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ACTION REQUEST 00309035

Type : NCR Orig Date: 12/02/08 07:38 Discovery Date:
Subject : WATER IN CISTERN BOX AIR RELIEF VLVE#1 COOLING TOWER BLOWDOW

Description

THE CISTERN BOX SURROUNDING AIR RELIEF VALVE #1OF COOLING TOWER BLOWDOWN LINE WAS INSPECTED ON 12/1/08 AT 1300. THE BOX HAD APPROXIMATELY 150 GALLONS OF STANDING WATER. TWO WEEKS PREVIOUS, 11/18/08 THE CONTAINMENT BOX WAS PUMPED OUT AND 150-200 GALLONS OF WATER WAS REMOVED. A SAMPLE WAS PULLED FOR ANALYSIS. THE WATER WAS COUNTED TO HNP LOWER LIMIT OF DETECTION AND WAS FOUND TO HAVE <1850 PCI/L OF TRITIUM. COOLING TOWER BLOWDOWN DISCHARGE IS AROUND 3500 PCI/L, THEREFORE THE WATER DOES NOT HAVE THE CHARACTERISTICS OF PLANT EFFLUENT. THE SAMPLE WAS SENT TO THE HEEC TO BE ANALYZED TO THE ENVIRONMENTAL LOWER LIMIT FROM TRITIUM OF 250 PCI/L.

Priority	: 2	Report To	:	Status:	APPROVED 12/04/08
Due Date	: 12/03/09	Event Date	:		
Originator	: BAXTEH	Originator Group:			
Facility	: HNP	Department	: I75	Organization:	
Owed To	:	Owed To Group	: CHUEVAL		
Owed To Fac	: HNP	Department	:	Discipline	:

AR Status History

Updated Date	Updated By	AR Status	AR Due Date
12/02/08	BAXTEH	INPROG	
12/02/08	BAXTEH	H/APPR	
12/04/08	FURRJA		12/03/09
12/04/08	FURRJA	PRE-APRV	
12/04/08	FURRJA	APPROVED	

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ATTACHMENT 3
Sheet 1 of 2

ADVERSE CONDITION INVESTIGATION FORM

Form CAP-NGGC-0200-3-18

Action Request Number: 309035 **Investigator:** Heather Baxter

1. Adverse Condition Description

The cistern box surrounding air relief valve #1 of cooling tower blowdown line was inspected on 12/1/08 at 1300. The box had approximately 150 gallons of standing water. Two weeks previous, 11/18/08 the containment box was pumped out and 150-200 gallons of water was removed. A sample was pulled for analysis. The water was counted to HNP lower limit of detection and was found to have <1850 pCi/L of tritium. Cooling Tower Blowdown discharge is around 3500 pCi/L, therefore the water does not have the characteristics of plant effluent. The sample was analyzed by the HEEC and found to contain 735 pCi/L +/- 155 pCi/L. This is less than the 20,000 pCi/L reporting criteria, therefore the sample is not reportable.

2. Investigation Summary

- What Should Be:
  - The Cooling Tower Blowdown Air Relief Valve cistern boxes should be devoid of standing water.
  - The groundwater along the Cooling Tower Blowdown line cannot have detectible tritium.

- What Is:
  - The cistern box surrounding the air relief valve #1 has historically filled with groundwater. The water level inside the box rises and falls depending upon weather conditions.
  - Several repeat samples of the groundwater in the cistern have shown about 800 pCi/L +/- 155 pCi/L of tritium.

- How it happened:
  - On 12/16/08 the cistern box was pumped out a second time and 225 gallons of water was removed. During the pump out, groundwater flowed into the cistern via a drain pipe hole located on the floor of the cistern.
  - A sample of the water from the drain pipe contained 850 pCi/L +/- 155 pCi/L of tritium.

- The inappropriate act or equipment malfunction.
  - The cistern box drain is designed to drain water from the cistern to the surrounding ground to prevent standing water from accumulating around the air relief valve stem. The hydraulic pressure from the surrounding water table causes groundwater to backflow into the cistern.
  - An unknown source of tritium is contaminating the groundwater surrounding the air relief valve #1 cistern box.

- Why happened.
  - The Cooling Tower Blowdown line is a 4 foot fiberglass line that is buried underground. It travels from the discharge weir at the base of the Cooling Tower to the discharge point near Harris Lake Spillway. In order to prevent air binding of the line, a series of air relief valves and manholes are placed along the length of the pipe. During plant construction, the pipe was buried several feet underground. The air relief valves were placed inside of large underground cisterns to provide easy access.

    According to plant construction diagrams, the Cooling Tower Blowdown pipe was placed upon a bed of gravel and backfilled with soil. At the bottom of each cistern was a small drain, which drains to the surrounding gravel. During the pump out on 12/16/08 it was observed that water was flowing into the cistern from the drain hole at a rate of about 0.5 L/min.

- As part of the site's Radiological Environmental Monitoring Program (REMP) the HNP Environmental Groundwater Monitoring Program utilizes on-site deep wells to monitor the tritium concentration of the groundwater. The typical lower level of detection for tritium in groundwater samples is 250 pCi/L. Historically the site's monitoring wells have all been less than detectible (<LLD) for tritium. The water inside of the cistern was sampled and analyzed at the environmental lower limit of detection. The table below shows the results:

Date	Tritium (pCi/L) (±155 pCi/L)
9/15/08	747
10/15/08	878
12/1/08	735
12/16/08	850

Even after the cistern is pumped out or rainfall events, the concentration of tritium within the cistern is within the error associated with the measurement. Therefore, the groundwater surrounding the cistern is contaminated with 800 pCi/L of tritium.

The pipe carries plant liquid releases to Harris Lake for discharge. Because of the reuse of Harris Lake, the concentration of tritium in the blowdown effluent is approximately 4000-5000 pCi/L. This concentration varies due to release tanks, concentration of lake tritium, and rainfall. In addition, the concentration of Harris Lake itself ranges from 3000 – 9000 pCi/L. At this point it is difficult to say where the tritium in the groundwater is coming from. It is possible that the tritium in the lake is impacting the groundwater surrounding the Cooling Tower Blowdown line or the Cooling Tower Blowdown line has a leak which is releasing blowdown effluent into the groundwater. Further investigation will be required to determine the source of the tritium in the groundwater.

An action plan will need to be developed to identify the source of the tritium in the groundwater, as well as, the remediation protocol to prevent migration of licensed material off-site and to minimize decommissioning impacts.

	DESCRIPTION	CAUSE	CODE	ORG	CORRECTIVE ACTION	ASSIGNMENT TYPE *	ASSIGNEE/ CONCURRENCE	DUE OR COMPLETION DATE**
ADVERSE CONDITION	800 pCi/L of tritium was discovered in the Cooling Tower Air Relief cistern	**N/A**	**N/A**	**N/A**	Pump out the water in the cistern box and dispose of the water appropriately	CORR	Larry Garner	Complete
					Develop and implement Action Plan for tritium source	CORR	Heather Baxter	4/15/09
I/A	Detectible concentration of tritium found in water	(Apparent) The Cooling Tower Blowdown line may be leaking blowdown effluent	J7U	N/A	See corrective action above for adverse condition	NA	NA	NA
OTHER	**N/A**	**N/A**	**N/A**	**N/A**	Document in the 2008 ARERR report the groundwater cistern results	ENHN	Heather Baxter	6/1/09

J:\Shared\Cause Codes\CAP Cause Codes.doc

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ASSIGNMENT NUMBER 05 **SUB**

Type	: CORR	Due Date	: 07/16/09		
Status	: NTFY/ASG	Reschedule	: 1	Pri Resp Group:	ERCCSUPT
Assigned To	: H BAXTER			Sec Resp Group:	
Subject	: CORR-DEVELOP AND IMPLEMENT ACTION PLAN FOR TRITIUM SOURC				
Aff Facility:	HNP	Unit	:	System	:
UCR	:	Schedule Ref	:		
Organization:		Department	: I75	Discipline	:
Est Manhrs	:	Est Comp Date	:		

Assignment Status History

Updated Date	Updated By	Assgn Status	Assgn Due Date
12/02/08	BAXTEH	INPROG	
12/31/08	GRUBBT		04/15/09
12/31/08	GRUBBT	NTFY/PRI	
12/31/08	CATTCH	ACC/PRI	
12/31/08	CATTCH	NTFY/ASG	
04/15/09	FURRJA		07/16/09

DEVELOP AND IMPLEMENT ACTION PLAN FOR TRITIUM SOURCE

Assignment Attribute Value	Reqd	Date
BENEFIT REALIZED	N	
Name :		

Assignment Attribute Value	Reqd	Date
1 UNIT/SECT EVALUATR	N	
Name :		

Assignment Attribute Value	Reqd	Date
1A COMMITTED	N	
Name :		

Assignment Attribute Value	Reqd	Date
1B CHANGE BASIS	N	
Name :		

First extension approved by Supervisor and Licensing/PERAS if NRC committed
Additional extensions approved by Unit Manager/Superintendent and Licensing/PERAS if committed
Justification should include the following:
" Why the assignment is being extended; to allow implementation of action plan
" The new due date: 7/16/09
" Why the new due date is acceptable from a nuclear safety and risk perspective: No radiological concern since we are dealing with Cooling Tower blow down line.
Concurrence received from Chris Burton via Mike Robinson on 4/15/09.

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Assignment Attribute Value	Reqd	Date
2 MISCELLANEOUS	N	
Name :		

Assignment Attribute Value	Reqd	Date
2A COMMENTS	N	
Name :		

Assignment Attribute Value	Reqd	Date
2B COMMENTS	N	
Name :		

Assignment Attribute Value	Reqd	Date
2C COMMENTS	N	
Name :		

Assignment Attribute Value	Reqd	Date
2D COMMENTS	N	
Name :		

Assignment Attribute Value	Reqd	Date
2E COMMENTS	N	
Name :		

Assignment Attribute Value	Reqd	Date
3A LTCA APPROVAL	N	
Name :		

Assignment Attribute Value	Reqd	Date
3B LTCA CONCURRENCE	N	
Name :		

COMPLETION NOTES

CAUSE/ACTION

ASSIGNMENT COMPLETION APPROVAL

Route List: 001 Route List Initiator:

PASSPORT	Fac	Alert Group/Type	Last Name	Send Date	Send Time	Action Taken	Action Date/Time
	HNP	ERCCSUPT	A				
	HNP	CHUEVAL	A				

Develop and implement Action Plan for tritium source

HNP Action Plan for

Groundwater Protection Program

Rev 1 (1/7/09)

Developer: Heather Baxter, Don Edwards	**Responsible Supervisor:** Mike Robinson
Date Initiated: 1/5/2009	**AR Number:** 309035

Section 1 - Define Problem and Expected Results

In accordance with the industry's Groundwater Protection Initiative, Harris Nuclear Plant is required to develop and implement a groundwater protection program to assure timely and effective management of situations involving inadvertent releases of licensed material to the groundwater.

This action plan will address management, remediation and decommissioning impacts of tritium detected along the Cooling Tower Blowdown Line and the addition of new monitoring wells.

Section 2 – Current Facts and Assumptions

- Facts:
  The water that is flooding the cistern that surrounds the Air Relief Valve #1 of the Cooling Tower Blowdown line contains 800 pCi/L of tritium. Both Harris Lake and the Cooling Tower Blowdown typically contains about 6000 pCi/L tritium. As part of the site's Radiological Environmental Monitoring Program the HNP Environmental Groundwater Monitoring Program utilizes on-site deep wells to monitor the tritium concentration of the groundwater. The typical lower level of detection for tritium in the groundwater samples is 250 pCi/L. Historically the site's monitoring wells have shown less than detectible (<250 pCi/L) of tritium. Therefore, the tritium concentration in the groundwater is not naturally occurring.

  There are currently no monitoring wells in the vicinity of the Cooling Tower Blowdown line; therefore the hydrogeological conditions of the site have not been evaluated.

- Assumptions:
  Since the source of the tritium in the groundwater surrounding the Cooling Tower Blowdown line is not naturally occurring, it is assumed that the groundwater tritium is either due to a Cooling Tower Blowdown Line leak or Harris Lake influence.

Section 3 – Define Needed Resources

Chemistry –

1. Manage the Groundwater Protection Program to ensure compliance with all rules and regulations
2. Analyze the groundwater samples for tritium and gamma emitters
3. Make recommendations for remediation
4. Document actions associated with this action plan in the site decommissioning 50.75(g) file.
5. Analyze soil samples for gamma emitters
6. If blowdown line is found leaking, estimate the leak rate to determine if a leak of licensed material exceeds the NEI 07-07 volumetric criteria for licensed material.

Engineering –

1. Evaluate Cooling Tower Blowdown Line for leaks
2. Evaluate modifying Combined Outfall Sampler pipe to prevent Cooling Tower Blowdown from interacting with groundwater
3. Evaluate Cooling Tower Blowdown cistern drain holes

Maintenance/Facility –

1. Pump out the water from the cistern and obtain a sediment sample
2. Provide access to the Cooling Tower Blowdown Line site

Contract – Silar Services

1. Evaluate the hydrogeologic conditions of the site and determine if there is a potential for water from that location to get off site
2. Install piezometers to measure isoconcentrations of tritium, if needed
3. Evaluate the influence of Harris Lake on the site's groundwater

Section 4 – Define the Nuclear or Personnel Safety Impact of the Problem (if applicable)
This problem does not represent a plant nuclear or personnel safety risk. The Groundwater Protection Program was implemented to provide public confidence in the nuclear industry and is enforced by the Nuclear Regulatory Commission. Even though 800 pCi/L of tritium is significantly below the 20,000 pCi/L of tritium reporting limit, any detectible tritium is a concern to the public. In order to help maintain a good relationship with the surrounding community and stakeholders the site must be proactive and efficiently deal with the problem.

Section 5 – Action Plan			
	Activity	Assignee	Expected Date of Completion
1	Revise Silar Services contract to provide services to HNP site	Charlie Ross/ Mike Robinson	Complete
2	Obtain, from Silar Services, an evaluation of the area's hydrogeologic conditions and possible impact to the public	Heather Baxter/ Don Edwards	Complete 4/1/09
3	Sample perched water along the Cooling Tower Blowdown Line for tritium	Heather Baxter/ Don Edwards	Complete 2/5/09
4	Measure the tritium concentration along the blowdown line to help isolate the possible location of a leak.	Heather Baxter/ Don Edwards	Complete 3/4/09
5	Obtain soil samples from the area and cistern sediment and measure for gamma emitters	Heather Baxter/ Don Edwards	Complete 2/5/09
6	Evaluate the remediation required for the site	Heather Baxter/ Don Edwards	In process 4/1/09
7	Document decommissioning impacts in the plant 50.75(g) file	Heather Baxter/ Don Edwards	Once actions (#1-6,11) are complete
8	If a leak is discovered, evaluate the impact of the leak upon the Cooling Tower Blowdown system	Ryan Welch/ Matt Denny	In process
9	Evaluate the cistern drain and methods to prevent backflow	Ryan Welch/ Matt Denny	In progress

10	Evaluate the need to modify the drain holes in the remaining cisterns	Ryan Welch/ Matt Denny	In process ARS 1 has been plugged
11	Evaluate the need to modify the Combined Outfall sampler hose penetration and drain hole	Ryan Welch/ Matt Denny	In process
12	Identify potential pathways for groundwater migration from cistern to off-site locations through groundwater	Heather Baxter/ Don Edwards	Complete 4/1/09
13	If blowdown line is found leaking, estimate the leak rate to determine if a leak of licensed material exceeds the NEI 07-07 volumetric criteria for licensed material.	Heather Baxter/ Don Edwards	Complete 4/1/09
14	Evaluate the location of new site monitoring wells	Heather Baxter/Don Edwards	Complete 4/1/09

Section 6 - References

- NEI 07-07 (Final) – Industry Ground Water Protection Initiative
- EPRI – Groundwater Protection Guidelines for Nuclear Power Plants TR 1015118, November 2007

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ASSIGNMENT NUMBER 06 **SUB**

Type	: ENHN	Due Date	: 06/01/09		
Status	: AWAIT/C	Reschedule	:	Pri Resp Group:	ERCCSUPT
Assigned To	: H BAXTER			Sec Resp Group:	
Subject	: ENHN-DOCUMENT IN THE 2008 ARERR REPORT THE GROUNDWATER CI				
Aff Facility:	HNP	Unit	:	System	:
UCR	:	Schedule Ref	:		
Organization:		Department	: I75	Discipline	:
Est Manhrs	:	Est Comp Date	:		

Assignment Status History

Updated Date	Updated By	Assgn Status	Assgn Due Date
01/05/09	GRUBBT	INPROG	
01/05/09	GRUBBT		06/01/09
01/05/09	GRUBBT	NTFY/PRI	
01/05/09	CATTCH	ACC/PRI	
01/05/09	CATTCH	NTFY/ASG	
04/28/09	BAXTEH	ACC/ASG	
04/28/09	BAXTEH	AWAIT/C	

DOCUMENT IN THE 2008 ARERR REPORT THE GROUNDWATER CISTERN RESULTS

Assignment Attribute Value	Reqd	Date
BENEFIT REALIZED	N	
Name :		

Assignment Attribute Value	Reqd	Date
1 CHANGE BASIS	N	
Name :		

Assignment Attribute Value	Reqd	Date
2 COMMENTS	N	
Name :		

COMPLETION NOTES

CAUSE/ACTION

ASSIGNMENT COMPLETION APPROVAL

Route List: 001 Route List Initiator: BAXTEH

PASSPORT	Fac	Alert Group/Type	Last Name	Send Date	Send Time	Action Taken	Action Date/Time
ROBINJ02	HNP	ERCCSUPT A	ROBINSON	04/28/09	01:39	APPROVED	04/28/09 07:27
	HNP	CHUEVAL A	ROBINSON	04/28/09	07:27		

Enclosure 5: Groundwater Samples taken in support of Groundwater Protection Initiative
NEI 07-07 Industry Groundwater Protection Initiative –
Final Guidance Document, Objective 2.4

Samples were taken at various locations throughout the plant in support of the Groundwater Protection Initiative.
Samples included the cistern enclosure of the Air Relief Valve for the Cooling Tower Blowdown Line, and Vaults and Yard Drains that may have collapsed and contain water that could potentially affect groundwater. All samples analyzed at HNP showed no detectable tritium activity. 3out of 6 samples from Cistern #2 analyzed at the Harris E&E Center showed activity less than the LLD value for the Harris Plant. The Harris E&E center analyzes to a lower LLD. An investigation is in process concerning the 3 positive results.

MANHOLE	DATE	TRITIUM (uCi/ml)
Cistern #2		
	1/7/2008	< 1.90E-06
	4/2/2008	< 1.98E-06
	6/26/2008	< 2.22E-06
	9/15/2008	8.78E-07
	10/15/2008	7.47E-07
	12/1/2008	7.35E-07
MH-12B-SA		
	3/5/2008	< 1.82E-06
MH-75		
	7/15/2008	< 1.96E-06
	10/7/2008	< 1.96E-06
MH-72D-SB		
	1/26/2008	< 1.87E-06
	7/1/2008	< 1.96E-06
	8/12/2008	< 1.90E-06
	9/22/2008	< 1.91E-06
	12/15/2008	< 1.72E-06
MH-72A-SA		
	3/5/2008	< 1.82E-06
	11/6/2008	< 2.03E-06
MH-71D-SB		
	1/26/2008	< 1.87E-06
	7/1/2008	< 1.96E-06
	9/22/2008	< 1.91E-06
	12/15/2008	< 1.72E-06
MH-71B-SB		
	3/5/2008	< 1.82E-06
	8/12/2008	< 1.90E-06

MANHOLE	DATE	TRITIUM (uCi/ml)
MH-523B		
	3/5/2008	< 1.82E-06
	8/12/2008	< 1.90E-06
	11/3/2008	< 2.03E-06
MH-523A		
	3/5/2008	< 1.82E-06
	8/12/2008	< 1.90E-06
	11/3/2008	< 2.03E-06
MH-519		
	7/15/2008	< 1.96E-06
	10/7/2008	< 1.96E-06
MH-511B		
	4/8/2000	< 1.88E-06
	7/2/2008	< 2.02E-06
	9/23/2008	< 2.02E-06
MH-511A		
	3/5/2008	< 1.82E-06
	11/6/2008	< 2.03E-06
MH-51		
	10/7/2008	< 1.96E-06
MH-505E		
	1/26/2008	< 1.87E-06
	4/8/2008	< 1.88E-06
	9/15/2008	< 2.03E-06
	10/13/2008	< 1.95E-06
	12/15/2008	< 1.72E-06
MH-505B		
	1/26/2008	< 1.87E-06
	3/5/2008	< 1.82E-06

	11/6/2008	< 2.03E-06
MH-70D		
	1/26/2008	< 1.87E-06
	7/1/2008	< 1.96E-06
	9/22/2008	< 1.91E-06
	12/15/2008	< 1.72E-06
MH-69		
	10/7/2008	< 1.96E-06
MH-61		
	2/20/2008	< 1.85E-06
	7/29/2008	< 1.86E-06
	10/14/2008	< 1.92E-06
MH-59		
	10/14/2008	< 1.92E-06
MH-525E		<
	7/2/2008	< 2.02E-06
	12/15/2008	< 1.72E-06
MH-523D		
	1/26/2008	< 1.87E-06
	7/1/2008	< 1.96E-06
	10/14/2008	< 1.95E-06
MH-17		
	7/29/2008	< 1.86E-06
	10/14/2008	< 1.92E-06

	4/8/2008	< 1.88E-06
	7/29/2008	< 1.86E+06
	9/2/2008	< 1.90E-06
	9/23/2008	< 2.02E-06
	11/26/2008	< 1.90E-06
MH-505A		
	3/5/2008	< 1.82E-06
	11/6/2008	< 2.03E-06
MH-503		
	7/29/2008	< 1.86E-06
MH-43		
	7/15/2008	< 1.96E-06
MH-41		
	10/7/2008	< 1.96E-06
MH-31		
	7/29/2008	< 1.86E-06
MH-29		
	7/29/2008	< 1.86E-06
MH-27		
	7/29/2008	< 1.86E-06
MH-23		
	9/15/2008	< 1.91E-06
MH-19		
	10/14/2008	< 1.92E-06