

# 2013 Inspection and Status Report for the Former Boiling Nuclear Superheater (BONUS) Reactor Facility, Rincón, Puerto Rico

## Summary

The Former Boiling Nuclear Superheater (BONUS) Reactor Facility, located on the west coast of Puerto Rico in the town of Rincón, was inspected on August 28, 2013. The inspection included confirming the integrity of the entombed reactor system, the containment building, site security, general housekeeping, and condition of the surrounding land. The site was found to be in good condition. No cause for a follow-up inspection was identified.

Puerto Rico Electric Power Authority (PREPA) personnel have done an excellent job responding to maintenance items and recommendations from the 2010 site inspection. With the exception of painting the outer surface of the containment dome, all maintenance items and recommendations identified in 2010 have been addressed. The outer surface of the containment dome was in the process of being painted and is scheduled to be completed in December 2013.

The BONUS facility consists of the containment building, which houses the entombed reactor system, and outside support facilities. The Puerto Rico Electric Power Authority (PREPA) uses the decommissioned BONUS facility as a history museum. It is opened to the public for scheduled tours.

There are limited and discrete areas within the museum building that have fixed residual radioactive contamination. DOE conducted an environmental assessment and concluded that there was no unacceptable risk to human health or the environment from the fixed radioactive contaminated areas. DOE remains responsible for the entombed radioactive materials that remain at the BONUS facility.

## 1.0 Introduction

This report presents the findings of the U.S. Department of Energy (DOE) inspection of the decommissioned Boiling Nuclear Superheater (BONUS) Reactor Facility, in Rincón Puerto Rico, on Wednesday August 28, 2013. M. Miller (Inspector) and K. Broberg (Assistant Inspector) with S.M. Stoller Corporation, (the DOE Office of Legacy Management [LM] Contractor) conducted the inspection. Other inspection participants included C. Carpenter, representing DOE LM, and J. Miller, representing S.M. Stoller Public Affairs. M. Ramos and A. Lucca with PREPA served as escorts at the facility.

The site inspection was conducted in accordance with the *Long-Term Surveillance and Maintenance Plan for the Boiling Nuclear Superheater (BONUS) Reactor Facility, Rincón, Puerto Rico*, (DOE Grand Junction, Colorado, May 2005), and procedures established by DOE for site inspections. The purposes of the inspection were to confirm the integrity of the entombed reactor and the building in which the entombed reactor is located, status site security, assess general housekeeping of the site, and look for changes in the surrounding area that might impact the long-term sustainability of the facility.

Prior to beginning the inspection, personnel reviewed and signed the Job Safety Analysis for the Site Inspection and source disposition at the BONUS Decommissioned Reactor Site, (expiration 12/31/2013).

## **2.0 Inspection Results**

Features discussed in this report are shown on the attached drawing. Photographs to support specific observations are identified in the text and on the drawing by photograph location (PL) numbers.

### **Containment Building and Entombed Reactor System**

The Containment Dome houses the entombed reactor system. The outer surface of the dome was in the process of being painted. The work observed appeared to be of high quality with an emphasis on safety. Paint color was tested prior to beginning the work (PL-1). The color on the far left, in PL-1, is the color that was selected. A portable lift is being used to get people and supplies to the top of the dome (PL-2). During the inspection supplies were being staged on top of the dome (PL-3). Painting is scheduled to be complete in December 2013.

Around the base of the containment dome is a rubber seal/gasket that serves to direct water away from the base of the outer curved surface of the dome. The dome has a diameter of approximately 160 feet, and a corresponding circumference of approximately 502.4 feet. In 2010, the rubber seal was observed to be in bad condition. It was cracked, ripped, and missing in some locations. Since 2010, PREPA personnel have installed a secondary seal over the damaged seal (PL-4 and PL-5). The secondary seal serves to carry water away from the underlying damaged primary seal.

In 2010 inspectors found that the flashing near the administrative offices at the base of the dome was bent away from the dome creating a large void for water to enter the building. Inspectors found that this flashing had been properly repaired (PL-6).

In 2010 inspectors recommended that peeling paint on painted surfaces in the basement of the facility be tested for lead. A test was conducted and one area was found to have paint that contained small amounts of lead. The lead-contaminated area was painted over to provide additional protection against potential lead exposure (PL-7).

The basement of the containment building flooded in September 1998 during Hurricane Georges (LTSP 2005) due to plugged storm drains and leaking door seals. It took several months to remove the water and allow the basement to dry out. The storm drains, which had debris from original construction, were unplugged and the rubber door seals around the basement doors were replaced (after being in place for more than 28 years).

A few inches of concrete have been added to the basement floor of the containment building since Hurricane Georges to provide shielding for some isolated and discrete areas of fixed radioactive contamination on the basement floor. Floor drains in the basement floor were filled in with concrete raising the question of how will water drain from the facility should it flood again (PL-8). It was recommended in 2010 that PREPA provide DOE the plans that will be followed to address future flooding events at the facility. Plans were prepared and made available to the DOE.

In 2010, inspectors observed the freight door on the east side of the containment building, leading to the basement was sealed shut with scale. Metal flashing in front of the freight door had large holes in it due to corrosion of the metal. These large holes had the potential to allow water to enter the basement should the entry way to the freight door flood as it did during Hurricane Georges in 1998. In 2010 inspectors recommended that the corroded flashing around the freight door be repaired, the door be opened, and the door seal cleaned, inspected, and replaced if deemed appropriate. Inspectors in 2013 found that PREPA had carried out the recommendation. The door was sealed shut (PL-9), and corroded metal in front of the door had been repaired with a layer of concrete (PL-10).

### **Site Security**

Site security consists of a manned guard shack, a motor operated entrance gate (24 feet wide), and a security fence that encloses an area of approximately 5 acres (6 foot high chain link fence topped with three strands of barbed wire).

In 2010, the fence was in poor condition. The barbed wire along much of the top of the fence was missing. Several holes, large enough for people to pass through, were cut in the fence. In several areas the fence was overgrown with vegetation. Inspectors in 2013 noted the fence to be in good condition. Although the barbed wire along much of the top of the fence was still missing, all holes had been repaired, and vegetation had been cleared from most of the fence (PL-11).

### **General Housekeeping**

General housekeeping was much improved from the 2010 inspection.

### **Surrounding Area**

No changes to the surrounding area were noted during the inspection. The retaining wall on the west side of the facility, near the beach, remains broken due to a close-growing palm tree, but remains serviceable (PL-12, through PL-16).

## **3.0 Recommendations**

No recommendations to report.

## 4.0 Photographs

<b>Photograph Location Number</b>	<b>Azimuth</b>	<b>Photograph Description</b>
PL-1	Na	Test paint – outside surface of containment dome.
PL-2	100	Extended bucket lift to top of containment dome.
PL-3	NA	Top of dome, paint supplies.
PL-4	NA	Repairs to seal around base of dome.
PL-5	NA	Repairs to seal around base of dome.
PL-6	45	Flashing repair along base of dome.
PL-7	NA	Repainted surface to address underlying lead paint.
PL-8	NA	Floor drain filled with cement.
PL-9	NA	Freight door, east side of containment building.
PL-10	NA	Freight door, east side of containment building.
PL-11	270	Looking west down north fence line.
PL-12	270	Top of dome, looking west.
PL-13	285	Top of dome, looking northwest.
PL-14	60	Top of dome, looking northeast.
PL-15	135	Top of dome, looking southeast.
PL-16	225	Top of dome, looking southwest.



BON 8/2013. PL-1. Test paint – outside surface of containment dome.



BON 8/2013. PL-2. Extended bucket lift to top of containment dome.





BON 8/2013. PL-3. Top of dome, paint supplies.



BON 8/2013. PL-4. Repairs to seal around base of dome.





BON 8/2013. PL-5. Repairs to seal around base of dome.



BON 8/2013. PL-6. Flashing repair along base of dome.





BON 8/2013. PL-7. Repainted surface to address underlying lead paint.



BON 8/2013. PL-8. Floor drain filled with cement.





BON 8/2013. PL-9. Freight door, east side of containment building.



BON 8/2013. PL-10. Freight door, east side of containment building.





BON 8/2013. PL-11. Looking west down north fence line.



BON 8/2013. PL-12. Top of dome, looking west.





BON 8/2013. PL-13. Top of dome, looking northwest.



BON 8/2013. PL-14. Top of dome, looking northeast.

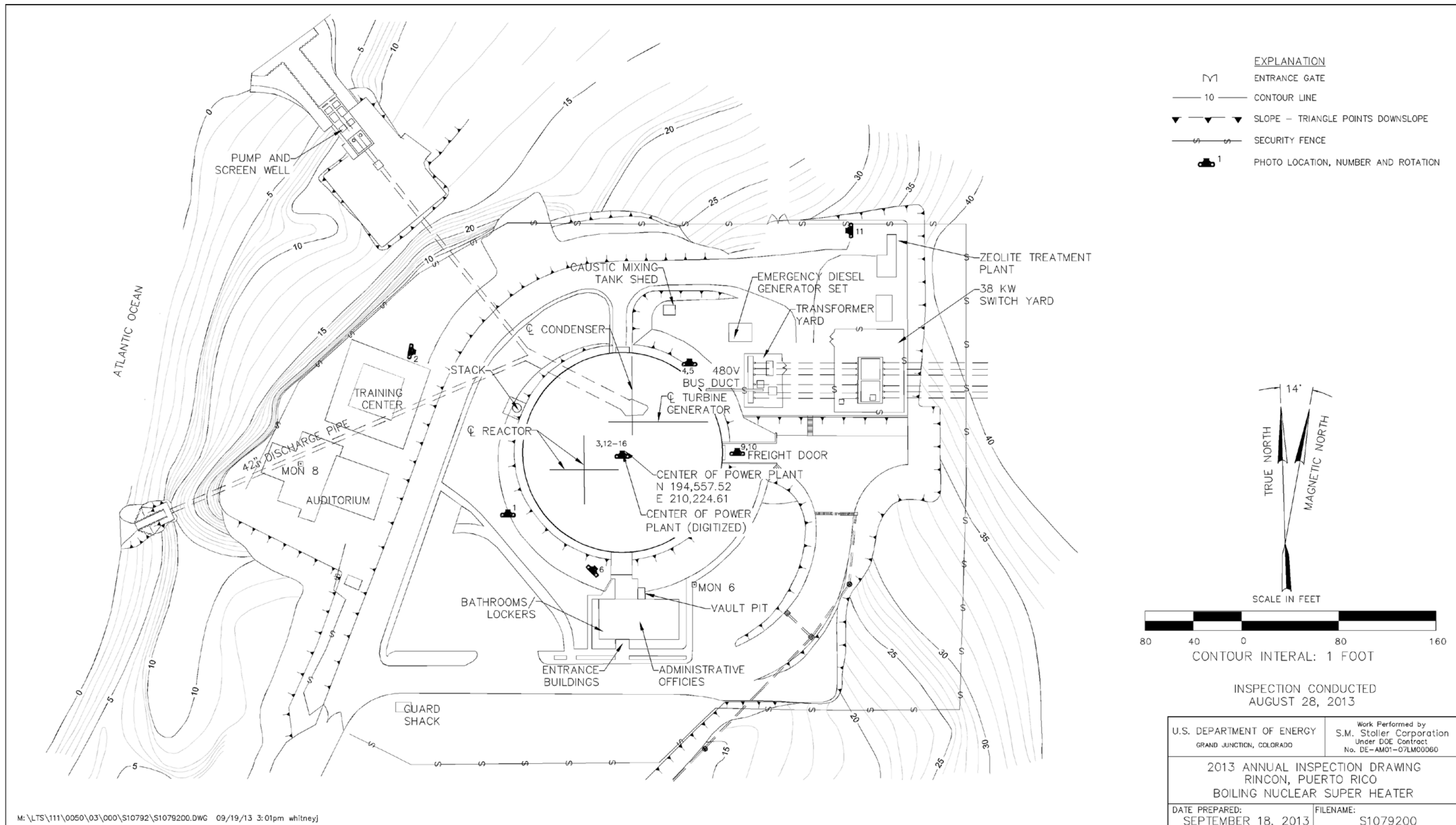


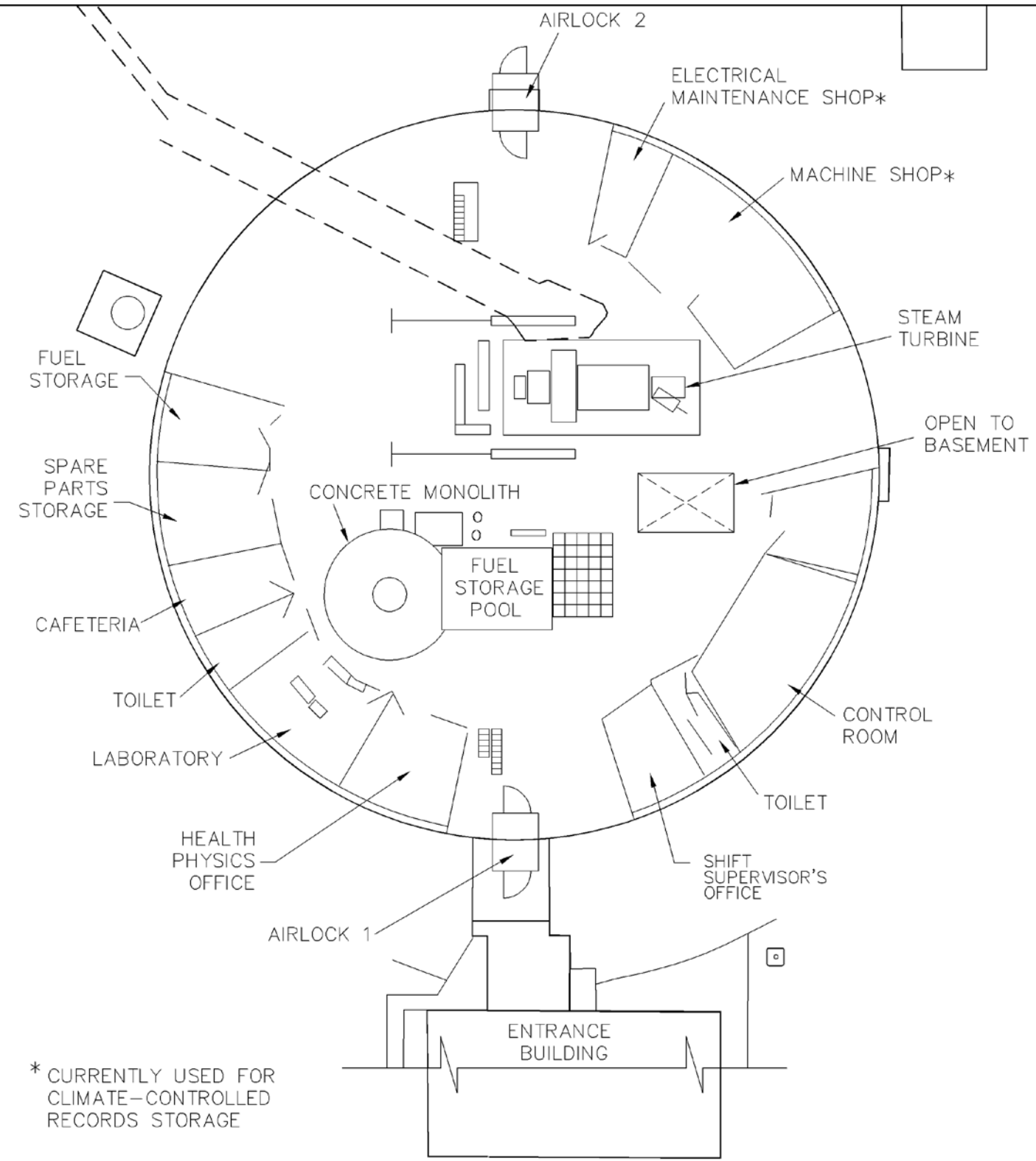


BON 8/2013. PL-15. Top of dome, looking southeast.

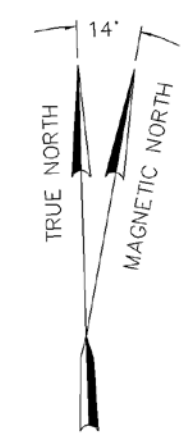


BON 8/2013. PL-16. Top of dome, looking southwest.





EXPLANATION	
	ENTRANCE GATE
	CONTOUR LINE
	SLOPE - TRIANGLE POINTS DOWNSLOPE
	SECURITY FENCE
	PHOTO LOCATION, NUMBER AND ROTATION



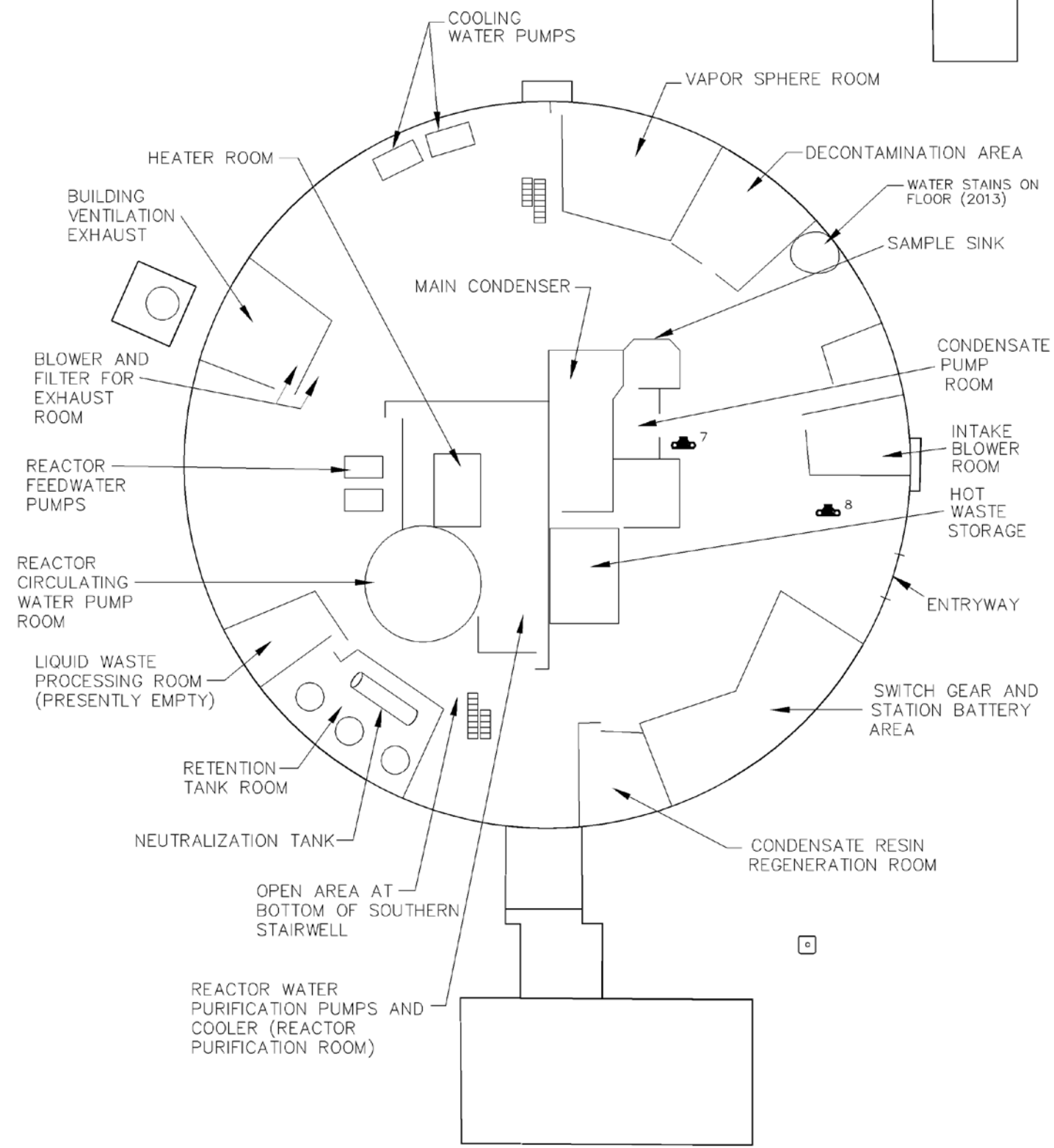
INSPECTION CONDUCTED  
AUGUST 28, 2013

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S.M. Stoller Corporation Under DOE Contract No. DE-AM01-07LM00060
2013 ANNUAL INSPECTION DRAWING RINCON, PUERTO RICO BOILING NUCLEAR SUPER HEATER	
DATE PREPARED: SEPTEMBER 18, 2013	FILENAME: S1079200

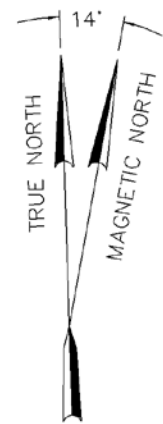
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EXPLANATION	
	ENTRANCE GATE
	CONTOUR LINE
	SLOPE - TRIANGLE POINTS DOWNSLOPE
	SECURITY FENCE
	PHOTO LOCATION, NUMBER AND ROTATION



BASEMENT FLOOR

INSPECTION CONDUCTED  
AUGUST 28, 2013

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S.M. Stoller Corporation Under DOE Contract No. DE-AM01-07LM00060
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