

Quick View Chart

Site	1. Have there been tritium releases (spills, leaks, etc.), other than routine effluent releases, from your plant into the public domain (areas outside the licensee's OCA)?	9. Has the licensee identified onsite radioactive groundwater contamination?	14. Does the licensee have any history of radioactive spills and/or leaks outside of buildings?
Arkansas	Yes	No	Yes
Callaway	Yes	Yes	See Question 1
Columbia Generating Station	No	NO, but DOE has identified tritium from their burial site just outside the protected area at CGS	No
Comanche Peak	No	No	No
Cooper	No	No	Yes
Diablo Canyon	No	No	Yes
Fort Calhoun	No	No	Yes
Grand Gulf	No	No	Yes
Palo Verde	No	No (?)	Yes
River Bend	No	Yes	No
San Onofre	Yes	No	Yes
South Texas	No	Yes	Yes
Waterford 3	No	No	Yes
Wolf Creek	No	No*	Yes

*Does not monitor

2-10

Region IV Radioactive Waste Related Questions

Site: ANO Date 3/07/06 Person Contacted David Moore
Dee Hawkins

1. Have there been tritium releases (spills, leaks, etc.), other than routine effluent releases, from your plant into the public domain (areas outside the licensee's OCA)?

YES

If yes, describe.

1975-76 time frame, Borated water storage tank leaked onto ground and the storm drain. Affected area was excavated 6"-8" and disposed of as radioactive waste.

Early 90's the RWT leaked. Affected area again excavated and disposed of as radioactive waste.

2. Where does the liquid waste discharge?
Directly to lake/reservoir

3. Does the licensee's radioactive liquid discharge line traverse any non-licensee owned areas (e.g., Is it on a right-of-way surrounded by private properties) ?

NO

4. If the licensee has discharge piping that carries radioactive liquids, does the licensee perform monitoring along the discharge pathway to identify potential leakage?

NO

If yes, how frequently is the sampling performed?

Are there vacuum breakers, pressure relief valves or similar type valves on the discharge piping? If so, how are these valves monitored for leakage?

YES, these are located within the Auxiliary Buildings and are monitored. Any leakage goes into building drains and is processed.

5. What surface bodies of water do you have onsite (Protected Area and Owner Controlled), including cooling tower basins, impoundments, cooling reservoirs, spray ponds, retention ponds, lakes, sanitary/sewage systems, etc.?

Cooling tower basin, Emergency cooling pond, Sewage treatment pond
Waste Water Holding Pond

Are these bodies of water lined ponds? If so, with what?

Yes, Cooling tower basin is concrete
Emergency cooling pond is lined with clay
Sewage treatment pond lined with clay
Waste water holding pond lined with clay

What is the highest level of residual contamination in each of those systems?

Most are slightly above MDA

6. Does the licensee have groundwater monitoring wells onsite?
NO

How many wells and where are they located (e.g., distributed around/throughout the site, in a particular region of the site and/or near particular buildings/structures, etc.)?
N/A

7. At what frequency does the licensee sample/analyze the wells?
N/A

8. What radionuclides does the licensee monitor? N/A

Gamma emitters? MDA

Tritium? MDA

Gross Beta? MDA

Other? MDA

9. Has the licensee identified onsite radioactive groundwater contamination?
NO

If yes, when was it identified?

Corrective action document No.

How large of an area?

Has the contamination moved outside the restricted area or the owner controlled area?

10. If the licensee does NOT have an onsite radioactive groundwater monitoring program does the licensee plan to implement a program and how extensive?
Echelon Corporate is evaluating this issue.

Does the licensee plan to take other measures to assure they can identify radioactive groundwater contamination?

11. Does the licensee have a surveillance program to periodically walkdown outside areas around the site to look at potential leaks and spills?
No formal program. Operations, Chemistry, and RP do this as part of routine duties.

12. Does the licensee perform other onsite monitoring (e.g. soil sampling) to identify unexpected radioactive releases?
NO, the REMP program looks at vegetation and does an annual shoreline sediment sample.
13. As discussed in IE Bulletin No. 80-10, what clean systems have become contaminated?
Unit 1 & 2 Condensate Storage Tanks
Unit 1 & 2 Domestic Water System
Unit 1 & 2 Main Chillers
Unit 1 & 2 Plant Heating System
Unit 1 & 2 Secondary systems (steam, condensate, feed) due to primary to secondary leaks in past
High & Low pressure Nitrogen supply
Service & Instrument air systems

What are the levels of residual contamination in those systems?

Tritium levels of 1 E-6 uCi/ml have been found and Gross Gamma at 1 E-8 uCi/ml

14. Does the licensee have any history of radioactive spills and/or leaks outside of buildings? YES

If so, have they been documented in accordance with 10CFR 50.75g?

YES

If not, why?

Region IV Radioactive Waste Related Questions

Site: CALLAWAY

Date: March 10, 2006

Person(s) Contacted:

Justin Hiller - Licensing

1. Have there been tritium releases (spills, leaks, etc.), other than routine effluent releases, from your plant into the public domain (areas outside the licensee's OCA)?

- YES

If yes, describe.

- As a normal part of the liquid effluent release pathway, the discharge pipeline carries diluted liquid effluents to the Missouri river. The discharge pipeline has broken on four occasions, resulting in the discharge of diluted liquid effluent onto the ground in the area of the break. The effluent had already been diluted below the applicable 10 CFR 20 Appendix B concentration limits as part of the normal liquid effluent release process. All four breaks occurred on Ameren property and each is described in the applicable Effluent Release Report and/ or Radiological Environmental Monitoring Report for the year of occurrence.

2. Where does the liquid waste discharge?

- Liquid radioactive effluents are discharged to the Missouri River. Refer to FSAR Figure 2.1-2 and NUREG-0813, "Final Environmental Statement Related to the Operation of Callaway Plant, Unit 1", January, 1982, Figure 4.2.

3. Does the licensee's radioactive liquid discharge line traverse any non-licensee owned areas (e.g., Is it on a right-of-way surrounded by private properties) ?

- The discharge pipeline runs generally south from the plant site through the Access Corridor to just south of Logan Creek, where it turns ESE and runs to the river intake structure. The land in the Access Corridor is owned by Ameren. Within the Access Corridor area, the discharge pipe runs under County Road 325, the Katy Trail State Park, and Logan Creek. The pipeline exits Ameren property a short distance beyond Logan Creek. After the pipeline exits Ameren property, it runs a short distance through a field, under Hwy 94, and through another field until it reaches Ameren property at the river intake structure. The land not owned by Ameren is river bottom land used for farming. There are no residences or drinking water wells on Ameren property or in the area along the pipeline that is not on Ameren property. The Katy Trail State Park is a hiking/ biking Rails-to-Trails conversion project and is approximately 200 miles long and 50 feet wide. Refer to FSAR Section 2.1.1.

4. a. If the licensee has discharge piping that carries radioactive liquids, does the licensee perform monitoring along the discharge pathway to identify potential leakage?

- No monitoring is performed along the discharge pipe pathway to detect leakage. Corrective action system documents CAR 200601854 and CAR 200601855 were written to evaluate Industry operating experience related to leakage from discharge pipelines.

b. If yes, how frequently is the sampling performed?

- N/A

c. Are there vacuum breakers, pressure relief valves or similar type valves on the discharge piping?

- There are vacuum breakers on the discharge pipe.

d. If so, how are these valves monitored for leakage?

- They are visually inspected annually.

5. a. What surface bodies of water do you have onsite (Protected Area and Owner Controlled), including cooling tower basins, impoundments, cooling reservoirs, spray ponds, retention ponds, lakes, sanitary/sewage systems, etc.?

- See Table Below (5.c.)

b. Are these bodies of water lined ponds? If so, with what?

- The cooling tower basin and clearwell are constructed of poured concrete. None of these are lined. N/A

c. What is the highest level of residual contamination in each of those systems?

The data is from the 2004 REMP Report, Table 9 and Table 18; and corrective action document CAR 200403826.

Description	Nuclide	Range	Type of sample
Cooling tower basin	H-3	562 - 642 pCi/l	Water
Sewage treatment lagoons and wetlands	Cs-137	*	Soil
Clearwell	H-3	278 - 400 pCi/l	Water
Ultimate Heat Sink (UHS)	H-3	330 - 443 pCi/l	Water
Abandoned excavation for Unit 2	H-3	224 - 229 pCi/l	Water
Runoff retention ponds	H-3	ND	Water
Settling ponds	H-3	ND	Water

ND = Not Detected * None detected above pre-operational background levels. The pre-operational background level for Cs-137 in soil, decay corrected to 2004, ranges from 60 - 820 pCi/kg. Refer to the 1983 and 1984 Annual REMP reports for complete information.

The pre-operational background levels for H-3 in surface water, decay corrected to 2004, is approximately 70 pCi/l as discussed in CAR 200403826.

6. Does the licensee have groundwater monitoring wells onsite?

- The onsite wells listed in the table below are described in the 2004 annual REMP report, Table 1 and Table 12.

How many wells and where are they located (e.g., distributed around/throughout the site, in a particular region of the site and/or near particular buildings/structures, etc.)?

- See table below.

Tables for questions 6 and 6.a.

Onsite and Offsite Deep Wells				
Well	Description	Frequency	Nuclide	Range (pCi/l)
D01	5 mi. SE, Holzhouseer Grocery Store/ Tavern, Portland, MO (drinking water)	Quarterly	H-3	ND
			Gamma Isotopic	ND
F05	0.9 mi. SSE	Quarterly	H-3	ND
			Gamma Isotopic	ND
F15	0.4 mi. NNE	Quarterly	H-3	ND
			Gamma Isotopic	ND
PW1	Onsite potable water from cafeteria	Quarterly	H-3	ND
			Gamma Isotopic	ND

ND = Not Detected

Onsite Shallow Groundwater Wells				
936	Plant SE of Spent Fuel Pool Building	Quarterly	H-3	176 - 429
			Beta	8.9 - 15.2
			Boron	ND
937C	Plant east of Radwaste Building	Quarterly	H-3	ND - 199
			Beta	5.5 - 8.7
			Boron	ND
937D	Plant south of Discharge Monitor Tanks	Quarterly	H-3	ND - 427
			Beta	5.6 - 9.2
			Boron	ND

ND = Not Detected

Samples from the ground water sump, located plant east of the Reactor Building and the Spent Fuel Pool Building were analyzed for H-3. The H-3 concentration ranged from not detected to 2500 pCi/l with a typical concentration of approximately 400 pCi/l. There was no boron detected in the ground water sump samples.

7. At what frequency does the licensee sample/analyze the wells?

- See table in Response 6.

8. What radio-nuclides does the licensee monitor?

Gamma emitters?	YES	MDA	Activity $\mu\text{Ci/l}$
Tritium?	YES	MDA	Activity $\mu\text{Ci/l}$
Gross Beta?	YES	MDA	Activity $\mu\text{Ci/l}$
Other?	NO	MDA	Activity $\mu\text{Ci/l}$

See table in Response 6. All samples were analyzed at the LLD provided in the NRC Radiological Assessment Branch Technical Position, Rev. 1, "An Acceptable Radiological Environmental Monitoring Program", November, 1979.

9. a. Has the licensee identified onsite radioactive groundwater contamination?

- YES shallow groundwater

b. If yes, when was it identified?

Corrective action document No.

- Onsite sampling was performed in response to NRC Information Notice 2004-05 and documented in CAR 200403826 (initiated 5/7/2004). The analytical results indicate that the shallow groundwater beneath the plant has levels of H-3 that are higher than naturally occurring background levels but are still well below the 20,000 pCi/l reporting level provided in the NRC Radiological Assessment Branch Technical Position, Rev. 1, "An Acceptable Radiological Environmental Monitoring Program", November, 1979, and the EPA Primary Drinking Water Regulations promulgated in 40CFR141.16. See the table in Response 6 for the analytical results.

As described in CAR 200403826, the source of the H-3 in the shallow groundwater is recirculation of the H-3 in the Missouri River *upstream* from the discharge pipe to the river water intake. H-3 in the liquid effluents is discharged into the Missouri River just downstream of the intake structure. A backflow eddy causes the H-3 to flow upstream to the intake. The river water is pumped to the plant where it is used for makeup water to the Circulating and Service Water (CSW) system, which supplies the water for the Cooling Tower. Leaks in the underground CSW piping allow the CSW to enter the shallow groundwater beneath the plant, where it is contained by the excavated area. The hydrogeologic properties of the site are described in FSAR Section 2.4 and in the Environmental Report, Operating License Stage, Section 2.4. CAR 200601856 was written to evaluate Industry operating experience related to H-3 leakage from CSW systems.

The shallow groundwater samples were analyzed for boron. Since boron was not detected in any of the samples, leakage from the Spent Fuel Pool or piping containing Reactor Coolant System water is not indicated.

c. How large of an area?

- The excavation of the site was designed to contain any contaminated water to the area directly beneath the plant power block and the excavated area for the cancelled Unit 2. The hydrogeologic properties of the site are described in FSAR Section 2.4 and in the Environmental Report, Operating License Stage, Section 2.4.

d. Has the contamination moved outside the restricted area or the owner controlled area?

- The site excavation was designed to contain any contaminated water as described in Response 9. There are no shallow groundwater wells outside the immediate plant site area; however, sampling and analysis of onsite and offsite deep wells have not detected H-3 contamination in the deep groundwater aquifer. See the table in Response 6.

10. a. If the licensee does NOT have an onsite radioactive groundwater monitoring program does the licensee plan to implement a program and how extensive?

- See response 9.

b. Does the licensee plan to take other measures to assure they can identify radioactive groundwater contamination?

- Based on the information presented in CAR 200403826, a design change was initiated (CAR 200507089) to relocate the end of the plant discharge pipeline to an area where there is no backflow eddy, which will eliminate the recirculation of H-3 in the river as a source of H-3 contamination in the shallow groundwater. This work is expected to be completed prior to January, 2007. Elimination of this source of H-3 in the CSW will also improve the long term leak detection sensitivity.

11. Does the licensee have a surveillance program to periodically walkdown outside areas around the site to look at potential leaks and spills?

- Operations Department personnel, using procedure ODP-ZZ-00016, at least daily walk down the areas outside plant buildings and look for leaks and spills from tanks or other sources.

12. Does the licensee perform other onsite monitoring (e.g. soil sampling) to identify unexpected radioactive releases?

- YES. Soil samples are taken from the sewage treatment lagoons and wetlands annually.

13. a. As discussed in IE Bulletin No. 80-10, what clean systems have become contaminated?

- See table below.

b. What are the levels of residual contamination in those systems?

Only systems with residual contamination are listed.

Sample ID	Nuclide	Concentration
Auxiliary Boiler	H-3	1E-6 µCi/ml
	Co-60	2E-8 µCi/ml
Secondary water	H-3	3E-5 µCi/ml
Secondary spent resin	I-131	6E-8 µCi/ml
	Cs-134	3E-7 µCi/ml
	Cs-137	3E-7 µCi/ml
CSW (Cooling Tower Basin)	H-3	6E-7 µCi/ml

14. a. Does the licensee have any history of radioactive spills and/or leaks outside of buildings?

- See discussion under response 1.

b. If so, have they been documented in accordance with 10CFR 50.75g?

- Yes.

c. If not, why?

- N/A

Region IV Radioactive Waste Related Questions

Site: Columbia Date 3/01/2006 Person Contacted Dave Bennett

1. Have there been tritium releases (spills, leaks, etc.), other than routine effluent releases, from your plant into the public domain (areas outside the licensee's OCA)?

NO

If yes, describe.

N/A

2. Where does the liquid waste discharge?

Circulating water blowdown line to the Columbia River

3. Does the licensee's radioactive liquid discharge line traverse any non-licensee owned areas (e.g., is it on a right-of-way surrounded by private properties) ?

NO, Lease goes all the way to the Columbia River

4. If the licensee has discharge piping that carries radioactive liquids, does the licensee perform monitoring along the discharge pathway to identify potential leakage?

NO

If yes, how frequently is the sampling performed?

N/A

Are there vacuum breakers, pressure relief valves or similar type valves on the discharge piping? If so, how are these valves monitored for leakage?

Vent lines spaced along the discharge piping

5. What surface bodies of water do you have onsite (Protected Area and Owner Controlled), including cooling tower basins, impoundments, cooling reservoirs, spray ponds, retention ponds, lakes, sanitary/sewage systems, etc.?

Cooling tower basins (5)

Spray Ponds (2)

Sewage Treatment (1)

Are these bodies of water lined ponds? If so, with what?

Concrete structures

What is the highest level of residual contamination in each of those systems?

The sewage treatment pond takes a discharge from the sewage system at the Fast Flux Test Facility which contains some tritium. The levels in the pond are less than 1,000 pCi/liter. The agreement with DOE says that DOE will clean up any contamination of the sewage treatment pond.

6. Does the licensee have groundwater monitoring wells onsite?

YES

How many wells and where are they located (e.g., distributed around/throughout the site, in a particular region of the site and/or near particular buildings/structures, etc.)?
CGS samples 3 wells; one onsite and two at the Unit 1 site which is down-grade from CGS. There are a number of other wells onsite associated with NPDS and are samples periodically, (i.e. every 5-10 years)

7. At what frequency does the licensee sample/analyze the wells?
quarterly

8. What radionuclides does the licensee monitor?

Gamma emitters? MDA 15-30 pCi/liter

Tritium? MDA 300 pCi/liter

Gross Beta? MDA 4 pCi/liter

Other? MDA

9. Has the licensee identified onsite radioactive groundwater contamination?
NO, but DOE has identified tritium from their burial site just outside the protected area at CGS

If yes, when was it identified? Corrective action document No.
N/A

How large of an area?
N/A

Has the contamination moved outside the restricted area or the owner controlled area?
N/A

10. If the licensee does NOT have an onsite radioactive groundwater monitoring program does the licensee plan to implement a program and how extensive?
N/A

Does the licensee plan to take other measures to assure they can identify radioactive groundwater contamination?
N/A

11. Does the licensee have a surveillance program to periodically walkdown outside areas around the site to look at potential leaks and spills?
NO

12. Does the licensee perform other onsite monitoring (e.g. soil sampling) to identify

unexpected radioactive releases?
Yes, Environmental Program

13. As discussed in IE Bulletin No. 80-10, what clean systems have become contaminated?
Reactor Closed Cooling Water,

What are the levels of residual contamination in those systems?
Approximately 1 E ^{-7} uCi/ml tritium

14. Does the licensee have any history of radioactive spills and/or leaks outside of buildings? NO

If so, have they been documented in accordance with 10CFR 50.75g?
N/A

If not, why?
N/A

Region IV Radioactive Waste Related Questions

<u>Site:</u> CPSES	<u>Date</u> March 2, 2006	<u>Person Contacted</u> Danny Wilder (254) 897-5544
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1. Have there been tritium releases (spills, leaks, etc.), other than routine effluent releases, from your plant into the public domain (areas outside the licensee's OCA)?

No.

If yes, describe.

2. Where does the liquid waste discharge?

Discharges to turbine building circulating water then to Squaw Creek Reservoir.

3. Does the licensee's radioactive liquid discharge line traverse any non-licensee owned areas (e.g., Is it on a right-of-way surrounded by private properties) ?

No.

4. If the licensee has discharge piping that carries radioactive liquids, does the licensee perform monitoring along the discharge pathway to identify potential leakage?

N/A, short run.

If yes, how frequently is the sampling performed?

Are there vacuum breakers, pressure relief valves or similar type valves on the discharge piping? If so, how are these valves monitored for leakage?

No.

5. What surface bodies of water do you have onsite (Protected Area and Owner Controlled), including cooling tower basins, impoundments, cooling reservoirs, spray ponds, retention ponds, lakes, sanitary/sewage systems, etc.?

Squaw Creek Reservoir

Safe shutdown impoundment

Five waste water basins (evap ponds) - lined with 70 mil polyethylene (has system to capture groundwater seeping in under liner)

Three oil pipe interceptor ponds that catch rain water runoff and any leaks from these oil lines that travers the OCA.

Are these bodies of water lined ponds? If so, with what?

See above

What is the highest level of residual contamination in each of those systems?

Very low levels have been found in waste water basin sludge in the "B" pond and the oil waste separator.

Mn54 - 0.02pCi/gm
Co60 - 0.035pCi/gm
Cs137 - 0.13pCi/gm

6. Does the licensee have groundwater monitoring wells onsite?

Yes

How many wells and where are they located (e.g., distributed around/throughout the site, in a particular region of the site and/or near particular buildings/structures, etc.)?

OCA

26 landfill monitoring wells (Shallow Groundwater) (#11 is sampled and is 330 meters east of the protected area (direction of groundwater flow from site))

2 deep ground water observation wells

5 potable water wells (two are sampled per ODCM)

8 other environmental monitoring wells

PA

10 monitoring wells (#9 and #14 are sampled and are located 10 to 15 feet NE and SE from the fuel building.

7. At what frequency does the licensee sample/analyze the wells?

Quarterly.

8. What radionuclides does the licensee monitor?

Gamma emitters? MDA

Tritium? MDA

Gross Beta? MDA

Other? MDA

The wells are sampled for Gamma emitters and Tritium to the environmental LLD found in the ODCM and are analyzed by a contractor (AREVA). The shallow water well around the land fill are analyzed by the onsite chemistry organization.

9. Has the licensee identified onsite radioactive groundwater contamination?

No.

If yes, when was it identified?

Corrective action document No.

How large of an area?

Has the contamination moved outside the restricted area or the owner controlled area?

10. If the licensee does NOT have an onsite radioactive groundwater monitoring program, does the licensee plan to implement a program and how extensive?

Yes.

Does the licensee plan to take other measures to assure they can identify radioactive groundwater contamination?

The licensee just started to monitor the landfill shallow water wells.

11. Does the licensee have a surveillance program to periodically walkdown outside areas around the site to look at potential leaks and spills?

Operations shift walkdowns of the yard.

System Engineering walkdowns.

Environmental Group monthly walkdown of storm drains and Quarterly spill prevention control walkdown.

12. Does the licensee perform other onsite monitoring (e.g. soil sampling) to identify unexpected radioactive releases?

Any digging or disturbance in the PA requires sampling if materials are to leave the PA.

The licensee has general area monitoring TLDs around the PA which are in addition to the Environmental TLDs.

Radiation protection performs quarterly and semi-annual surveys of areas outside the plant buildings with micro-R meters.

13. As discussed in IE Bulletin No. 80-10, what clean systems have become contaminated?

Only sludge from sewer treatment.

What are the levels of residual contamination in those systems?

Mn54 - 1.2E-8 uCi/gm

Co60 - 9.8E-8 uCi/gm

Cs137 - 4.7E-9 uCi/gm

14. Does the licensee have any history of radioactive spills and/or leaks outside of buildings?

No.

If so, have they been documented in accordance with 10CFR 50.75g?

If not, why?

Other info provided.

**The reservoir is at equilibrium at 11,000pCi/L Tritium with an ODCM limit of 30,000pCi/L.
The reservoir and plant site on top of a 200 foot thick unfractured rock formation.**

Region IV Radioactive Waste Related Questions

Site: COOPER Date 3/01/2006 Person Contacted Bob Bilki, Chem Mgr

1. Have there been tritium releases (spills, leaks, etc.), other than routine effluent releases, from your plant into the public domain (areas outside the licensee's OCA)?

NO

If yes, describe.

N/A

2. Where does the liquid waste discharge?

Mississippi River

3. Does the licensee's radioactive liquid discharge line traverse any non-licensee owned areas (e.g., Is it on a right-of-way surrounded by private properties) ?

NO

4. If the licensee has discharge piping that carries radioactive liquids, does the licensee perform monitoring along the discharge pathway to identify potential leakage?

NO

If yes, how frequently is the sampling performed?

N/A

Are there vacuum breakers, pressure relief valves or similar type valves on the discharge piping? If so, how are these valves monitored for leakage?

No vacuum breakers, etc.

5. What surface bodies of water do you have onsite (Protected Area and Owner Controlled), including cooling tower basins, impoundments, cooling reservoirs, spray ponds, retention ponds, lakes, sanitary/sewage systems, etc.?

2 Sewage Treatment Ponds

Are these bodies of water lined ponds? If so, with what?

Lined in accordance with Nebraska state regulations, material unknown

What is the highest level of residual contamination in each of those systems?

No contamination detected, samples once per year

6. Does the licensee have groundwater monitoring wells onsite?

No monitoring wells, licensee does have water wells for plant use.

How many wells and where are they located (e.g., distributed around/throughout the site, in a particular region of the site and/or near particular buildings/structures, etc.)?

7. At what frequency does the licensee sample/analyze the wells?
Licensee does not monitor the water wells

8. What radionuclides does the licensee monitor?

Gamma emitters? MDA

Tritium? MDA

Gross Beta? MDA

Other? MDA

9. Has the licensee identified onsite radioactive groundwater contamination?
NO

If yes, when was it identified? Corrective action document No.
N/A

How large of an area?
N/A

Has the contamination moved outside the restricted area or the owner controlled area?
N/A

10. If the licensee does NOT have an onsite radioactive groundwater monitoring program does the licensee plan to implement a program and how extensive?
This issue is being evaluated on a corporate level by Entergy

Does the licensee plan to take other measures to assure they can identify radioactive groundwater contamination?

11. Does the licensee have a surveillance program to periodically walkdown outside areas around the site to look at potential leaks and spills?
No formal surveillance program

12. Does the licensee perform other onsite monitoring (e.g. soil sampling) to identify unexpected radioactive releases?
Environmental program takes samples at locations within the Owner Controlled Area. Also, during excavation activities, samples will be taken and analyzed.

13. As discussed in IE Bulletin No. 80-10, what clean systems have become contaminated?
Aux Boiler has trace levels of Co-60 in the residual scale. Occurred in the early 80's when a demineralized water line with X-connections to the condensate system leaked by the valves.

What are the levels of residual contamination in those systems?
Trace levels of Co-60

14. Does the licensee have any history of radioactive spills and/or leaks outside of buildings? 1 or 2 spills

If so, have they been documented in accordance with 10CFR 50.75g?
NO

If not, why?
Cleaned up, do not require documentation.

Region IV Radioactive Waste Related Questions

<u>Site:</u>	<u>Date</u>	<u>Person Contacted</u>
Diablo Canyon	3/08/06	Larry Parker, Jeff Gardner, Bob Hite

1. Have there been tritium releases (spills, leaks, etc.), other than routine effluent releases, from your plant into the public domain (areas outside the licensee's OCA)?

No.

If yes, describe.

2. Where does the liquid waste discharge?

Into the Pacific Ocean, via the discharge structure.

3. Does the licensee's radioactive liquid discharge line traverse any non-licensee owned areas (e.g., Is it on a right-of-way surrounded by private properties) ?

No.

4. If the licensee has discharge piping that carries radioactive liquids, does the licensee perform monitoring along the discharge pathway to identify potential leakage?

Not all piping is above ground.

If yes, how frequently is the sampling performed?

A system engineer walks down the piping in the auxiliary building on a monthly basis.

Are there vacuum breakers, pressure relief valves or similar type valves on the discharge piping? If so, how are these valves monitored for leakage?

No.

5. What surface bodies of water do you have onsite (Protected Area and Owner Controlled), including cooling tower basins, impoundments, cooling reservoirs, spray ponds, retention ponds, lakes, sanitary/sewage systems, etc.?

None.

Are these bodies of water lined ponds? If so, with what?

NA

What is the highest level of residual contamination in each of those systems?

NA

6. Does the licensee have groundwater monitoring wells onsite?

No. There are some wells which catch run-off

How many wells and where are they located (e.g., distributed around/throughout the site, in a particular region of the site and/or near particular buildings/structures, etc.)?

NA

7. At what frequency does the licensee sample/analyze the wells?

NA

8. What radionuclides does the licensee monitor?

Gamma emitters? MDA

Tritium? MDA

Gross Beta? MDA

Other? MDA

9. Has the licensee identified onsite radioactive groundwater contamination?

No. No groundwater monitoring program.

If yes, when was it identified?

Corrective action document No.

How large of an area?

Has the contamination moved outside the restricted area or the owner controlled area?

10. If the licensee does NOT have an onsite radioactive groundwater monitoring program does the licensee plan to implement a program and how extensive?

The licensee is evaluating the possibility but presented no definite plan.

Does the licensee plan to take other measures to assure they can identify radioactive groundwater contamination?

The licensee is evaluating the possibility but presented no definite plan.

11. Does the licensee have a surveillance program to periodically walkdown outside areas around the site to look at potential leaks and spills?

The license performs walkdowns around the reactor water storage tank.

12. Does the licensee perform other onsite monitoring (e.g. soil sampling) to identify unexpected radioactive releases?

The licensee conducts sediment monitoring in accordance with its radiological environmental monitoring program.

13. As discussed in IE Bulletin No. 80-10, what clean systems have become contaminated?

None.

What are the levels of residual contamination in those systems?

14. Does the licensee have any history of radioactive spills and/or leaks outside of buildings?

Yes.

If so, have they been documented in accordance with 10CFR 50.75g?

Yes. These examples are documented in the corrective action program as a special type of document.

If not, why?

Region IV Radioactive Waste Related Questions

Site: Fort Calhoun

Date: 3/9/06

Person Contacted: Donna Guinn
Licensing
402-533-7337

In early March the NRC requested information through Licensing regarding Tritium at Fort Calhoun Station. Below are the NRC questions and the Fort Calhoun Station answers. Also attached is an aerial view of the Owner Controlled Area with locations of wells. Please refer to this map at the appropriate questions/answer.

NRC Question #1:

Have there been Tritium releases (spills, leaks, etc.) other than routine effluent releases from your plant into the public domain (any areas outside of the Owner Controlled Area)? If yes, describe.

OPPD Answer #1:

Other than routine effluent releases, Fort Calhoun Station has not had any spills into areas outside the Owner Controlled Area.

NRC Question # 2:

Where does the liquid radioactive waste discharge?

OPPD Answer #2:

Fort Calhoun Station's liquid radioactive waste is discharged through the waste discharge piping located within the Station to the Circulating Water discharge system. It then goes to the Missouri River.

NRC Question #3:

Does the Licensee's radioactive liquid discharge line traverse any non-licensee owned areas?

OPPD Answer #3:

No, all of Fort Calhoun's radioactive liquid discharge lines are located within the protected area.

NRC Question #4a:

If Licensee has discharge piping that carries radioactive liquids, does the Licensee perform monitoring along the discharge pathway to identify potential leakage?

OPPD Answer #4a: Any leakage of piping internal to the turbine building structure would be evident to station operators during periodic rounds. However, no monitoring is performed along the buried pipe in the discharge pathway. There have been no leaks identified at Fort Calhoun Station.

NRC Question #4b:
If yes, how frequently is the sampling performed?

OPPD Answer #4b:
See response to #4a.

NRC Question #4c:
Are there vacuum breakers, pressure relief valves or similar type valves on the discharge piping? If so how are these valves monitored for leakage?

OPPD Answer #4c:
Fort Calhoun Station does not have vacuum breakers or pressure relief valves in the Rad Waste Disposal piping downstream of the flow control valves.

NRC Question #5a:
What surface bodies of water do you have on site (Protected Area and Owner Controlled Area)? This includes cooling tower basins, cooling reservoirs, impoundments, spray ponds, retention ponds, lakes, and sanitary sewer system.

OPPD Answer #5a:
There are no bodies of water inside the Protected Area and only two bodies of water on the Owner Controlled Area. They are two sanitary lagoons and are each approximately 2.5 acres.

NRC Question #5b:
Are these bodies of water lined ponds? If so, with what?

OPPD Answer #5b:
Yes, both lagoons are lined with 60 mil poly-flex polyethylene geomembranes.

NRC Question #5c:
What is the highest level of residual contamination within each of these systems?

OPPD Answer #5c:
Fort Calhoun Station does not analyze for tritium in the two sanitary lagoons. The types of residual contamination found in the sanitary lagoons are Cobalt-60 and Cesium-137. For these residual contaminations, there is no activity detected for gamma analysis for the water phase. The following chart provides the activity level for the sludge phase:

Contamination	Lagoon #1 E Co-60 pCi/gm	Lagoon #1 E Cs-137 pCi/gm	Lagoon #2 W Co-60 pCi/gm	Lagoon #2 W Cs-137 pCi/gm
Average value	0.238	0.318	0.276	0.291
Highest value	1.98	0.834	2.04	0.498

NRC Question #6a:

Does the Licensee have ground water monitoring wells onsite?

OPPD Answer #6a: Fort Calhoun Station does have ground water monitoring wells onsite.

NRC Question #6b:

How many wells and where are they located (distributed around the site or by a specific building)? They are looking for general information, i.e., x' away from building. If a drawing would be easier than explaining and is available, we can submit the drawing.

OPPD Answer #6b:

Fort Calhoun Station has a total of 10 wells. We have included an aerial picture of the wells locations attached to this email.

- *Well #1 is a preop/postop monitoring well which is approximately 600 feet N of containment.*
- *Well #2 is a preop/postop monitoring well which is approximately 700 feet NW of containment.*
- *Well #3 is a plant supply well to the Reverse Osmosis (RO) unit which is approximately 500 feet W of containment.*
- *A total of five wells are installed for site burial of industrial waste (MW-1 through 5 which are approximately 1000 feet SSE from containment).*
- *Fort Calhoun Station has one lagoon make-up well which is located 900 feet SSE from the center of containment.*
- *Fort Calhoun Station also has one lagoon industrial well which is used for flushing piping, which is approximately 3000 feet S from containment.*

NRC Question #7:

At what frequency does the Licensee sample/analyze the wells?

OPPD Answer #7:

Fort Calhoun Station samples the lagoon make-up well for tritium on a quarterly basis.

NRC Question #8:

What radionuclides does the Licensee monitor (gamma emitters, gross beta, tritium, others)? To what LLD or MDA (preferred) do they count to?

OPPD Answer #8:

Fort Calhoun Station monitors for tritium to approximately 300 pCi/L for the Lower Limit Detection (LLD).

NRC Question #9a:

Has Licensee identified onsite radioactive ground water contamination?

OPPD Answer #9a:

Fort Calhoun Station has not identified any detectable tritium onsite radioactive ground water contamination.

NRC Question #9b:

If when, when was it identified? What is the corrective action document? How large is the area? Has the contamination moved outside the restricted area or the Owner Controlled Area?

OPPD Answer #9b:

See response to #9a.

NRC Question #10a:

If the Licensee does not have a on-site monitoring radioactive ground water monitoring program, does the Licensee plan to implement a program and how extensive?

OPPD Answer #10a:

Fort Calhoun Station is currently evaluating the expansion of the ground water monitoring program. This evaluation began in 2005 and is currently tracked in the Corrective Action Program. Engineering Programs has the action item to initiate an Engineering Change to drill wells.

NRC Question #10b:

Does the Licensee plan to take other measures to assure they can identify radioactive ground water contamination? (i.e., we know how much discharge pressure is and we would monitor)

OPPD Answer #10b:

Fort Calhoun Station is currently evaluating the expansion of the ground water monitoring program. This evaluation began in 2005 and is currently tracked in the Corrective Action Program.

NRC Question #11:

Does the Licensee have a surveillance program to periodically walkdown outside areas around the site to look for potential leaks and spills? (contaminated oil would still be a concern)

OPPD Answer #11:

Fort Calhoun Station does have a quarterly preventative maintenance surveillance that looks for potential spills and leaks in the Protected Area. This is documented on FCS form FC-778.

NRC Question #12:

Does the Licensee perform other onsite monitoring (e.g., soil sampling) to identify unexpected radioactive releases?

OPPD Answer #12:

No, Fort Calhoun Station does not perform onsite monitoring to identify unexpected radioactive releases. However, System Engineering and Operations personnel do perform system and building walkdowns for site observations to identify leakages.

NRC Question #13a:

As discussed in IE Bulletin 80-10, "Contamination of Non Radioactive System and Resulting Potential for Unmonitored, Uncontrolled Release of Radioactivity to the Environment", what clean systems have become contaminated?

OPPD Answer #13a:

Fort Calhoun Station's Component Cooling Water System has chemical additives that have become neutron activated as they system cools various reactor components.

A steam generator tube rupture occurred at the Fort Calhoun Station in the mid 1980s. This caused the secondary side of that steam generator to become contaminated. Since then, during normal operations, there is no indication of contamination. During outages, the secondary side steam generator blowdown samples may indicate a low level of Co-60 and Cs-137 due to corrosion product breaking loose from the steam generator.

The auxiliary boiler was moderately contaminated during one event where a boiler tube in the waste evaporator leaked allowing some contaminants to enter the auxiliary steam system. The contaminate levels of the auxiliary steam (boiler) system have been less than detectable for many years and the evaporator has been abandoned

NRC Question #13b:

What are the levels of residual contamination in those systems? (i.e., CCW should be clean but leakage made it contaminated)

OPPD Response #13b:

The levels for the Component Cooling Water System are typically very low. The current online levels of residual contamination in the Component Cooling Water are e-6 uCi/ml for tritium, e-8 uCi/ml for CS-137, and e-8 uCi/ml Na24.

As a result from the steam generator tube leak from the mid 1980s, the long lived isotopes in the secondary side steam generators blowdown samples have, on occasion, indicated approximately e-8 uCi/ml Cs-137.

The contaminate levels of the auxiliary steam (boiler) system have been less than detectable for many years and the evaporator has been abandoned. However, a complete gamma analysis is still being performed on the evaporator on a monthly basis.

NRC Question #14a:

Does the Licensee have a history of radioactive spills and/or leaks outside of buildings?

OPPD Response #14b:

Fort Calhoun Station does not have a history of radioactive spills or leaks outside of the buildings. However, we did have a spill in the early 1980s where Safety Injection Refueling Water Storage Tank water spilled into a corridor and out of a truck bay door onto the soil.

Following that incident the soil was excavated and disposed of as radioactive waste. Since that event, Fort Calhoun has had no spills outside the buildings.

NRC Question #14b:

If so, have they been documented IAW 10 CFR50.75G (Decommissioning Rule)?

OPPD Response #14b:

No, the event was not documented IAW 10CFR50.75G.

NRC Question #14c:

If not, why?

OPPD Response #14c:

Fort Calhoun Station did capture the event in an older Corrective Action Program and it is used to take credit for the decommissioning record keeping process 10 CFR 50.75(G). Per the Station's procedure SO-G-110, "Record Keeping for Decommissioning Planning", it states "If cleanup was successful and contaminants have not spread to inaccessible locations and significant contamination no longer remains, the records need not be included in the decommissioning file". Significant contamination is defined as > 5,000 dpm/100 cm² fixed or >1,000 dpm/100 cm² removal able. Therefore, according to our procedures, Fort Calhoun Station does not need to capture events we remediate for 10 CF 50.75(G).

Region IV Radioactive Waste Related Questions

Site: Grand Gulf Nuclear Station **Date** 3/9/6

Person(s) Contacted: Mike Larson, Licensing, Roger Tolbert, Chemistry, John Lassetor, Chemistry

1. Have there been tritium releases (spills, leaks, etc.), other than routine effluent releases, from your plant into the public domain (areas outside the licensee's OCA)?

No releases to the public domain

If yes, describe. **NA**

2. Where does the liquid waste discharge? **Within the Protected Area (PA) a single 4" pipe discharges into a 48" service water pipe mixing basin for dilution that discharges into the Mississippi River.**

3. Does the licensee's radioactive liquid discharge line traverse any non-licensee owned areas (e.g., Is it on a right-of-way surrounded by private properties) ? **No**

4. If the licensee has discharge piping that carries radioactive liquids, does the licensee perform monitoring along the discharge pathway to identify potential leakage? **No**

If yes, how frequently is the sampling performed? **NA**

Are there vacuum breakers, pressure relief valves or similar type valves on the discharge piping? If so, how are these valves monitored for leakage? **No**

5. What surface bodies of water do you have onsite (Protected Area and Owner Controlled), including cooling tower basins, impoundments, cooling reservoirs, spray ponds, retention ponds, lakes, sanitary/sewage systems, etc.?

- a. **Low Volume Waste Basin; Man-made located within the PA**
- b. **Standby Service Water Basins A & B located within PA**
- c. **Unit-1 Circulating Water Basin located on the Owner Controlled Area (OCA)**
- d. **Unit-2 Circulating Water Pit (Cooling Tower Basin) located within the PA**
- e. **Sedimentation Basins A & B located within OCA**
- f. **Hamilton Lake located within the OCA**
- g. **Gin Lake located within the OCA**

Are these bodies of water lined ponds? If so, with what?

- a. Low Volume Waste Basin - Bentonite Clay
- b. Standby Service Water Basins A & B - Concrete
- c. Unit-1 Circulating Water Basin - Concrete
- d. Unit-2 Circulating Water Pit - Concrete
- e. Sedimentation Basins A & B - unlined
- f. Hamilton Lake - unlined
- g. Gin Lake - unlined

What is the highest level of residual contamination in each of those systems?

Only Sedimentation Basin B has had measurable radioactivity 400 - 657 pCi/l.

6. Does the licensee have groundwater monitoring wells onsite? **3 Drinking water well, 12 Observation wells, and 8 Dewatering wells (within the PA)**

How many wells and where are they located (e.g., distributed around/throughout the site, in a particular region of the site and/or near particular buildings/structures, etc.)?
See above

7. At what frequency does the licensee sample/analyze the wells?
Drinking water wells - Annually
The other wells are not sampled routinely for radioactivity

8. What radionuclides does the licensee monitor?

The drinking water wells are analyzed for Tritium and Gammas in accordance with the ODCM Section 6.12.1.3.

Gamma emitters?	MDA
Tritium?	MDA
Gross Beta?	MDA
Other?	MDA

9. Has the licensee identified onsite radioactive groundwater contamination? **None**

If yes, when was it identified? **NA** Corrective action document No. **NA**

How large of an area? **NA**

Has the contamination moved outside the restricted area or the owner controlled area?
NA

10. If the licensee does NOT have an onsite radioactive groundwater monitoring program does the licensee plan to implement a program and how extensive? **They have a program**

Does the licensee plan to take other measures to assure they can identify radioactive groundwater contamination? **Entergy Corporate corrective action document will address this subject.**

11. Does the licensee have a surveillance program to periodically walkdown outside areas around the site to look at potential leaks and spills? **No formal program; just operators and environmental staff during rounds.**
12. Does the licensee perform other onsite monitoring (e.g. soil sampling) to identify unexpected radioactive releases? **Soil samples are collected as required by the REMP, annually**
13. As discussed in IE Bulletin No. 80-10, what clean systems have become contaminated?
- a. **Demineralized Water System**
 - b. **Instrument Air**
 - c. **Sanitary Sludge**
 - d. **Various Closed Cooling Water Systems (CCW)**

What are the levels of residual contamination in those systems?

- a. **Demineralized Water System: $\leq 3.0 \text{ E-6 uCi/ml}$ GGNS considers that clean.**
 - b. **Instrument Air: $< 3.0 \text{ E-6 uCi/ml}$ GGNS considers that clean.**
 - c. **Sanitary Sludge: $4.0\text{E-4 uCi/Kg Co-60}$, 270 pCi/Kg Mn-54**
 - d. **Various Closed Cooling Water Systems (CCW)**
 - 1. **Drywell CCW: $2.48\text{E-6 uCi/ml Na-24}$**
 - 2. **Drywell Chiller: E-5 uCi/ml H3**
 - 3. **Turbine Bldg. CCW: E-5 uCi/ml H3**
14. Does the licensee have any history of radioactive spills and/or leaks outside of buildings? **Yes**

If so, have they been documented in accordance with 10CFR 50.75g? **Yes**

If not, why? **NA**

NRC Questions on Tritium Issues

NRC Question	Palo Verde Nuclear Generating Station Answer
1. Have there been any tritium releases, other than routine effluent releases, into the public domain (defined as outside the owner's controlled area/site boundary/off-site, groundwater, liquid releases, all of the above)?	No.
- If yes, describe.	Not applicable
2. Where does your liquid waste discharge?	<p>There is no liquid discharge pathway off-site. (All discharges stay on site: Chemical Waste Neutralizer tank (CWNT) to Retention Basins to Evaporation Ponds all on site. Water in CWNT meets release limits before movement to Retention Basins and Evaporation Pond)</p> <p>ODCM section 3.2 Requirements: Secondary System Liquid Waste Discharges To Onsite Evaporation Ponds or Circulating Water System - Concentration, contains limits and sample frequency for releases to the Circulating Water system and releases to the onsite evaporation ponds. These requirements are implemented using 74RM-9EF23</p> <p>There is a line from the Water Reclamation Facility Reservoir to the Redhawk plant. This water is treated effluent from Phoenix and does not contact any PVNGS plant systems. This line may contain medical radiopharmaceuticals. It is only mentioned to provide a complete picture of offsite piping. Reservoir sampling requirements are stated in the ODCM, section 6.1, and 74RM-0EN03.</p>
3. Does licensee radioactive discharge line(s) traverse any non-licensed area?	No. We do not have a liquid discharge line.
4. If licensee has discharge piping that carries rad liquid, does licensee perform monitoring to detect potential leakage?	No. We do not have liquid discharge piping.
- If yes, how frequently is sampling performed?	Not applicable
- Are there vacuum breakers/pressure relief valves on the discharge line?	Not applicable
- If so, how are they monitored?	Not applicable

NRC Questions on Tritium Issues

<p>5. What surface body of water do you have on site (including cooling tower basin, impoundments, cooling water reservoir, spray pond, retention ponds, lakes, sanitary sewage systems, etc.)</p>	<ul style="list-style-type: none"> • Water Storage Reservoir (WSR): Receives treated water from the Water Reclamation Facility (WRF) and stores it for use as cooling water for the generating station. 80 acres in size. Holds 670M gallons of water. A new reservoir, with a synthetic liner, is under construction. After the new reservoir is placed in service, the existing WSR will be drained and re-lined. • Six Spray Ponds: These are concrete containment structures meeting USNRC Seismic Category 1 requirements. • Nine Cooling Towers (Three Cooling Towers and Basins per unit): Treated wastewater from the WSR is used as make-up water for the cooling towers. A concrete apron is installed around each cooling tower to collect and return the majority of any overspray. The industrial wastewater from the cooling towers is discharged to the evaporation ponds. The average blowdown rate of each of the three units is 970 gpm. Cooling Tower sludge disposal is controlled by WROP-8ZZ04 which implements our Arizona Radiation Regulatory Agency, Special Approval License #7-368. • Two Sedimentation Basins: Unlined surface impoundments constructed and maintained to collect storm water, storm water in combination with discharges from specific sources and NRC-allowable non-storm water discharges from the Facility. Sedimentation Basin # 1 collects drainage from the western portion of the Facility and consists of a three-sided earthen berm approximately 1,000 feet long (15 acres). Sedimentation Basin # 2 collects drainage from the eastern portion of the Facility and consists of a three-sided earthen berm approximately 3,000 feet long (60 acres). • Two Industrial Waste Water Retention Basins (RBs) (East and West): The oily and non-radioactive waste systems for each Unit collect and transport liquid waste from equipment and floor drains of Unit buildings through oil/water separators to the two RBs. The RBs also receive flow from the Sewage Treatment Plant whenever the WRF is not in service. Wastewater in the RBs are sampled for pH, hydrazine, visible oil and radioactivity prior to discharge to the Evaporation Ponds. Both RBs are being replaced by tanks • Two Evaporation Ponds: Wastewater streams not recycled or reused are either directly or indirectly discharged to two on-site evaporation ponds. These ponds are 470 surface acres in combined size (#1, 250 acres; #2, 220 acres) and are designed to evaporate the process waste water. • Sewage Treatment Plant: The STP is contained in above ground structures. It is used for treatment of waste water and receives floor drains from the HVAC cooling system. It is rated at 60,000 GPD and uses the activated sludge treatment process. The discharge from the STP is recycled to the WRF and reused. When the WRF is off-line, the discharge is directed to the retention basins.
<p>- Are these bodies of water lined ponds?</p>	<p>Yes and no as noted below.</p>

NRC Questions on Tritium Issues

<p>- If so, with what?</p>	<ul style="list-style-type: none"> • Water Storage Reservoir: Synthetic-lined, the bottom is rubberized asphalt compound, 200 mil minimum thickness. The sides are Hypalon lined, 45 mil minimum thickness. Single-lined, no leakage detection. • Spray Ponds: Concrete engineered structures. • Cooling Tower Basins: Concrete • Sedimentation Basins: Unlined • Retention Basins: Gunnite and Hypalon lined. Equipped with leakage monitoring systems. • Evaporation Ponds: Synthetic-lined with leakage and vadose zone monitoring systems. Evaporation Pond # 1 has two liners with a leak detection system between liners. The bottom is double-lined with 80 mil HDPE installed over a geotextile fabric and 200 mil rubberized asphalt. The sides are 80 mil HDPE underlined with geotextile fabric and 45 mil Hypalon. Evaporation Pond # 2 has one liner (80 mil HDPE) with leak detection beneath the liner. There are plans to construct Evaporation Pond # 3 which will have two liners and a leak detection system between liners. When Evap Pond # 3 is placed in service, Evap Pond # 2 will be reconstructed with two liners and a leak detection system between liners. • Sewage Treatment Plant: The STP is contained in above-ground structures including tanks.
<p>- What is the highest level of residual contamination in each of these systems?</p>	<ul style="list-style-type: none"> • Water Storage Reservoir: < minimum detectable activity (MDA) (On occasion, I-131 is identified: <MDA to 20 pCi/L. The source of this iodine from the City of Phoenix effluent.) • Spray Ponds: Up to 11,000 pCi/L tritium • Cooling Tower Basins: Up to 21,000 pCi/L tritium and 3.6 E-7 uCi/ml I-131 (concentration effect on Phoenix effluent containing I-131) • Sedimentation Basins: < MDA usually; up to 3,500 pCi/L. • Retention Basins: Up to 41,000 pCi/L tritium. Concentrations restricted going in. These meet APP limits. • Evaporation Ponds: 1,000 to 2,000 pCi/L tritium • Sewage Treatment Plant: Not sampled directly. STP output is sampled as sludge at the WRF centrifuge and analyzed for radioactivity periodically prior to disposal in the on-site sludge landfill. <MDA. <p>74RM-9EF23 contains release limits to these impoundments. Reservoir and Evaporation Pond sampling requirements are stated in the ODCM, section 6.1. Additional sampling requirements are listed in 74RM-0EN03.</p>
<p>6. Does Licensee have ground water monitoring wells on site?</p>	<p>Yes</p>

NRC Questions on Tritium Issues

<p>- How many wells and where are they located? (All over the site, next to buildings, etc.)</p>	<p>Four onsite deep wells and 11 onsite shallow wells</p> <p>Attached are two maps in PDF that display the on-site and off-site well locations that are monitored for tritium.</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p>EMP map small.pdf (124 KB) Well map mu.pdf (3 MB)</p>
	<p>The file below contains the Environmental sample schedule.</p> <div style="text-align: center;">  </div> <p>Monitoring Wells Sampling Order...</p> <p>Regarding Information Notice 88-22 - "Disposal of Sludge from Onsite Sewage Treatment Facilities at Nuclear Power Stations": We no longer transport sludge offsite to the Hassayampa Landfill as we did when the IN was issued in 1988. Everything from the sanitary waste facility is recycled back to the WRF. WRF sludge is periodically sampled for activity prior to disposal onsite.</p>
<p>7. What frequency does Licensee analyze wells?</p>	<p>ODCM Requirement, Section 6.1 (implemented using 74RM-0EN03) for deep wells: Quarterly grab. APP Requirement for shallow wells: Quarterly</p> <p>This file is a matrix from the tritium presentation that shows sample frequency and historical results for tritium</p> <div style="text-align: center;">  </div> <p>sample matrix w results.doc (3...</p>
<p>8. What radionuclide does Licensee monitor (gamma emitters, tritium, gross beta or other - need MDA for each)</p>	<p>Per the ODCM: Tritium and gamma spectroscopy quarterly for deep wells: Tritium MDA is 280 pCi/L (ODCM LLD requirement is <2,000 pCi/L). LLD requirement for Gross beta: 4 pCi/L, Mn-54: 15 pCi/L, Fe-59: 30 pCi/L, Co-58: 15 pCi/L, Co-60: 15 pCi/L, Zn-65: 30 pCi/L, Zr-95: 30 pCi/L, Nb-95: 15 pCi/L, I-131: 1 pCi/L, Cs-134: 15 pCi/L, Cs-137: 18 pCi/L, Ba-140: 60 pCi/L, La-140: 15 pCi/L (Water) per ODCM Table 6-3</p>
<p>9. Has licensee identified on site ground water contamination?</p>	<p>No</p>
<p>- If yes, where?</p>	<p>Not applicable</p>
<p>- Contamination associated with the ground water?</p>	<p>Not applicable</p>
<p>- How large of an area?</p>	<p>Not applicable</p>

NRC Questions on Tritium Issues

- Has the contamination moved outside the owner controlled area or into restricted areas	Not applicable
10. If Licensee does not have an on site ground water monitoring program, does the licensee plan to implement a plan?	Not applicable. PVNGS has an on site ground water monitoring program.
- How extensive?	Not applicable
- Does Licensee plan to take other measures to assure they can identify radioactive groundwater contamination?	Not applicable
11. Does the licensee have a surveillance program to periodically monitor water in outside area (outside buildings) around the site to look at potential leaks of liquid and spills (any kind of contamination, not just liquid)? (This includes off-site areas.)	<p>We survey yards, when leaks are identified, we sample to record results in decommissioning log.</p> <p>We have taken soil samples on occasion to verify that we are not building up gamma emitters in the most prevalent wind direction (ANI initiative in 1999 - see #12 below)</p> <p>Civil Engineering conducts visual inspections of structures during walkdowns. They would report any leaks they see either from a building (e.g., refueling building) or general yard area.</p>
12. Does licensee perform other on site monitoring to identify any unexpected radioactive releases? (For example: soil sampling) (Any type of release)	<p>Yes. Soil sampling. We do not have a specified periodicity. We occasionally take soil samples and analyze them (reference 74RM-0EN03). Soil samples were collected at the site boundary TLD locations in 1998 and reported in the 1998 Annual Radiological Environmental Operating Report (AREOR). Levels were comparable to the 1976 and 1984 pre-operational samples. In 1999 additional soil samples were obtained between the Protected Area boundary and the Site Boundary in the most prevalent wind direction. These samples were also comparable to the 1976 and 1984 pre-operational samples and were reported in the 1999 AREOR. Samples are obtained from Sedimentation Basin #2 when available. Sludge results are compared to pre-operational soil results and reported in the AREOR.</p>
13. As discussed in IEB 80-10, what clean systems have become contaminated?	<p>Nuclear Cooling Water (NC), Essential Cooling Water (EW), Essential Spray Pond (SP), and Nitrogen Header.</p> <p>These are procedurally addressed in 74DP-9ZZ05, Appendix G</p>
- What are the levels of residual contamination in those systems?	<p>Very low levels of contamination and very low activity concentrations; usually none detectable, with occasional discrete particles. EW has measurable tritium at 10E-4 uCi/ml.</p>
14. Does the licensee have any history of radioactive spills or leaks outside any builds?	Yes. Documented in decommissioning file
- If so, have they been documented IAW 50.75 G?	Yes
- If not, why not?	Not applicable

Region IV Radioactive Waste Related Questions

<u>Site:</u>	<u>Date</u>	<u>Person Contacted</u>
River Bend	3/08/06	Bob Biggs, Dean Burnett, Mike Davis, Kristi Huffstatler, Bill Spell

1. Have there been tritium releases (spills, leaks, etc.), other than routine effluent releases, from your plant into the public domain (areas outside the licensee's OCA)?

No.

If yes, describe.

NA

2. Where does the liquid waste discharge?

FSAR Chapter 11.2.3.1, "Release Points"

All liquid effluent releases from River Bend Station are discharged into the cooling tower water blowdown which is directed to the Mississippi River.

3. Does the licensee's radioactive liquid discharge line traverse any non-licensee owned areas (e.g., Is it on a right-of-way surrounded by private properties) ?

The discharge line crosses under Parish Road WF-7. However, the licensee owns the property on either side of the road.

The discharge line (CWS-020-035-4) crosses under the abandoned Illinois Central Railroad line. The piping area under the railroad line is provided with a sleeve and the sleeve is equipped with a molded casing seal at each end. (ref. EB-002N Rev. 9, EB-002AE Rev. 5 section 67-67)

The discharge line (CWS-020-035-4) also crosses under Police Jury Rd. The piping area under the road is provided with a sleeve and the sleeve is equipped with a molded casing seal at each end. (ref. EB-002N Rev. 9, EB-002AE Rev. 5 section 70-70)

4. If the licensee has discharge piping that carries radioactive liquids, does the licensee perform monitoring along the discharge pathway to identify potential leakage?

Observation.

If yes, how frequently is the sampling performed?

Shiftly.

Are there vacuum breakers, pressure relief valves or similar type valves on the discharge piping? If so, how are these valves monitored for leakage?

Yes, the discharge line is equipped with air release valves. The air release valves are located in concrete-walled underground chambers to allow access to the valves. The walls and slab of the chambers are approximately 1 foot thick. (ref. PID-02-01B Rev. 42, EB-002X Rev. 7, Y Rev. 7, Z Rev. 12 and EC-24C Rev. 4.)

The valves are monitored/observed shiftly by an operator.

5. What surface bodies of water do you have onsite (Protected Area and Owner Controlled), including cooling tower basins, impoundments, cooling reservoirs, spray ponds, retention ponds, lakes, sanitary/sewage systems, etc.?
None.

Are these bodies of water lined ponds? If so, with what?

NA

What is the highest level of residual contamination in each of those systems?

NA

6. Does the licensee have groundwater monitoring wells onsite?
Yes.

How many wells and where are they located (e.g., distributed around/throughout the site, in a particular region of the site and/or near particular buildings/structures, etc.)?

Two.

For REMP purposes, groundwater samples are collected semi-annually from one up-gradient and one down-gradient well in the Upland Terrace Aquifer, approximately 460 meters northeast and southwest of the reactor, respectively (ESP-8-021). Prior to the 1999 (REMP Reduction), this was a quarterly sample.

7. At what frequency does the licensee sample/analyze the wells?
Semi-annually to satisfy TRM 3.12.1 requirements

8. What radionuclides does the licensee monitor? .

Gamma emitters? **Yes MDA See attachment 1**

Tritium? **Yes MDA 2000 pCi/liter**

Gross Beta? **MDA**

Other? **MDA**

9. Has the licensee identified onsite radioactive groundwater contamination?
Yes. Tritium.

If yes, when was it identified?

Corrective action document No.

A review of annual REMP Reports was performed from construction to present. All results were less than the lower limit of detection (LLD) except in 1993, 1994, 1997 and 2000. See below:

Year	Date	Upstream (pCi/L)	Downstream (pCi/L)
1993	3 rd Qtr	226	< LLD
1994	4 th Qtr	336	173
1997	1 st Qtr	223	< LLD
2000	5-17-00	< LLD	255
2000	11-21-00	259	325

(Although the required MDA is 2000 pCi/l, the licensee can actually detect approximately 200 pCi/l.)

How large of an area?

Has the contamination moved outside the restricted area or the owner controlled area?
No.

10. If the licensee does NOT have an onsite radioactive groundwater monitoring program does the licensee plan to implement a program and how extensive?
NA

Does the licensee plan to take other measures to assure they can identify radioactive groundwater contamination?
NA

11. Does the licensee have a surveillance program to periodically walkdown outside areas around the site to look at potential leaks and spills?
No.

12. Does the licensee perform other onsite monitoring (e.g. soil sampling) to identify unexpected radioactive releases?

Quarterly sediment samples are collected from East and West Creek and are analyzed by gamma isotopic analysis. These locations which receive all roof and yard system drainage from the Protected Area.

13. As discussed in IE Bulletin No. 80-10, what clean systems have become contaminated?
None.

What are the levels of residual contamination in those systems?

14. Does the licensee have any history of radioactive spills and/or leaks outside of buildings?
No.

If so, have they been documented in accordance with 10CFR 50.75g?

NA (CR-05-0749 identified that River Bend did not have a formally designated repository for information related to future decommissioning as required by 10CFR50.75(g).)

If not, why?

ATTACHMENT 1