

## **B1 Buried Pipe, Area I - Radiological Release Survey and Waste Certification**

This data package provides the radiation survey results of the buried pipe debris at B1 ISRA location in Area I of SSFL. This analysis and data interpretation complies with the procedure approved by the California Department of Public Health<sup>1</sup> and with Boeing procedure RS-00012<sup>2</sup>.

Instrument measurements were made for beta/gamma total surface contamination (Ludlum 3 plus Ludlum 44-9 GM probe) and gamma exposure rate (Bicron microrem meter). Wipes were taken for removable alpha/beta contamination and counted in a low-background Tennelec laboratory alpha/beta counter.

Instrument minimum detectable activity (MDA) for total contamination measurements are <5,000 dpm/100 cm<sup>2</sup> beta (Ludlum 44-9 probe). Removable contamination MDAs for the Tennelec are 13 dpm/100 cm<sup>2</sup> alpha and 20 dpm/100 cm<sup>2</sup> beta. The Bicron MDA is ~4 µR/hr. Survey results are provided in Appendix 1.

### **Conclusions**

Results of all field measurements were non-detect (i.e. less than the MDA) and are therefore indistinguishable from background. The dose from any resulting post-demolition solid debris is therefore zero mrem per year. If it were conservatively assumed that the debris was actually contaminated at the MDA levels, then the effective dose would be much less than 1 mrem per year<sup>3,4</sup>.

This debris meets the most restrictive regulatory surface contamination limits<sup>5,6,7</sup> for release/clearance of equipment and material for unrestricted use from former radiological facilities. B1 is not a former radiological facility.

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<sup>1</sup> Boeing, "Northern Drainage Waste Sampling for Radionuclides." Revision 9, November 5, 2007. (Attachment 3 to Northern Drainage Work Plan) and "ISRA Waste Sampling for Radionuclides", Attachment A to the ISRA Soil Management Plan.

<sup>2</sup> Boeing, "Methods and Procedures for Radiological Monitoring." RS-00012, Revision B, August 6, 2006.

<sup>3</sup> ANSI N13.12-1999. "Surface and Volume Radioactivity Standards for Clearance." American National Standards Institute/Health Physics Society, 1999. The most limiting beta/gamma screening value is 6,000 dpm/100 cm<sup>2</sup> corresponding to a dose of 1 mrem per year. The most limiting alpha screening value is 600 dpm/100 cm<sup>2</sup> corresponding to a dose of 1 mrem per year.

<sup>4</sup> NUREG-1640. "Radiological Assessments for Clearance of Materials from Nuclear Facilities." Nuclear Regulatory Commission, June 2003. The most restrictive beta/gamma dose conversion from Table 2.1 is 0.16 µrem/y per dpm/100 cm<sup>2</sup>. This corresponds to 0.8 mrem/y per 5,000 dpm/100 cm<sup>2</sup>.

<sup>5</sup> U.S. Nuclear Regulatory Commission Regulatory Guide 1.86. "Termination of Operating Licenses for Nuclear Reactors." June 1974. and U.S. NRC "Guidelines for Decontamination of Facilities and Equipment Prior to Release to Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," August 1987.

The debris is certified to be radiologically acceptable for off-site disposal and/or recycling. There are no radiological controls or restrictions imposed on future disposition or use of this debris.

This waste meets the requirements of disposal facility permits<sup>8,9</sup> and complies with the California Health & Safety Code<sup>10</sup>.

The Governor's Executive Order D-62-02 (September 2002) prohibits the "disposal of decommissioned materials to Class 3 landfills or unclassified management units." The subject debris is not decommissioned material, and has not originated from a radiological facility. The survey in this certification has therefore been conducted as a best management practice, that also complies with the requirements of D-62-02. Verification surveys and/or approval by the California Department of Public Health (CDPH) Radiologic Health Branch (RHB) are not required for the off-site disposal of decommissioned material or of the subject material<sup>11</sup>.

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<sup>6</sup> U.S. Department of Energy Order 5400.5. "Radiation Protection of the Public and Environment." Chapter IV. January 7, 1993. and U.S. Department of Energy Guide DOE G 441.1-XX. "Control and Release of Property with Residual Radioactive Material." April 4, 2002.

<sup>7</sup> California Department of Public Health. DECON-1. "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use." and IPM-88-2. "Clearance Inspection and Survey." December 1, 1997.

<sup>8</sup> This waste is exempt from regulation and licensing or is expressly authorized for disposal under the Radiation Control Law (Division 104, Part 9, Chapter 8 of the California Health & Safety Code).

<sup>9</sup> This waste is not prohibited from disposal by any government agency with jurisdictional authority over this waste.

<sup>10</sup> Division 104, Part 9, Chapter 5, Article 1, Section 114715, "No person shall bury, throw away, or in any manner dispose of radioactive wastes within the state except in a manner and at locations as will result in no significant radioactive contamination of the environment." For the purposes of this requirement, "significant" is defined in Section 114710 as amounts of radioactive materials that are likely to expose persons to ionizing radiation greater than the guide levels published by the Federal Radiation Council (FRC). The FRC no longer exists, but the applicable guide level last published by the FRC was 500 mrem per year to a member of the public. Because the regulatory dose limit to members of the public has since been lowered to 100 mrem per year, CDPH/RHB conservatively utilizes the lower dose for purposes of defining "significant" radioactive contamination in this Article of the California Health and Safety Code.  
<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=hsc&group=114001-115000&file=114705-114780>

<sup>11</sup> The California Department of Public Health (CDPH) Radiologic Health Branch (RHB) has stated in a November 9, 2007 email to Phil Rutherford (Boeing) ... "The Governor's Executive Order D-62-02, does not specifically require the Department of Health Services (now the Department of Public Health) to perform verification sampling of decommissioned material or to provide approval for disposal of specific decommissioned material shipped offsite (e.g., to Class I or II landfills). The California DPH has not imposed a requirement that Boeing or the Department of Energy (DOE) seek DPH verification sampling or approval of all decommissioned material destined for Class I or II landfills in compliance with the Governor's Executive Order."

A handwritten signature in cursive script that reads "Phil Rutherford".

Phil Rutherford  
Manager, Health, Safety & Radiation Services

**Appendix 1**  
**Field Survey Results**



## RADIATION SURVEY REPORT

FACILITY: Area I

LOCATION: B-1 Yard

SAMPLE NUMBER	DATE SAMPLED	DATE ANALYZED	PURPOSE: Material release	UNITS	dpm/100 cm <sup>2</sup> α	dpm/100 cm <sup>2</sup> β	β cpm	γ (μrem/hr)	
			DESCRIPTION		LIMIT	20 removable	100 removable	< MDA	
1	8/30/2010	8/30/2010	Pipes		< 20	< 100	90	9	
2	8/30/2010	8/30/2010	Pipes		< 20	< 100	100	8	

COMMENTS: MDA = minimum detectable activity  
<sup>1</sup>Tennelec (MDA = 13 dpm/100 cm<sup>2</sup> α and 20 dpm/100 cm<sup>2</sup> β)  
<sup>2</sup>Ludlum 3 with 44-9 GM probe (MDA ≤ 100 cpm over lowest background)  
<sup>3</sup>Bicron micro rem meter (MDA = 4 μrem/hr)

INSTRUMENT	Tennelec <sup>1</sup>		Ludlum 3 <sup>2</sup>	Bicron <sup>3</sup>
IDENTIFICATION	NR001737		EX054113	EX041001
CALIBRATION DUE	Daily		8/26/2011	8/26/2011
BACKGROUND (cpm)	0.1	2	40-150 cpm	4-12 μrem/hr
EFFICIENCY	31%	39%	10%	N/A
COUNT TIME	1 min.	1 min.	Scan	Scan

SAMPLED BY: R. Ford *Ryan Ford* DATE: 8/30/2010  
 REVIEWED BY: Phil Rutherford *Phil Rutherford* DATE: 9/3/2010

### Sample Report

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<b>Batch ID:</b>	Smears 1 Minute Count - 201008301451	<b>Count Date:</b>	8/30/2010 2:51:40PM
<b>Group:</b>	D	<b>Count Minutes:</b>	1.00
<b>Device:</b>	RMHF Tennelec (NR 007137)	<b>Count Mode:</b>	Simultaneous
<b>Batch Key:</b>	1442	<b>Operating Volts:</b>	1425
<b>Selected</b>	Swipe/Smear	<b>Comments:</b>	Pipes

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<b>Background (cpm)</b>		<b>Efficiency (%)</b>	
<b>Alpha Rate:</b>	0.10 ± 0.10	<b>Alpha:</b>	31.16 ± 0.93
<b>Beta Rate:</b>	2.00 ± 0.45	<b>Beta:</b>	39.39 ± 1.00

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<u>Sample ID</u>	<u>Sample Type</u>	<u>Alpha (dpm)</u>	<u>Unc</u>	<u>Alpha MDA (dpm)</u>	<u>Beta (dpm)</u>	<u>Unc</u>	<u>Beta MDA (dpm)</u>
1	Unknown	2.89	3.23	13.00	-2.54	2.78	20.00
2	Unknown	-0.32	0.32	13.00	0.00	3.77	20.00