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FPL Energy.

**Duane Arnold Energy Center**

December 20, 2007

NG-07-0932
10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Duane Arnold Energy Center
Docket 50-331
License No. DPR-49

Application for Technical Specification Change to Add Surveillance for River Depth
Affected Technical Specification: Section 3.7.2

Pursuant to 10 CFR 50.90, FPL Energy Duane Arnold, LLC (FPL Energy Duane Arnold) hereby requests revision to the Technical Specifications (TS) for the Duane Arnold Energy Center (DAEC).

The proposed change would add a Surveillance Requirement to TS Section 3.7.2, "RWS [River Water Supply] System and UHS [Ultimate Heat Sink]," to require surveillances of the Cedar River depth to assure UHS operability.

FPL Energy Duane Arnold requests approval of this application no later than January 1, 2009 and an implementation period of 120 days after issuance of the license amendment.

This application has been reviewed by the DAEC Onsite Review Group. A copy of this submittal, along with the 10 CFR 50.92 evaluation of "No Significant Hazards Consideration," is being forwarded to our appointed state official pursuant to 10 CFR 50.91.

No new commitments and no changes to previous commitments are made in this submittal. If you have any questions or require additional information, please contact Steve Catron at (319) 851-7234.

A001
NRR

I declare under penalty of perjury that the foregoing is true and correct.

Executed on December 20, 2007.

Richard L. Anderson
Vice President, Duane Arnold Energy Center
FPL Energy Duane Arnold, LLC

Enclosures: A) Evaluation of Proposed Change
B) Proposed Technical Specification Changes (Mark-Up)
C) Proposed Technical Specification Pages (Re-Typed)
D) Proposed Technical Specification Bases Pages (For Information Only)
E) History of Cedar River Projects at DAEC

cc: Administrator, Region III, USNRC
Project Manager, DAEC, USNRC
Resident Inspector, DAEC, USNRC
D. McGhee (State of Iowa)

ENCLOSURE A

EVALUATION OF PROPOSED CHANGE

Subject: Application for Technical Specification Change to Add Surveillance for River Depth

1.0 DESCRIPTION

2.0 PROPOSED CHANGES

3.0 BACKGROUND

4.0 TECHNICAL ANALYSIS

5.0 REGULATORY ANALYSIS

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5 Pages Follow

**ENCLOSURE A**

Application for Technical Specification Change to Add Surveillance for River Depth

## 1.0 DESCRIPTION

This letter is a request to amend Operating License DPR-49 for the Duane Arnold Energy Center (DAEC). Currently, FPL Energy Duane Arnold performs Technical Specifications (TS) Section 3.7.2, "RWS [River Water Supply] System and UHS [Ultimate Heat Sink]," Surveillance Requirement 3.7.2.1 to verify Cedar River level elevation is ≥ 725.2 feet mean sea level on a frequency of once every 24 hours. The proposed change would add new Surveillance Requirements to TS Section 3.7.2 to require a surveillance of the Cedar River depth at the Intake Structure to assure UHS OPERABILITY.

## 2.0 PROPOSED CHANGES

Existing Surveillance Requirements in TS Section 3.7.2, "RWS System and UHS" would remain unchanged. This letter is a request to add a Surveillance Requirement to TS Section 3.7.2 to require a surveillance of the Cedar River depth at the Intake Structure once every 92 days to assure UHS operability. A conditional surveillance will also be added in the event Cedar River depth at the Intake Structure falls below 2 feet, TS Section 3.7.2 will then require a surveillance of river depth at the Intake Structure once every 7 days to assure UHS OPERABILITY.

Technical Specification Bases are also modified to reflect the above changes (see Enclosure D). The Bases changes are included for information only. Bases changes will be completed per the TS Bases Control Program (TS 5.5.10).

## 3.0 BACKGROUND

Currently, FPL Energy Duane Arnold performs TS Section 3.7.2, "RWS System and UHS," Surveillance Requirement 3.7.2.1 to verify Cedar River level elevation is ≥ 725.2 feet mean sea level on a frequency of once every 24 hours. However, we now recognize that measuring river level elevation alone may not be sufficient under all conditions to assure UHS OPERABILITY, see Enclosure E for details. Adequate river flow into the Intake Structure, measured in cubic feet per second (cfs), must be available to meet emergency cooling requirements and assure UHS OPERABILITY. River flow, which is independent of river level elevation, can be determined using river depth (i.e., river level elevation minus river bottom elevation) at the Intake Structure. Therefore, river depth should also be measured periodically to assure UHS OPERABILITY.

## 4.0 TECHNICAL ANALYSIS

The RWS System is designed to provide cooling water for the Emergency Service Water (ESW) and Residual Heat Removal Service Water (RHRSW) Systems, which provide support for various systems required for safe reactor shutdown following a Design Basis Accident (DBA) or transient. The Intake Structure openings to the river act as rectangular weirs, with the water depth at the Intake Structure providing the driving head, see Figure 2 of Enclosure E.

FPL Energy Duane Arnold performs TS Section 3.7.2, "RWS System and UHS," Surveillance Requirement 3.7.2.1 to verify Cedar River level elevation is ≥ 725.2 feet mean sea level on a frequency of once every 24 hours. River water level elevation ≥ 725.2 feet mean sea level ensures proper operation of the RWS pumps based on net positive suction head and vortexing considerations. However, we now recognize that measuring river level elevation alone may not be sufficient under all conditions to assure UHS OPERABILITY. Adequate river flow into the Intake Structure, measured in cubic feet per second (cfs), must be available to meet emergency cooling requirements and assure UHS OPERABILITY. As specified in the DAEC Updated Final Safety Analysis Report, a minimum river flow of 13 cfs must be available to assure UHS OPERABILITY. Per FPL Energy Duane Arnold calculation, a minimum depth requirement was calculated for pump run out conditions for the RWS pumps equaling flow of 17.60 cfs. Adequate flow of 17.60 cfs is provided as long as river depth is 6.5 inches or greater at the Intake Structure. The proposed Surveillance Requirement ensures margin to the minimum flow by specifying a depth of 12 inches or greater at the Intake Structure.

Based upon the Cedar River studies discussed in Enclosure E, performing the river depth surveillance on a frequency of once every 92 days would provide adequate indication of changes in the river bed conditions in a timely manner. Additionally, a conditional surveillance will also be added in the event Cedar River depth at the Intake Structure falls below 2 feet. In this case, TS Section 3.7.2 will require a surveillance of river depth at the Intake Structure once every 7 days to assure UHS OPERABILITY. This conditional surveillance requirement will ensure that river bed conditions are monitored until any corrective actions, such as dredging, are implemented. FPL Energy Duane Arnold has been periodically measuring river depth for the past 12 months as part of preplanned maintenance. Based on the trends of these depth measurements, the Cedar River studies discussed in Enclosure E and normal river hydraulics, it has been determined that river bed changes occur gradually enough that performing the river depth surveillance on a frequency of once every 92 days with a conditional surveillance to measure river depth once every 7 days if depth falls below 2 feet is appropriate to ensure UHS operability.

## 5.0 REGULATORY ANALYSIS

The proposed change does not change the design requirements or the assumptions in the safety analysis for the DAEC.

## 5.1 Regulatory Commitments

There are no changes to existing commitments made in this request.

## 6.0 NO SIGNIFICANT HAZARDS CONSIDERATION

FPL Energy Duane Arnold has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

Technical Specifications currently require surveillance of river level elevation and temperature. These surveillance requirements are unchanged. Adding an additional surveillance requirement to measure river depth will not adversely impact the probability or consequences of an accident previously evaluated.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

Adding TS Surveillance Requirements to measure river depth does not create the possibility of a new or different kind of accident from any accident previously evaluated and does not represent a change in the methods governing normal plant operation. In addition, the proposed change does not alter or eliminate any existing requirements. The proposed change does not alter assumptions made in the safety analysis. The proposed change is consistent with the safety analysis assumptions and current plant operating practice.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No.

Per the DAEC UFSAR, adequate river flow into the Intake Structure must be available to meet emergency cooling requirements and assure UHS OPERABILITY. Adequate river flow can be assured by requiring a minimum river depth of 6.5 inches or greater at the Intake Structure. The proposed Surveillance Requirements ensure margin to the minimum flow by specifying a depth of 12 inches or greater at the Intake Structure.

Adding additional surveillance requirements for river depth will not adversely impact any margin of safety.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

CONCLUSION

Based on the preceding 10 CFR 50.92 evaluation FPL Energy Duane Arnold concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

## 7.0 ENVIRONMENTAL EVALUATION

10 CFR Section 51.22(c) (9) identifies certain licensing and regulatory actions which are eligible for categorical exclusion from the requirement to perform an environmental assessment. A proposed amendment to an operating license for a facility requires no environmental assessment if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant hazards consideration; (2) result in a significant change in the types or significant increase in the amounts of any effluents that may be released offsite; and (3) result in a significant increase in individual or cumulative occupational radiation exposure. FPL Energy Duane Arnold has reviewed this request and determined that the proposed amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR Section 51.22(c) (9). The basis for this determination follows.

<u>Basis</u>

1. As demonstrated in the 10 CFR 50.92 evaluation included in this exhibit, the proposed amendment does not involve a significant hazards consideration.

2. The proposed change does not result in an increase in power level, does not increase the production, nor alter the flow path or method of disposal of radioactive waste or

byproducts. There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

3. The proposed change does not result in changes in the level of control or methodology used for processing of radioactive effluents or handling of solid radioactive waste nor will the proposal result in any change in the normal radiation levels within the plant. There is no significant increase in individual or cumulative occupational radiation exposure.

Pursuant to 10 CFR Section 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with the issuance of the amendment.

ENCLOSURE B

PROPOSED TECHNICAL SPECIFICATION

CHANGES

(MARK-UP)

1 Page Follows

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.7.2.1 | Verify the river water level is ≥ 725.2 ft mean sea level. | 24 hours |
| SR 3.7.2.2 | Verify the average river water temperature is ≤ 95°F. | 24 hours |
| SR 3.7.2.~~3~~ 4 | Verify each RWS subsystem power operated and automatic valve in the flow paths servicing safety related systems or components, that is not locked, sealed, or otherwise secured in position, is in the correct position. | 31 days |
| SR 3.7.2.~~4~~ 6 | Verify each RWS subsystem actuates on an actual or simulated initiation signal. | 24 months |
| SR 3.7.2.3 | ---------- NOTE ---------- Not required to be performed until river depth < 2 feet at the Intake Structure. ---------- Verify the river water depth ≥ 12 inches. | 7 days |
| SR 3.7.2.5 | Verify the river water depth ≥ 12 inches. | 92 days |

ENCLOSURE C

PROPOSED TECHNICAL SPECIFICATION PAGES

(RE-TYPED)

1 Page Follows

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.7.2.1 | Verify the river water level is ≥ 725.2 ft mean sea level. | 24 hours |
| SR 3.7.2.2 | Verify the average river water temperature is ≤ 95°F. | 24 hours |
| SR 3.7.2.3 | ----------NOTE----------<br>Not required to be performed until river depth < 2 feet at the intake structure.<br>----------<br><br>Verify the river water depth is ≥ 12 inches. | 7 days |
| SR 3.7.2.4 | Verify each RWS subsystem power operated and automatic valve in the flow paths servicing safety related systems or components, that is not locked, sealed, or otherwise secured in position, is in the correct position. | 31 days |
| SR 3.7.2.5 | Verify the river water depth ≥ 12 inches. | 92 days |
| SR 3.7.2.6 | Verify each RWS subsystem actuates on an actual or simulated initiation signal. | 24 months |

ENCLOSURE D

PROPOSED TECHNICAL SPECIFICATION BASES PAGES

(FOR INFORMATION ONLY)

7 Pages Follow

B 3.7 PLANT SYSTEMS

B 3.7.2 River Water Supply (RWS) System and Ultimate Heat Sink (UHS)

BASES

BACKGROUND

The RWS System is designed to provide cooling water for the Emergency Service Water (ESW) and Residual Heat Removal Service Water (RHRSW) Systems, which provide required support for various systems required for a safe reactor shutdown following a Design Basis Accident (DBA) or transient. The RWS System also provides water to the Circulating Water System to make up for cooling tower evaporative losses, as required, during normal operation. Upon receipt of a Loss of Offsite Power or Loss of Coolant Accident (LOCA) signal, the radwaste dilution/cross-tie valves are closed, if open, the river water makeup valves fail open, and selected pumps are started to ensure adequate delivery of water to the RHRSW/ESW Stilling Basin in the pump house. A two minute delay is implemented if a running RWS pump trips due to a dead supply bus and is subsequently restarted in response to a Loss of Offsite Power or LOCA signal.

The RWS System consists of the UHS and two independent and redundant subsystems. Each of the two RWS subsystems is made up of a header, two 6000 gpm pumps, a suction source, valves, piping and associated instrumentation. Either of the two subsystems is capable of providing the required cooling capacity to support the required systems with one pump operating. The two subsystems are separated from each other so failure of one subsystem will not affect the OPERABILITY of the other system.

Cooling water is pumped from the Cedar River by the RWS pumps to the RHRSW/ESW Stilling Basin in the pump house through the two main headers. From there, the water is either used by the RHRSW and/or ESW Systems, or is supplied to the Circulating Water System to replace evaporation losses from the cooling towers during normal plant operation. Since a common Stilling Basin is fed from either RWS subsystem and is connected to both RHRSW/ESW pump pits, either RWS subsystem can feed both RHRSW/ESW subsystems. The adequacy of the Cedar River as the UHS is discussed in Reference 4. The minimum river level requirement ensures that the minimum required flow rate (13 cubic feet per second) will be available to the RWS pump pits, and that sufficient suction pressure will be present to allow the RWS

(continued)

The minimum river depth requirement ensures that the minimum required flow rate, 13 cubic feet per second (cfs), will be available to the RWS pump pits.



BASES

BACKGROUND (continued)

pumps to deliver sufficient flow to the pump house stilling basin. The maximum river water temperature ensures that the water available for cooling safety related heat loads can remove heat in the quantities assumed in any safety analyses.

APPLICABLE SAFETY ANALYSES

Sufficient water inventory is available for the RWS System if the Ultimate Heat Sink specification is met. The ability of the RWS System to supply sufficient water to support the RHRSW and ESW Systems in providing long term cooling of the reactor containment, as assumed in evaluations of the equipment required for safe reactor shutdown, is presented in the UFSAR (Ref 3). These analyses include the evaluation of the long term primary containment response after a design basis LOCA.

The ability of the RWS System to supply sufficient makeup water in support of systems that provide adequate cooling to the identified safety equipment is an implicit assumption for the safety analyses evaluated in References 1 and 2. The ability to provide onsite emergency AC power is dependent on the ability of the RWS System to supply sufficient makeup water for use by the ESW System in cooling the DGs.

The RWS System, together with the UHS, satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The RWS subsystems are independent of each other to the degree that each has separate controls, power supplies, and the operation of one does not depend on the other. In the event of a DBA, one subsystem of RWS is required to provide makeup water to support the ESW and RHRSW Systems in providing the minimum heat removal capability assumed in the safety analysis for the system to which it supplies cooling water. To ensure this requirement is met, two subsystems of RWS must be OPERABLE. At least one subsystem will operate, if the worst single active failure occurs coincident with the loss of offsite power.

A subsystem is considered OPERABLE when it has an OPERABLE UHS, one OPERABLE pump, and an OPERABLE flow path capable of taking suction from the intake structure and transferring the water to the RHRSW/ESW Stilling Basin in the pump house.

(continued)

• The minimum river depth is based on the minimum required flow rate into the Intake Structure of 13 cfs to meet emergency cooling requirements.



BASES

LCO (continued)

The OPERABILITY of the UHS is based on having a minimum river water level of 725.2 ft mean sea level, a minimum river depth of 12 inches, and a maximum river water temperature of 95°F. The minimum river level is based on the minimum level assumed in the RWS System resistance calculations, and the maximum river temperature is based on the heat removal calculations for components supported by the RHRSW and ESW Systems.

APPLICABILITY

In MODES 1, 2, and 3, the RWS System and UHS are required to be OPERABLE to support OPERABILITY of the RHRSW and ESW Systems.

In MODES 4 and 5, the OPERABILITY requirements of the RWS System and UHS are determined by the systems they support, and therefore, the requirements are not the same for all facets of operation in MODES 4 and 5. Thus, LCOs of the systems supported by the RWS System and UHS will govern RWS System and UHS OPERABILITY requirements in MODES 4 and 5.

ACTIONS

A.1

With one RWS subsystem inoperable, the RWS subsystem must be restored to OPERABLE status within 7 days. With the unit in this condition, the remaining OPERABLE RWS subsystem is adequate to supply sufficient makeup water. However, the overall reliability is reduced because a single failure in the OPERABLE RWS subsystem could result in loss of RWS function.

The 7 day Completion Time is based on the redundant RWS System capabilities afforded by the OPERABLE subsystem, the low probability of an accident occurring during this time period, and is consistent with the allowed Completion Time for restoring an inoperable RHRSW or ESW subsystem.

(continued)

BASES

ACTIONS (continued)

B.1 and B.2

If the RWS subsystem cannot be restored to OPERABLE status within the associated Completion Time, or both RWS subsystems are inoperable, or the UHS is determined to be inoperable, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 12 hours and in MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

The Required Actions of Condition B are modified by a Note indicating that the Applicable Condition of LCO 3.4.7 "Residual Heat Removal (RHR) Shutdown Cooling System - Hot Shutdown," be entered and Required Actions taken if the inoperable RWS subsystem results in an inoperable RHR Shutdown Cooling subsystem. The Note also alerts the operator that RHR shutdown cooling will be inoperable when the Applicability of LCO 3.4.7 is met. This allows the operator to make provisions for an alternate method of decay heat removal for each inoperable RHR shutdown cooling subsystem, in accordance with the Required Actions of LCO 3.4.7. This is in accordance with LCO 3.0.6 and ensures proper actions are taken for these components.

SURVEILLANCE REQUIREMENTS

SR 3.7.2.1

This SR verifies the river water level to be sufficient for the proper operation of the RWS pumps (net positive suction head and pump vortexing are considered in determining this limit). The 24 hour Frequency is based on operating experience related to trending of the parameter variations during the applicable MODES.

SR 3.7.2.2

Verification of the River Water temperature ensures that the heat removal capability of the RHRSW and ESW Systems are within the assumptions of the DBA analysis. The 24 hour Frequency is based on operating experience related to trending of the parameter variations during the applicable MODES.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

INSERT A

SR 3.7.2.~~8~~ 4

Verifying the correct alignment for each power operated and automatic valve in each RWS subsystem flow path provides assurance that the proper flow paths will exist for RWS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves were verified to be in the correct position prior to locking, sealing, or securing. A valve is also allowed to be in the nonaccident position, and yet considered in the correct position, provided it can be automatically realigned to its accident position within the required time. This SR does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position. This SR does not apply to manual valves or to valves that cannot be inadvertently misaligned, such as check valves.

The 31 day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions.

INSERT B

SR 3.7.2.~~8~~ 6

This SR verifies that the automatic isolation valves of the RWS System will automatically switch to the safety or emergency position to provide cooling water exclusively to the RHRSW/ESW Stilling Basin in the pump house during an accident event. This is demonstrated by the use of an actual or simulated initiation signal. This SR also verifies the automatic start capability of one of the two RWS pumps in each subsystem.

Operating experience has shown that these components usually pass the SR when performed at the 24 month Frequency. Therefore, this Frequency is concluded to be acceptable from a reliability standpoint.

(continued)

INSERT A

SR 3.7.2.3

This SR verifies the river depth to provide sufficient flow to meet the plant's emergency cooling requirements. River depth is measured in front of the Intake Structure. This SR is modified by a note which allows this SR not to be performed when river depth is ≥ 2 feet. If river depth falls below 2 feet, this SR is performed once every 7 days to assure UHS OPERABILITY. The 7 day frequency will ensure that river bed conditions are monitored until corrective actions, such as dredging, are implemented.

INSERT B

SR 3.7.2.5

This SR verifies the river depth to provide sufficient flow to meet the plant's emergency cooling requirements. River depth is measured in front of the Intake Structure. The 92 days Frequency is based on operating experience related to trending of river bottom fluctuations.

BASES (continued)

REFERENCES

1. UFSAR, Chapter 15.
2. UFSAR, Section 6.2.2.
3. UFSAR, Section 9.2.2.
4. UFSAR, Section 1.8.27.

**ENCLOSURE E**

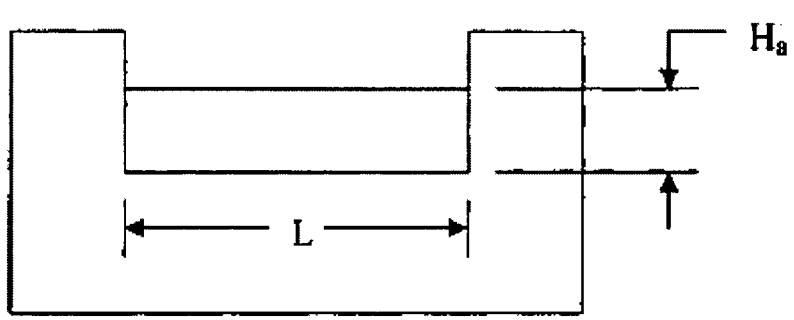
History of Cedar River Projects at DAEC

FPL Energy Duane Arnold has been monitoring and maintaining the river sediment level at the Intake Structure since original plant startup. During the DAEC Safety System Functional Inspection in 1990, a concern was identified that silt build up in front of the Intake Structure threatened long-term integrity of the Ultimate Heat Sink (UHS). As a result, DAEC committed to and completed a Cedar River Silting Study and installation of the Iowa Vanes, as documented in NRC Inspection Report 90-003.

The Iowa Vanes were installed in 1991 and are located directly in front and upstream of the Intake Structure. The Iowa Vanes are designed to create secondary currents in the river which scour the face of the structure and help prevent the deposition of sediment in front of the Intake Structure entrance sill.

In 2006, FPL Energy Duane Arnold installed Spur Dikes upstream of the Intake Structure on the riverbank opposite to the Intake Structure. The Spur Dikes are placed on the east riverbank, upstream of the Intake Structure, to direct the Cedar River flow tangentially toward and immediately along the face of the Intake Structure. The purpose of these Spur Dikes is to quicken the river flow past the Intake Structure to minimize the sediment movement toward the Intake Structure. The spur dikes are designed to alter the river flow into a new configuration over time. As water travels past the spur dikes, sediment is deposited in between the dikes causing the riverbank to build-up. The placement of the spur dikes is intended to straighten the riverbank to the 1980 river bounds. This would direct river flow straight past the Intake Structure, narrow the river channel, and create faster flows past the Intake Structure thereby sweeping sediment away.

Figure 1 is an aerial view of the Cedar River, showing the location of the Intake Structure and Spur Dikes. Figure 2 is a cut-away of the Intake Structure looking to the north. The Intake Structure foundation is constructed on bedrock. This figure shows how river level and depth in front of the Intake Structure impact flow into the Intake Structure. The Intake Structure consists of two openings that act as rectangular weirs as depicted in the following figure.



The available flow through the rectangular weir is determined using the equation:

$V_{sf} = 3.33(L-0.2H_a)H_a^{3/2}$

where $V_{sf}$ = rate of flow in cfs
$H_a$ = water depth in front of the weir in feet
L = length of weir

To determine a minimum depth requirement, a flow requirement equal to pump run out conditions for the RWS pumps was used, i.e., 17.60 cfs. The length of the rectangular weir, L, is 13.5 feet. Assuming only one weir is available; a depth $H_a$ of 6.48 inches is required to obtain 17.60 cfs of flow. The proposed Surveillance Requirement ensures margin to the minimum flow by specifying a depth of 12 inches or greater at the Intake Structure.

The Iowa Institute of Hydraulic Research (IIHR) college of Hydroscience and Engineering at the University of Iowa has conducted several studies related to sediment control near the DAEC Intake Structure dating back to 1981. These studies have shown that the significant majority of all channel deposition and scour occurs when the river bed particles begin to move downstream as a "mobile bed." Generally the river channel experiences a mobile bed during every spring flood as the spring runoff increases river flow velocities. However, mobile bed conditions can also be experienced during low river flow conditions which have historically occurred during the late summer.

FPL Energy Duane Arnold has been periodically monitoring river depth in front of the Intake Structure to ensure adequate depth exists to assure UHS OPERABILITY. As part of implementation of this Technical Specification change, FPL Energy Duane Arnold plans to procure and install a US Geological Society depth measuring device at the Intake Structure.

IIHR has conducted two Cedar River surveys since the installation of the spur dikes. Those surveys, conducted in December 2006 and July 2007, indicate adequate depth, in excess of 8 feet of depth, in front of the Intake Structure.

Upstream and downstream Cedar River flow data is available from the National Oceanic and Atmospheric Administration's Advanced Hydrologic Prediction Service. This data provides early indication of changing river flow conditions, typically one to two days in advance of flow conditions reaching DAEC.

Based on the above, FPL Energy Duane Arnold has determined that performing the river depth surveillance on a frequency of once every 92 days will provide adequate indication of changes in the river bed conditions in a timely manner. Additionally, a conditional surveillance will also be added in the event Cedar River depth at the Structure falls below 2 feet. With river depth less than 2 feet, TS Section 3.7.2 will require a surveillance of river depth at the Intake Structure once every 7 days to assure UHS OPERABILITY. This conditional surveillance requirement will ensure that river bed conditions are monitored until any corrective actions, such as dredging, are implemented.

Figure 1

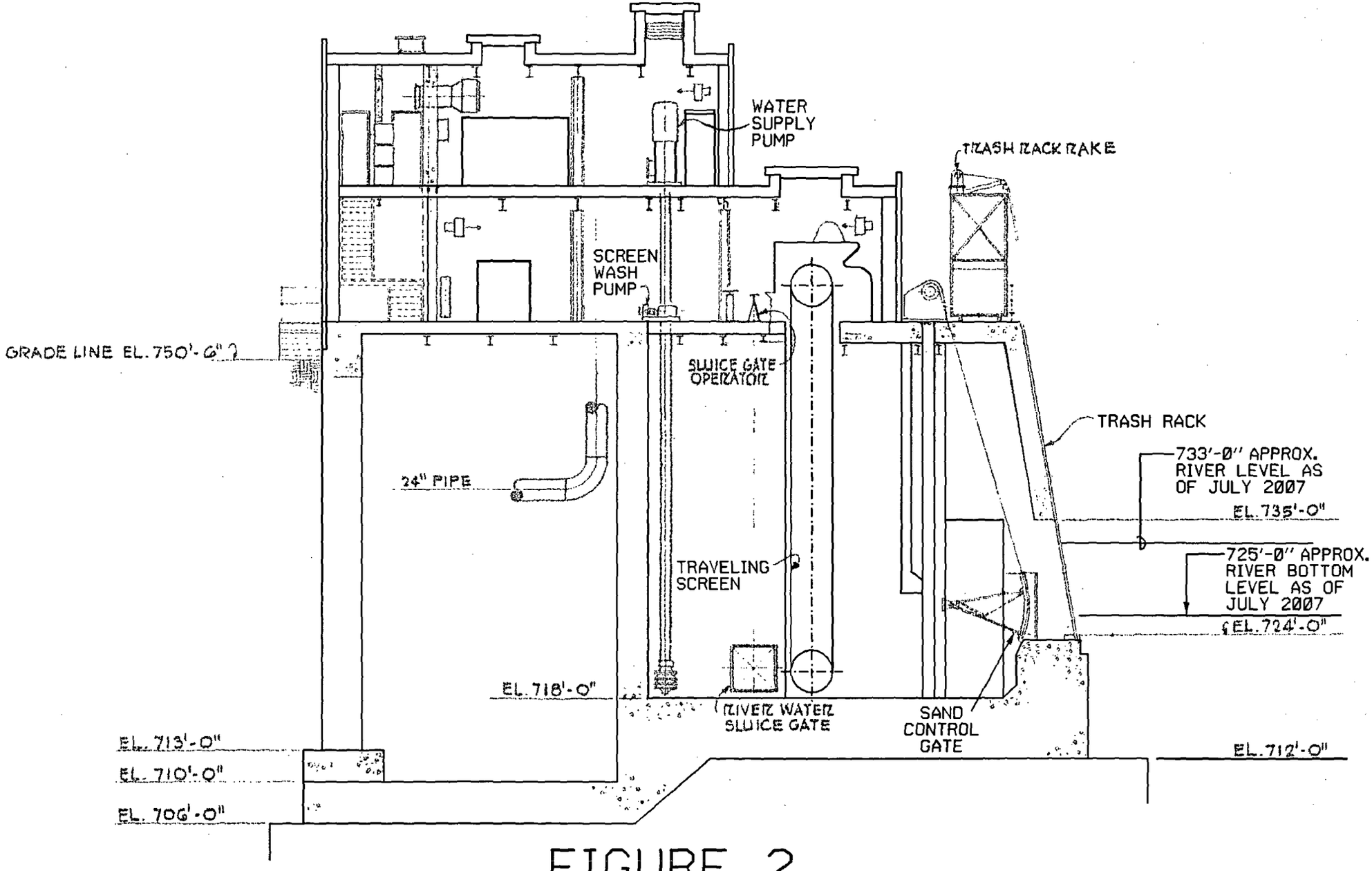

WATER SUPPLY PUMP
TRASH RACK RAKE
SCREEN WASH PUMP
GRADE LINE EL. 750'-0"
SLUICE GATE OPERATOR
TRASH RACK
733'-0" APPROX. RIVER LEVEL AS OF JULY 2007
EL. 735'-0"
24" PIPE
725'-0" APPROX. RIVER BOTTOM LEVEL AS OF JULY 2007
TRAVELING SCREEN
EL. 724'-0"
EL. 718'-0"
RIVER WATER SLUICE GATE
SAND CONTROL GATE
EL. 713'-0"
EL. 712'-0"
EL. 710'-0"
EL. 706'-0"

FIGURE 2