Fields of Opportunities

# STATE OF IOWA

THOMAS J. VILSACK, GOVERNOR
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DEPARTMENT OF NATURAL RESOURCES
JEFFREY R. VONK, DIRECTOR

June 8, 2007

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DNR F.O.1

CERTIFIED MAIL

Duane Arnold Energy Center
3277 DAEC Road
Palo, IA 52324-9785

ATTN: Dean Curtland, Plant Manager-Nuclear

SM

RE: Duane Arnold Energy Center Wastewater Treatment Facility Inspection
**NPDES Permit #: 5700104**

Dear Mr. Curtland:

Enclosed is the report of the recent inspection of the above facility conducted by Sue Miller of the Field Office #1 staff.

We believe you will find the report self-explanatory and strongly encourage you to take action on the requirements and/or recommendations listed at the end of the report. The previous inspection in 2005 identified several deficiencies that required action on the company's part. Those actions are again outlined in the requirements of the attached report. Failure to address these deficiencies within 30 days of the receipt of this report may result in enforcement action by the department.

If you have any questions about the inspection or report, please contact Sue Miller or myself at this office.

Sincerely,

Mike Wade
Environmental Specialist

cc: IDNR Wastewater Section, (w/encl.)
Jerald Hogan, Health Physicist, DAEC
Rick Robertson, City of Shellsburg, (w/encl.)
File: Ind. WW/FPL Duane Arnold
eFile: 57 WW Palo Duane Arnold 053007 nins sjm

IOWA DEPARTMENT OF NATURAL RESOURCES
WASTEWATER TREATMENT FACILITY INSPECTION

NPDES Permit #: 05700104



## FACILITY INFORMATION

| | | | | | |
|---|---|---|---|---|---|
| FACILITY | NAME: Duane Arnold Energy Center Wastewater | | PLANT GRADE: | | |
| | ADDRESS: 3277 DAEC Road | CITY: Palo | STATE: Iowa | ZIP: 52324-9785 | PHONE: 563-851-7606 |
| | RESPONSIBLE AUTHORITY/OWNER: FPL Energy Duane Arnold, LLC | | | | |
| RESPONSIBLE OPERATOR | NAME: Jerald Hogan | GRADE: NA | | CERTIFICATION NUMBER: NA | |

| | | | | |
|---|---|---|---|---|
| DESIGN CAPACITY | AVERAGE MGD: Outfall 002- 0.054 | MAXIMUM MGD: Outfall 002- 0.08 | POUNDS BOD/DAY: 93 | PE (BOD): 560 |
| NOW TREATING | AVERAGE MGD: 0.011 (2005) | MAXIMUM MGD: | POUNDS CBOD/DAY: | PE (BOD): |
| | PERIOD REVIEWED: 7/01/05-5/01/07 | POPULATION SERVED: Approx. 400 | | |
| RECEIVING STREAM | Cedar River, A1, B(WW1) | | | |

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|---|---|
| GENERAL DESCRIPTION: | Outfall 001 - DISCHARGE OF COOLING TOWER BLOWDOWN FROM THE RECIRCULATING WATER SYSTEM AND STORM WATER RUNOFF.<br>Outfall 002 - STORM WATER RUNOFF AND DISCHARGES FROM A SEQUENCING BATCH REACTOR WASTEWATER TREATMENT PLANT TREATING DOMESTIC WASTEWATER. |

## INSPECTION INFORMATION

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|---|---|---|---|
| INSPECTION | DATE THIS INSPECTION: 05/30/07 | DATE LAST INSPECTION: 07/21/05 | PURPOSE: Routine Compliance Inspection |
| PERSONS INTERVIEWED | NAME: Jerald Hogan<br>Rick Robertson | TITLE: Health Physicist<br>SBR plant operator | |

## NPDES PERMIT COMPLIANCE SUMMARY

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|---|---|---|---|
| SELF-MONITORING | Operation Reports Submitted: ☒ Sat. ☐ Marg.* ☐ Unsat.* | Required Data on Reports: ☒ Sat. ☐ Marg.* ☐ Unsat.* | Testing Adequacy: ☒ Sat. ☐ Marg.* ☐ Unsat.* |
| EFFLUENT LIMITATIONS | SELF-MONITORING RESULTS: ☒ Satisfactory ☐ Marginal* ☐ Unsatisfactory* | | |
| SAMPLES THIS INSPECTION | TYPE: None | | LAB DATA ATTACHED? ☐Yes ☐ No |
| | RESULTS: ☐ Satisfactory ☐ Marginal* ☐ Unsatisfactory* | | |
| | VISUAL APPEARANCE OF EFFLUENT: clear | VISUAL APPEARANCE OF RECEIVING STREAM: No visible impact | |
| COMPLIANCE SCHEDULE | COMPLIANCE w/SCHEDULE: ☐ Sat. ☐ Marg.* ☐ Unsat.* | NEXT ITEM DUE: | DATE DUE: |

* Explain in Comments and Recommendations Section

## AUTHENTICATION

| | | |
|---|---|---|
| INSPECTOR: | NAME: Sue Miller, Environmental Specialist<br>Sue Miller | DATE: 6/8/07 |
| REVIEWER: | NAME: Mike Wade, Environmental Specialist<br>Mike Wade | DATE: 6-8-07 |

## FACILITY EVALUATION:

**Outfall 001 Cooling Water —**

Water for the recirculating water system at the facility is withdrawn from the Cedar River. The recirculating water system removes heat from various processes at the nuclear power plant. Typical monthly average flows are approximately 2.5 MGD, with maximum flows as high as 8.87 MGD. The intake water passes through a bar screen to remove large debris followed by a traveling screen. Copper ion is injected to prevent fouling in the system.

Mr. Hogan discovered in March that a filter on the cooling water line had the potential to discharge chlorine to a storm drain if it happened to be backwashing while they were chlorinating the line. The storm drain leads to the discharge canal just downstream from outfall 001. Mr. Hogan triggered a backwash when the system was being chlorinated and collected samples from the system, at the storm drain and at the discharge canal. In the system the TRC measure 1.7 mg/l. The company must include the discharge from this filter on its NPDES permit.

After passing though the cooling system, the water is discharge into an open canal that leads back to the Cedar River just below the intake structure. As mentioned in the previous inspection, water was spilling over the metal retaining wall rather that all of it flowing through the discharge pipe that extends out into the channel. As I pointed out in the last inspection, the Company must investigate the reason for water bypassing the outfall 001 discharge pipe. If the effluent pipe is found to be plugged, steps must be taken to clear the pipe. If the effluent pipe is not plugged, the pipe diameter is not sufficient to handle the flow. In that case, the effluent pipe must be re-designed to handle all of the flow from the system.

**Outfall 002 SBR —**

There is one duplex lift station at the head of the plant. The lift station is equipped with a light to indicate pump malfunction. Plant security monitors the lift station.

The lift station pumps the wastewater to an influent wet well equipped with a comminutor. The wastewater flows by gravity through a splitter box into two parallel sequencing batch reactor aeration basins. The basins are aerated by three blowers, with two running at any given time. The following aeration and decant, the wastewater flows through a chlorine contact chamber before discharge to an open canal that leads to the Cedar River. The plant effluent soaks into the ground before it reaches the river.

Mr. Robertson reported that he no longer adds dog food to the influent wastewater to increase the BOD. Mr. Robertson also reports that he adds Vitastim®, a vitamin solution, to the aeration basins. These additions are thought to be needed to maintain a high quality effluent, given that actual influent flow is roughly 20% of the design.

I recommend that the company stop adding this material. Literature on the additive indicates it is for use when ammonia is a problem. The Duane Arnold plant does not have any ammonia limitations on its effluent. CBOD concentrations in the effluent are averaging less than 3 mg/l with 99% removal. It is not clear that there is any benefit to the plant.

As was noted in the previous inspection, the chlorine contact chamber is still in disrepair and must be rehabilitated. Mr. Hogan showed me the new plastic lumber that has been purchased to make the repairs. The comminutor appeared to be laboring. Mr. Hogan reported that a replacement comminuter has been purchased but not installed.

The operator collects 24-hour composite samples from both the influent and effluent. Because this is an SBR plant effluent samples must be flow-based rather than time based composites. The composite sampler should be connected to the solenoid so it will only collect samples when the aeration basins are decanting. The composite sample must be preserved during the entire 24-hour sampling event, by refrigeration or ice. A thermometer must be placed in the sampler and a log kept of the temperatures to ensure that the sample was properly preserved.

**Flow Measurement —**
Time clocks on the lift station pumps are used for calculating influent flow, along with a measurement from the influent v-notch weirs. The influent v-notch weirs may not be used to calculate the influent flow. The lift station pumps must be recalibrated at least every six months to take into account for impeller wear. These calibrations must be kept with other maintenance records.

**Miscellaneous —**
**Sludge—** Waste sludge is manually pumped to an aerated sludge digester. Digested sludge is hauled to the Cedar Rapids Pollution Control Facility or disposal.

**Change of Ownership—** Majority ownership of the nuclear power plant has changed since the previous inspection. The plant's majority owner is now FPL Energy Duane Arnold, LLC.

## SUMMARY OF REQUIREMENTS

1. The company must include the discharge from the cooling water filter backwash on its NPDES permit.
2. The company must investigate the reason for water bypassing the outfall 001 discharge pipe. If the effluent pipe is found to be plugged, steps must be taken to clear the pipe. If the effluent pipe is not plugged, the pipe diameter is not sufficient to handle the flow. In that case, the effluent pipe must be re-designed to handle all of the flow from the system.
3. The chlorine contact chamber is in disrepair and must be rehabilitated.
4. The influent v-notch weirs may not be used to calculate the influent flow.
5. The lift station pumps must be recalibrated at least every six months to take into account for impeller wear. These calibrations must be kept with other maintenance records.
6. The company must replace the old comminutor with the new one that was purchased.
7. Because this is an SBR plant effluent samples must be flow-based rather than time based composites.
8. The composite sample must be preserved during the entire 24-hour sampling event, by refrigeration or ice. A thermometer must be placed in the sampler and a log kept of the temperatures to ensure that the sample was properly preserved.
9. MSDS sheets for the copper ion additive and Vitastim® must be submitted to this office within 30 days of receipt of this report.
10. Representative grab samples from Outfall 001 must be collected and analyzed for copper. Copper is toxic to aquatic life. Data from this analysis will determine if copper monitoring and effluent limits will be added for this parameter to the NPDES permit for this facility.

## SUMMARY OF RECOMMENDATIONS

1. I recommend that the company stop adding VitaStim. It is not clear that the benefit outweighs the cost of the additive.