to extremely turbid in about two hours. The supervisor speculated that the rapid temperature drop experienced that evening had caused the clarifier to turn over like ponds turn over in the spring and fall. While it is possible that the rapid drop in temperature (from 60.8°F at 7:00 pm to 46.4° at 10:00 pm) had some effect on the clarifier, that is not likely the main reason for the clarifier upset. The Phase II system was operating at 200 gpm continuously throughout the day and evening on waster from the Bio surge Lagoon (BSL). Temperature effects would have been minimized by the constant flow of water through the clarifier.

Early the next morning another operator performed rounds on the clarifier and observed bubbles forming in the surface. He walked the system down and found that air was being used to blow out the sludge line from the clarifier to the sludge holding tank. He turned off the air and observed that the bubbles stopped forming on the surface of the clarifier. For air to have gotten back into the clarifier from the location where air was entering the

pipeline, it had to have passed through a check valve. The check valve was removed by maintenance personnel and found to be in working order and not coated with sludge. An attempt was made on May 2, 2001, to recreate the circumstances of April 25 to determine if air would pass through the check valve. The check valve prevented air from entering the clarifier since no bubbles were observed on the surface of the clarifier.

Another theory offered by one of the supervisors is that the bubbles were due to decay of biological matter in the clarifier. The clarifier sludge is primarily an alum sludge, but algae grows in the clarifier during spring and summer months and the clarifier receives filtrate from filtration of Sewage Treatment Plant sludge. Another source of biological material is water from the BSL that contains residue and droppings from geese, frogs and other wildlife.

The exact cause of the clarifier upset is unknown. The most likely cause is that a small piece of sludge or other material was in check valve preventing it from closing completely and allowing air to flow into the bottom of the clarifier and cause the sludge to flow over the weir.

To prevent future clarifier upsets from affecting the uranium discharge to the river, turbidimeters will be installed on the discharge from the clarifier weirs. These turbidimeters will detect solids that flow out of clarifiers via the weir and alarm in the control room. The operators will be able to react immediately to shut down the system before solids can pass through the entire system and reach the Parshall Flume.