



RADIOLOGIC HEALTH BRANCH
RADIOLOGICAL ASSESSMENT UNIT

DATE: October 15, 2018

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SUBJECT: Hunters Point Shipyard Parcel A-2
Health and Safety Survey



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RADIOLOGIC HEALTH BRANCH
RADIOLOGICAL ASSESSMENT UNIT

California Department of Public Health

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HUNTERS POINT SHIPYARD, PARCEL A - 2 HEALTH AND SAFETY SURVEY WORK PLAN

Field Survey Dates: October 22 through November 2018

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DATE

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DATE



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All maps and some graphs and graphics in this report are intended for multi-color presentation, evaluation, and interpretation. Black and white printing and/or photocopying may lead to a misinterpretation of the data presented.

The CDPH reserves the right to amend the survey plan as required by changed site conditions or deemed necessary by the project lead.



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Hunters Point Shipyard, Parcel A-2, Health and Safety Survey

INTRODUCTION

PURPOSE

In response to allegations of data falsification and public concern, the US Environmental Protection Agency (US EPA), the Navy, the Department of Toxic Substances Control (DTSC), and stakeholders from the City of San Francisco, have requested the California Department of Public Health (CDPH) to perform a phased approach radiological survey to assure the health and safety of the public at Parcel A. CDPH has regulatory authorities and recognized expertise in the area of radiological health. The Environmental Health Branch and the Radiologic Health Branch (RHB) have been serving as radiological contamination remediation consultants for the Department of Toxic Substances Control (DTSC).



Figure 1 Hunters Point Shipyard, from Navy website

Parcel A consists of two separate land areas, Parcels A-1 and A-2. CDPH is conducting a gamma scan of A-1 that began in July of 2018. CDPH staff will now perform a gamma scan survey in Parcel A-2. Parcel A-2 is being scanned because it is planned for development with housing units and residents, and because some of the soil excavated during the development of Parcel A-1 was placed at Parcel A-2. This CDPH survey is limited to investigating ionizing radiation.

The detection instruments that will be used are state-of-the-art, highly-sensitive calibrated instruments that are appropriate for performing sensitive gamma ray scans. The instruments are sensitive enough to detect levels of radiation that could be harmful to future residents, even if it is located below the surface. The survey will be done in two parts, a mapping survey where a towed array of large volume radiation detectors of Radiation Solutions (RS-700) gamma mapping system is pulled over accessible parts of the parcel and a walkover survey with handheld instruments for areas less accessible to the towed array. This two-part survey will ensure that as much of Parcel A-2 is scanned as possible. If scans show radiation above background levels, and the elevated level does not appear to be due to naturally occurring radiation, then CDPH will implement the notification plan and will coordinate with the involved agencies regarding a response action.

LOCATION

The Former Hunters Point Naval Shipyard is in the southeastern part of San Francisco, California. Parcel A covers approximately 75 acres, and has been subdivided into Parcel A-1 and Parcel A-2. Parcel A-2 has not been developed but plans are in place to develop it for residential use, including townhomes and condominiums. All of Parcel A was transferred from Navy possession to the City of San Francisco in 2004. See Figure 1¹ for location of Parcel A.

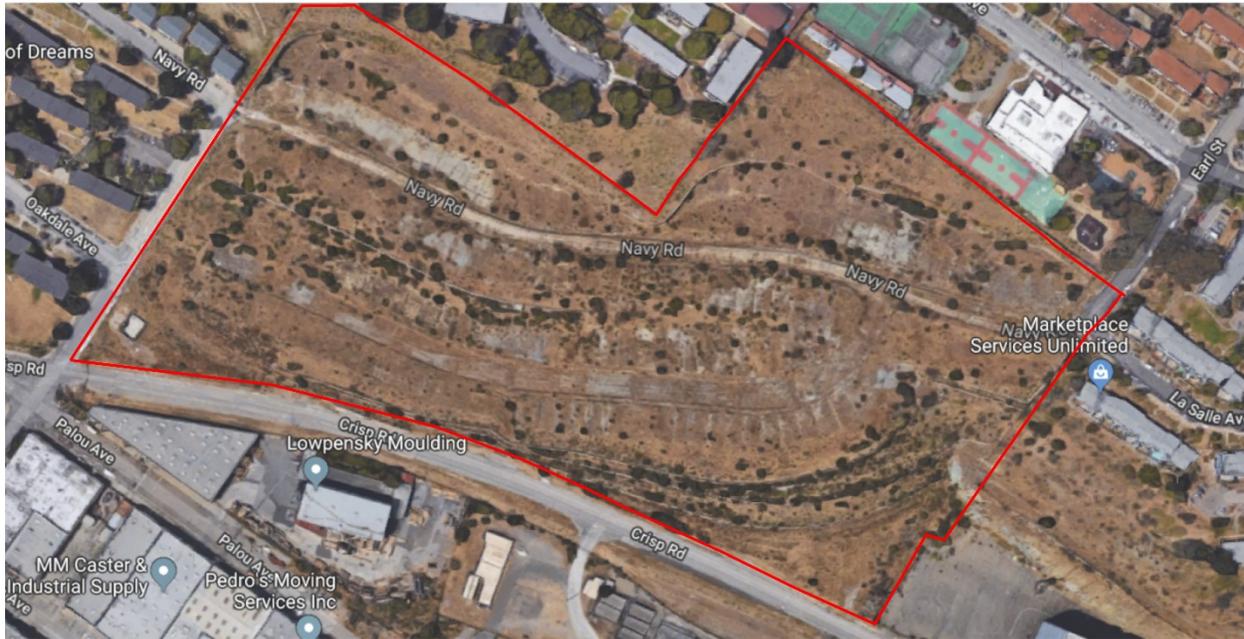


Figure 2 Aerial View of Parcel A-2

The area labeled as Parcel A-2 in Figure 1 is currently open land without buildings, paved roads or sidewalks. The topography of Parcel A-2 includes extremely steep slopes, retaining walls and natural barriers. Accessibility of these steep slopes will be dependent on staff safety considerations. The red line on the map shows the approximate border of Parcel A-2, see Figure 2.²

SURVEY SCOPE

CDPH will perform a gamma radiation survey of all accessible areas where staff can remain safe while completing accurate and detailed surveys. This gamma radiation survey, with isotopic identification performed at locations where elevated readings are detected, is an effective and most efficient method to determine if any sources of

¹ https://bracpmo.navy.mil/brac_bases/california/former_shipyard_hunters_point/hpns_parcels.html; access date: August 16, 2018

² Google Maps; <https://www.google.com/maps/place/Bayview,+San+Francisco,+CA/@37.719312,-122.3707184,1122a,35y,39.13t/data=!3m1!1e3!4m5!3m4!1s0x808f7f1bb30d3455:0xccec952a18d54560!8m2!3d37.730416!4d-122.384424?hl=en>; access date: August 16, 2018



radiation from human activity are present and assure the radiological health and safety of the public.

This survey is designed to detect gamma radiation levels that exist above the nominal background levels that could put public health and safety at risk. The array of instruments that will be used for this survey, including the various types of hand held radionuclide identification devices and the towed array RS-700 will eliminate the need for time consuming soil sample analysis that could take months to complete in the laboratory. Given the historical uses of Parcel A and, based on over 90 percent of the area scanned in A-1, only naturally occurring potassium-40 (other than a naval deck marker on the boundary of the site) has been detected, therefore wide-spread dispersed radiological contamination is not probable. Scanning is more effective in detecting discrete forms of contamination, such as a deck markers, than soil sampling.

SURVEY ACTIONS

The following survey actions will be performed, as conditions allow:

- Background variability readings in a nearby, but off-site, neighborhood where lithology and underlying soils would be similar to the survey site.
- Using the towed array RS-700 Gamma Mapping System, perform gamma scan over all accessible areas where vegetation is absent or less than four inches in height.
- Gamma walkover survey of soil, vegetated areas and areas inaccessible to the Radiation Solutions RS-700 gamma mapping system using 2" by 2" scintillation detectors.
- Confirmatory gamma spectroscopic investigation of static measurements greater than the background average plus three sigma using a Canberra Inspector 1000 or Canberra Falcon 5000.

In the event that a radiation measurement greater than background variability average plus three sigma is found, the following steps will be performed before initiating the Notification Plan.

1. Anomalous Measurement Confirmation – Perform static one-minute counts at 2-inch and 12-inch heights centered on highest count rate point, using 2" by 2" scintillation detector record measurements, location, date and time.
2. Measurements for Radionuclide Identification - Perform 20-30 minute measurement using the Canberra Inspector 1000 *OR* 30-60 minute measurement using the Canberra Falcon 5000 for radionuclide identification, save data, including radionuclide identity.
3. Perform radionuclide identification to verify if anthropogenic (man-made) radionuclides exist before initiating the Notification Plan.
4. Surveyor will durably mark the location and initiate the Notification Plan.



NOTIFICATION PLAN

Upon discovery of a confirmed anomalous measurement of an anthropogenic radionuclide, which is a reading above three-sigma (standard deviation) plus mean of background readings, following actions will be taken.

1. Provide telephone notification to RHB Chief with details of anomaly.
2. Send e-mail as soon as is practical to RHB Branch Chief, with cc to Radioactive Materials Inspection, Compliance, and Enforcement (RAM ICE) Section Chief, and Radiological Assessment Unit Chief. This e-mail will contain detailed information about what was found, when and where it was found, and planned actions.
3. The RHB Branch Chief, or his designee, will notify RS&EM Division, by telephone and e-mail. RHB Branch Chief will also notify US EPA, DTSC, CDPH Office of Public Affairs (OPA), CEH Deputy Director, and others as appropriate.
4. CDPH will also coordinate with the Navy to notify City of San Francisco officials. Although housing has not been constructed on Parcel A-2, CDPH will continue to coordinate with the developer to notify A-1 residents.

RADIONUCLIDE SOURCE RECOVERY

If a man-made radionuclide source is confirmed, the following actions will be implemented by CDPH staff in coordination with the involved agencies.

1. Take video of the recovery process performed by the Navy.
2. Carefully ensure the recovered source is not removed from hole until depth of the source (e.g. marker) is established by using a tape measurer.
3. Take two readings of one minute counts by two different sets of 2"x2" Sodium Iodide (NAI) scintillation instruments (Models: Ludlum-2221 and Detector 44-10) at contact of source and 2 inches and 12 inches of height by using a tape measurer from source. Take photograph of meter face reading and the selector switch setting for each measurement.
4. Take two readings by two sets of Micro-R instruments (Model: Ludlum-19) at contact, 2 inches and 12 inches by using a tape measurer. Take photograph of meter face reading and the selector switch setting for each measurement.
5. Perform 20-30 minute measurement using the Canberra Inspector 1000 *OR* 30-60 minute measurement using the Canberra Falcon 5000 for radionuclide identification, save data, including radionuclide identity.
6. Keep soil sampling kit ready for soil collection if deemed necessary.



SURVEY ORGANIZATION

RHB staff will be performing the following tasks:

- RS-700 Gamma Scan Survey with GPS
 - Radiological Assessment Unit (RAU) will use the towed array RS-700 gamma scan to map accessible grounds. This gamma mapping may be occurring concurrently with the walkover survey. Data from the RS-700 must be analyzed and mapped to present it in a meaningful form.

- Gamma Walkover Survey
 - Teams of two staff each will perform a walking radiological scanning survey on Parcel A-2 using 2"x2" Sodium Iodide (NaI) scintillation detectors. These instruments do not record data and location as they are used, so surveyors will read and record periodic and judgmental static measurements and their locations. At those same static measurement locations, staff will also read and record dose rate measurements.

- Survey Units
 - RS-700 Survey Units
RS-700 Survey Units have been delineated considering the drivability of the RS 700 survey equipment. These units are outlined in blue color on the map. Safety should be a consideration for driving uneven ground conditions.
 - Gamma Walkover Survey Units
Survey units for Gamma Walkover Survey are delineated and outlined in green color on the map. No RS-700 scanning is possible on these areas due to the topography and natural barriers on the parcel. These areas are only accessible by foot. Accessibility to some areas of these units is limited due to retaining walls and steep slopes.

- Radioactive Isotope Identification
 - The Site Lead or Site Assistant/Tech will use the Canberra Inspector 1000 and/or Canberra Falcon 5000 to collect gamma spectroscopic data for radioactive isotope identification at the points of elevated measurements flagged by survey teams.

- Staff positions
 - Survey team for the towed array (RS-700) gamma scan, three staff members
 - Scanner – configures the software and the system, does quality control checks before and after scanning and drives the vehicle for towing the RS-700 radiation-monitoring cart.
 - Guides (2 positions) – Help and guide in delineating the drivable areas for RS-700 towed array system. Mark the scanned areas and ensure the safety of the equipment and personnel.
 - Survey teams for Gamma Walkover Surveys, two staff members per team



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- Scanner – swings the detector and reads the instrument measurements.
- Data Recorder – records the survey instrument measurements.
- Site Lead will present the daily safety and survey briefing, supervise survey teams, answer questions from residents, manage survey assignments, provide water, shade breaks, notifications to headquarters, and first aid to staff as needed.
- Site Assistant will direct daily instrumentation Quality Assurance (QA) checks, perform gamma spectroscopy radioactive isotope identification, and assist in supervising survey teams, provide water, shade breaks and notifications.



APPENDIX 1: GAMMA WALKOVER SURVEY PROCEDURE



**HUNTERS POINT PARCEL A-2
Gamma Walkover Survey Procedure**

Do not collect resident's personal information, including names and telephone numbers, on any forms.

	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>
0730-0800	Travel	Briefing, Instrument QA Check			
0830-1130		Survey			
1130-1200	Lunch Break				QA Check
1200-1230	Briefing, Instrument QA Check				Lunch
1230-1530	Survey				Travel
1530-1600	Debrief, Instrument QA Check				

SAFETY DISCUSSION, INSTRUMENT QA – DAILY ONSITE – 0730 – 0800 HOURS

1. Sign in timekeeping log
2. Sign out survey instruments,
 - Ludlum 2221 or Ludlum 2220, with Ludlum 44-10 (2" by 2" NaI detector)
 - Ludlum 19
3. QA measurements – in the same location perform measurements for each RHB survey instrument used each day, before survey begins (AM), following lunch break (Noon), and after surveying ends for the day (PM). Use one copy of form **RAU-2** for each instrument.
4. Sign out Required State provided Personal Protective Equipment (PPE) for use during the week
 - Safety glasses
 - Safety vest
 - Hard hat
5. Staff is suggested to bring/use this PPE
 - Personal State-issued radiation dosimeter
 - Long pants
 - Sun protection, sunscreen
 - Steel toe shoes or boots
 - Water bottle(s)
 - Sunglasses/dark glasses, optional
 - Gloves, optional
6. Survey Unit assignments – the Site Lead will provide initial assignments during the morning and after lunch briefings. If your team completes surveying your assigned area, collect another survey assignment from the Site Lead and continue surveying.
7. Water and Shade– OSHA and CCR (Title 8, section 3395) require employees be provided with water, rest and shade. The Site Lead's and the Site Assistant's air-conditioned vehicles will provide shade. Sufficient water must be provided by the employer and available onsite to meet the following requirements:
 - Temperatures <85° Fahrenheit – up to 1 quart water per person per hour upon



HUNTERS POINT PARCEL A-2 Gamma Walkover Survey Procedure

- employee request, shade breaks greater than 5 minutes
- Temperatures between 85° and 95° Fahrenheit – up to 1 quart water per person per hour
 - Temperature $\geq 95^\circ$ Fahrenheit, team members should watch each other for signs of heat illness, drink water every 15 minutes even if people do not feel thirsty, record temperatures hourly.
8. Daily water plan: Chilled water will be provided as bottled water in an ice-filled insulated cooler(s) and/or in a 5-gallon insulated container. The Site Lead and the Site Assistant will carry water in their vehicles.
- Staff shall doff gloves, if worn, and must clean hands with soap and water, or pre-moistened wipes before handling cooler or 5-gallon water container
 - Site Lead and Site Assistant are responsible for the water supply: *one quart of water per person per hour* when temperatures exceed 85° Fahrenheit
 - AM: Before traveling to the site, acquire water and ice for 5-gallon container, ice and bottled water for cooler(s)
 - Noon: Check water supply, replenish as needed
 - End of Day: Purchase bottled water for the next day, as needed, drain and wash cooler and 5-gallon container.
9. Hazards
- Slip, trip and fall – wear required PPE, watch for obstructions on the ground and uneven surfaces. There is a significant fall hazard near/on steep slopes at the bluff edge.
 - Animal bites – wear snake gators to protect legs, avoid bushes
 - Toxic materials (second hand smoke, chemicals, perfumes, etc.)
 - Bio-hazards
 - Contagious diseases (Tuberculosis, influenza, common cold, etc.) – wash hands or use alcohol-based hand sanitizer frequently, wear gloves (optional)
 - Blood borne pathogens – watch for dropped hypodermic needles, wear gloves (optional)
 - Animal hair, dander, and, droppings – wash hands or use wet wipes after leaving areas where animals are present, wear gloves (optional)
 - Insect bites and stings (spiders, bees, mosquitoes, ticks, lice, etc.) – avoid flowering plants, look for webbing, avoid touching or leaning on surfaces
 - Violence – in the event of violent/hostile actions, call 9-1-1, report to Site Lead or Site Assistant
10. Report any injuries, illness, or problems immediately to:
- Site Lead or Site Assistant
 - RAU Unit Supervisor: Roger Lupo
 - Your Supervisor



PROCEDURE FOR GAMMA WALKOVER SURVEY

The gamma walkover survey is for publicly accessible areas only. Staff shall not attempt to survey in confined spaces, hazardous slopes, or other inaccessible locations.

Observe and record actions and data using data blocks on **HSPASurv-1**. Use one **HPSPA Surv-1** form for each instrument.

1. Perform QA measurements before using instrument
2. Record Survey Unit designation, start time
3. Record names of survey team members
4. For each survey instrument and each substrate (soil, cement, asphalt, etc.) scanned, collect background measurement and record data and calculations on **HPSPASurv-1**. Use extra forms if your survey unit contains more than three substrates.
 - Record five background measurements, location description, substrate material
 - Calculate average background counts per minute.
 - Calculate standard deviation.
 - Calculate Average +3 sigma, which is the instrument specific/substrate specific action level using **HPSPASurv-3**
 - Enter calculated values on **HPSPASurv-1**
 - HP(s) performing the calculations: sign **HPSPASurv-3**, **HPSPASurv-1**
 - Important: record units for all measurements
5. Scanner:
 - Survey Preparation: Adjust detector rope so that you can comfortably swing the detector 1 inch off the scanning surface
 - Walking speed: one meter per second, or slower,
 - Swing the 2" x 2" Nal detector in a slow three foot pass crosswise to your direction of motion, maintaining an even 1-inch height off the scanning surface,
 - Listen for changes in click rate or changes in tone frequency,
 - Static Measurements:
 - How often: Approximately once every fifty feet, or judgmental measurement spacing
 - How to make a static measurement at 2-inch height:
 - 2" x 2" Nal detector: perform one minute count using the meter in "scaler" mode, record results when count is complete
 - Ludlum 19: randomly read meter face and record, *record a random value, do not select for highest or lowest values shown*
 - How to make judgmental static measurements:
 - If the click rate, or the tone changes significantly, or in places where the public is likely to spend extended time, for example park benches, play areas, etc.
 - Make judgmental measurements with both survey instruments.
 - When measurements are greater than the action level of the background average plus three sigma:
 - If the measurement is greater than the action level, check that the substrate you are measuring is the same as the substrate action level you are comparing your measurement to
 - Collect and record a static measurement,
 - If the static measurement is less than the action level, continue

surveying

- If the static measurement is greater than the action level, refer to FOLLOW-UP MEASUREMENTS procedure below

6. Data Recorder:

- Do not record multiple survey units on one **HPSPASurv-1** form.
 - Use one **HPSPASurv-1** form for each instrument
 - Watch for trip hazards for scanner as she/he is walking
 - Important: record units for all measurements
 - Record static measurements for each survey instrument on **HPSPASurv-1** forms, using additional sheets as necessary to complete the survey unit
 - Number each static measurement and mark location on map using the same number
 - For anomalous measurements, refer to FOLLOW-UP MEASUREMENTS procedure below
 - Record observations, resident comments and/or questions, and answers given
 - When survey unit scanning is complete: record end time
7. Scanner and Data Recorder sign **HPSPASurv-1** in the signature block at the bottom of the form, circle RHB or EMB, as applicable
8. When scanning the survey unit is finished:
- Sign, number, and date all documents: **HSPASurv-1, HSPASurv-3, HSPASurv-2**, if used
 - Retrieve any **HSPASurv-2** forms from Site Assistant/Tech
 - Assemble all survey unit documents into folder and give to Site Lead
 - Collect another survey unit assignment packet from Site Lead, as time permits

FOLLOW-UP MEASUREMENTS – SURVEY TEAM

Use form **HSPASurv-2** to record static measurements collected by CDPH staff and **ResSurv-5** for measurement placement. Minimum static measurements should include contact, 2” and 12” height at center point, and 6” and 12” from the center point in the four ordinal directions with the detector on contact with the **ResSurv-5** mat.

1. Mark location:
 - Use chalk sticks on cement
 - Use spray chalk on soil/vegetation only
2. Record location, description of follow-up measurement center point location, including dimensions from nearby structures or landmarks
3. Align the intersection of the green lines of **HSPASurv-5** directly over the point of greatest count rate measured, with the arrow pointing north
4. Photograph location of follow-up static measurement with **HSPASurv-5** in place.
5. Mark location of follow-up static measurement on map. Record measurements from nearby structures or landmarks using measuring tape
6. Collect static measurements and record on **HSPASurv-2**, using a different form for each survey instrument, adding additional measurements, as needed, and marking measurement locations on the diagram on **HSPASurv-2**
7. Notify Site Assistant/Tech and request measurement with Inspector 1000 or Falcon 5000
 - Site Assistant/Tech: Initial “Follow up” column on the given static measurement row



HUNTERS POINT PARCEL A-2 Gamma Walkover Survey Procedure

8. Scanner and Data Recorder sign **HPSPASurv-2** in the signature block at the bottom of the form, circle RHB or EMB, as applicable
9. Give **HSPASurv-2** forms to Site Assistant/Tech
10. Continue scanning the survey unit.

FOLLOW-UP MEASUREMENTS – SITE ASSISTANT/TECH

1. Initial **HPSPA Surv-1**
2. On reverse side of **HSPASurv-2**, record Inspector 1000 and/or Falcon 5000 file name(s) on **HSPASurv-2**, serial numbers, detector height
3. Collect and record Inspector 1000 measurements (microR/hr) in position 0 (zero) at contact, 2-inch and 12-inch heights
4. Record Inspector 1000 radionuclide identification results
 - If results list radionuclides of concern greater than background average plus three sigma, inform Site Lead and follow the NOTIFICATION PLAN below
5. Record file names using the FILE NAMING PROTOCOL below.
6. Record observations
7. Site Assistant/Tech sign **HPSPASurv-2** in the signature block at the bottom of the form
8. When completed, return the **HPSPASurv-2** form to the survey team responsible for that survey unit

NOTIFICATION PLAN

Upon discovery of a confirmed anomalous measurement

1. Provide telephone notification to RAU Chief and RHB Chief with details of anomaly.
 - Gonzalo Perez, RHB Branch Chief
 - Roger Lupo, RAU Chief
2. Send e-mail as soon as is practicable to RHB Branch Chief, with cc to Radioactive Materials Inspection, Compliance, and Enforcement (RAM ICE) Section Chief, and Radiological Assessment Unit Chief. This e-mail will contain the detailed information about what was found, when, where, and planned actions.
3. The RHB Branch Chief, or his designee will notify, RS&EM Division, by telephone and e-mail.
4. CDPH will also coordinate with the Navy to notify City of San Francisco officials.

CONTINGENCY PLAN

CDPH staff will implement the notification plan if gamma investigation confirms a measurement greater than the background average plus three sigma. The Navy will be requested to perform a radiological characterization of the anomalous area and determine their next steps in conjunction with CDPH.

REQUESTS FOR INFORMATION –

- Resident – refer person to Site Lead or Site Assistant and provide resident with EPA contact card
- Media – refer interested persons to CDPH Office of Public Affairs.



HUNTERS POINT PARCEL A-2 Gamma Walkover Survey Procedure

END OF SURVEY DAY

1. Survey Instruments:
 - Perform QA source check for survey instruments
 - Check in survey instruments
 - Plug instruments in for charging, as needed
2. Unfinished surveys:
 - Assemble forms in binder and place in “Unfinished Survey” file
3. Finished Surveys:
 - Check that each page is signed by the CDPH health physicists
 - Group forms by survey date and file by date
4. Group Debrief, give a brief verbal summary of:
 - Survey Units completed and unfinished survey units
 - Problems during surveying
 - Each static follow-up measurement made
5. Record/Form organization and time keeping:
 - Enter pertinent data in “HPS Parcel A-1 Survey Log” in binder.
 - Sign timekeeping log after group debrief and before leaving for the day

END OF SURVEY WEEK

1. Survey Instruments:
 - Perform QA source check for survey instruments
 - Check in survey instruments
2. Pack and load survey instruments
3. Unfinished surveys:
 - Assemble forms in binder and place in “Unfinished Survey” file
4. Finished Surveys:
 - Check that each page is signed by the CDPH health physicists
 - Group forms by survey date and file by date, place in “Finished Surveys” file
5. Group Debrief, give a brief verbal summary of:
 - Survey Units completed and unfinished survey units
 - Problems during surveying
 - Each static follow-up measurement made
6. Check-in CDPH supplied safety vests, safety glasses, and hard hats (remove sweatbands)
 - Site Lead or Site Assistant/Tech are responsible for laundering, or delegating laundering, vests and hardhat sweatbands and returning them to the office by 0730 the following Monday*
7. Record/Form organization and time keeping:
 - Enter pertinent data in “HPS Parcel A Survey Log” in binder.
 - Sign timekeeping log after group debrief and before leaving for the day



HUNTERS POINT PARCEL A-2 Gamma Walkover Survey Procedure

FORMS LIST

- HPSPASurv-1:** Gamma walkover data sheet
- HPSPASurv-2:** Static Measurement Follow-up
- HPSPASurv-3:** Action Level Calculation Worksheet
- HPSPASurv-4:** Equipment Inventory Checklist
- HPSPASurv-5:** RS 700 Survey Unit Field Log
- HPSPASurv-6:** Timekeeping and Equipment Log
- HPSPASurv-7:** RS 700 Field QA Log
- HPSPASurv-8:** Survey Equipment Log
- HPSPASurv-9:** Site Lead Job Action Sheet
- HPSPASurv-10:** Site Assistant/Tech Job Action Sheet
- HPSPASurv-11:** Survey Instrument Log
- RAU-2:** QA form for documenting thrice-daily QA checks for RHB equipment, use one sheet per instrument.
- ResSurv-5:** A large vinyl sheet marked with the measurement locations for follow-up static measurements.

FILE NAMING PROTOCOL

For electronic data files collected during the residential surveys, use the following naming protocol:

[Survey Unit Designation]_[YYYYMMDD]_[Static Measurement Number]_[Optional: Location, Bkgd]
Example; ICPA_20180709_ICP-1

Where ICPA is the designation for the Play area in Innes Court.



APPENDIX 2: HUNTERS POINT SHIPYARD PARCEL A SURVEY FORMS

HPSPASURV-1: GAMMA WALKOVER

HPSPASURV-2: STATIC MEASUREMENT FOLLOW-UP

HPSPASURV-3: ACTION LEVEL CALCULATION WORKSHEET

HPSPASURV-4: EQUIPMENT INVENTORY CHECKLIST

HPSPASURV-5: RS-700 SURVEY UNIT FIELD LOG

HPSPASURV-6: TIMEKEEPING AND EQUIPMENT LOG

HPSPASURV-7: RS-700 FIELD QA LOG

HPSPASURV-8: SURVEY EQUIPMENT LOG

HPSPASURV-9: SITE LEAD JOB ACTION SHEET

HPSPASURV-10: SITE ASSISTANT/TECH JOB ACTION SHEET

RAU-1: SURVEY INSTRUMENT LOG

RAU-2: SURVEY INSTRUMENT QA LOG



DATE _____

Survey Unit _____

Start Time: _____	End Time: _____	Survey Team Members: _____
Resident observed survey? Y / N		
Resident questions? Y / N		

Survey Instrument

Meter: <input type="checkbox"/> Ludlum 3 <input type="checkbox"/> Ludlum 19 <input type="checkbox"/> Ludlum 2220 <input type="checkbox"/> Ludlum 2221 <input type="checkbox"/> Other _____	Serial Number: Serial Number:	Calibration Date:
Detector: <input type="checkbox"/> None <input type="checkbox"/> Ludlum 44-9 <input type="checkbox"/> Ludlum 44-10 <input type="checkbox"/> Other _____		

Background Measurements

Perform calculations using calculator and **HPSPA Surv-3**

BACKGROUND ID# _____			BACKGROUND ID# _____			BACKGROUND ID# _____		
Count time: _____			Count time: _____			Count time: _____		
Units: <input type="checkbox"/> cpm <input type="checkbox"/> microR/hr								
Location(s): _____			Location(s): _____			Location(s): _____		
Material Description: _____			Material Description: _____			Material Description: _____		
	2" Height	12" Height		2" Height	12" Height		2" Height	12" Height
1			1			1		
2			2			2		
3			3			3		
4			4			4		
5			5			5		
Average: _____			Average: _____			Average: _____		
Std. Dev: _____			Std. Dev: _____			Std. Dev: _____		
Avg + 3σ: _____			Avg + 3σ: _____			Avg + 3σ: _____		
Calc. by: _____			Calc. by: _____			Calc. by: _____		
Date/time: _____			Date/time: _____			Date/time: _____		

Comments

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Action Level Calculation Worksheet

Survey Unit _____

SURVEY INSTRUMENT

Meter: <input type="checkbox"/> Ludlum 3 <input type="checkbox"/> Ludlum 19 <input type="checkbox"/> Ludlum 2220 <input type="checkbox"/> Ludlum 2221 <input type="checkbox"/> Other _____	Serial Number:	Calibration Date:
Detector: <input type="checkbox"/> None <input type="checkbox"/> Ludlum 44-9 <input type="checkbox"/> Ludlum 44-10 <input type="checkbox"/> Other _____	Serial Number:	
Height: <input type="checkbox"/> 2" <input type="checkbox"/> 12" <input type="checkbox"/> other _____	Count time: <input type="checkbox"/> N/A <input type="checkbox"/> 60 s <input type="checkbox"/> other _____	

STANDARD DEVIATION CALCULATIONS

$$\text{Standard Deviation} = \sigma = \sqrt{\frac{(x_1 - \bar{x})^2 + (x_2 - \bar{x})^2 + (x_3 - \bar{x})^2 + (x_4 - \bar{x})^2 + (x_5 - \bar{x})^2}{N-1}}$$

N = 5 measurements collected

Background ID# _____			
Average: _____		Height: <input type="checkbox"/> 2" <input type="checkbox"/> 12"	
<i>i</i>	Measurement x_i	Measurement – Average $(x_i - \bar{x})$	(Measurement – Average) ² $(x_i - \bar{x})^2$
1			
2			
3			
4			
5			
		<i>sum</i> = _____	
		<i>sum</i> ÷ 4 = _____	
		<i>sigma</i> = $\sigma = \sqrt{\text{sum} \div 4}$ = _____	
		3 × σ = _____	
BKG ID# _____		Action Level: <i>Average</i> + (3 × σ) = _____	

Record Action Level on HPSPASurv-1

OBSERVATIONS/NOTES

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HUNTERS POINT PARCEL A SURVEY

DATE _____

Background ID# _____			
Average:		Height: <input type="checkbox"/> 2" <input type="checkbox"/> 12"	
<i>i</i>	Measurement <i>x_i</i>	Measurement – Average $(x_i - \bar{x})$	(Measurement – Average) ² $(x_i - \bar{x})^2$
1			
2			
3			
4			
5			
<i>sum</i> =			
<i>sum</i> ÷ 4 =			
<i>sigma</i> = $\sigma = \sqrt{\text{sum} \div 4}$ =			
3 × σ =			
BKG ID# _____ Action Level: <i>Average</i> + (3 × σ) =			

Record Action Level on HPSPASurv-1

Background ID# _____			
Average:		Height: <input type="checkbox"/> 2" <input type="checkbox"/> 12"	
<i>i</i>	Measurement <i>x_i</i>	Measurement – Average $(x_i - \bar{x})$	(Measurement – Average) ² $(x_i - \bar{x})^2$
1			
2			
3			
4			
5			
<i>sum</i> =			
<i>sum</i> ÷ 4 =			
<i>sigma</i> = $\sigma = \sqrt{\text{sum} \div 4}$ =			
3 × σ =			
BKG ID# _____ Action Level: <i>Average</i> + (3 × σ) =			

Record Action Level on HPSPASurv-1



Survey Equipment

- Ludlum Model 2221 or Ludlum 2220 with Ludlum 44-10 detector, 6 sets
- Ludlum 19, 6 each
- ResSurv-5, vinyl mat
- Direct-read dosimeters, 2 each
 - Spare batteries, 1 box
- RS 700 System
 - 7 of 7 components
 - Batteries
 - Marine
 - Medium blue
 - Straps, for binding detectors to trailer
 - Trailer keys
 - Mule keys
 - Mule
 - Fuel can
 - Tarp, for shading instruments
 - Bungee cords
 - Inverter
- Falcon 5000 HPGe
 - Computer
 - Batteries, charged
- Inspector 1000, 2 each
 - Batteries, charged
- Camera, 2 each
 - Batteries, charged
 - Battery charger
 - Photo log booklet
- Check sources
 - Uncalibrated Cs-137
 - Inspector 1000 check source
 - Falcon 5000 check source
- Box of office supplies
- Calculators
- Storage clipboards
- Tape measure
- Measuring wheel
- Chalk sticks
- Spray chalk cans
- _____
- _____

Safety and PPE

- CDPH Safety Vest
- Safety glasses
- First Aid kit
- Water dispenser
- Hand washing towelettes
- Cooler(s)
- Bottled Water
- _____
- _____

Record Keeping

- CDPH 2444 Mandatory Health and Safety Checklist for Field Personnel
- File box
 - [RAU-2](#): one per survey instrument
 - HPSPA Survey Log binder
 - HPSPASurv-1 (QA and Residential Survey Observation)
 - HPSPASurv-2 (Follow-up Measurement)
 - HPSPASurv-3 (Action Level calculation Worksheet)
 - HPSPASurv-Procedure (one copy per staff)
 - HPSPASurv-Check List
 - Direct Read Dosimeter Log
 - Time keeping/equipment check-out
 - PRA hand-out cards
 - File folders
- _____
- _____
- _____



**HUNTERS POINT PARCEL A SURVEY
RS 700 SURVEY UNIT FIELD LOG**

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**HUNTERS POINT PARCEL A SURVEY
TIMEKEEPING AND EQUIPMENT LOG
WEEK _____**

For "Time In" and "Time Out", please initial box and enter time in military form (example, 2:00 p.m. = 1400)
Use this log for non-surveying visitors, also.

Name (print name)	MONDAY			TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		
	Time in	Time out	PPE Check out	Time in	Time out	Time in	Time out	Time in	Time out	Time in	Time out	PPE Check in
			<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses									<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses
			<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses									<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses
			<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses									<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses
			<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses									<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses
			<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses									<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses
			<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses									<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses
			<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses									<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses
			<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses									<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses
			<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses									<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses
			<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses									<input type="checkbox"/> vest <input type="checkbox"/> hard hat <input type="checkbox"/> glasses



HUNTERS POINT PARCEL A SURVEY
TIMEKEEPING AND EQUIPMENT LOG
WEEK _____

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**HUNTERS POINT PARCEL A SURVEY
RS 700 QA FIELD LOG**

Survey Location: _____
Source: _____
S/N or ID: _____
Source Position: _____

Survey Dates: _____
Source Activity: _____
Source Activity Date: _____

FILE NAMING:

Source: **[Location]_QA_(Date)_(Cs-137, ra-226, etc.)-(am, noon, or pm)**
 No Source: **[Location]_QA_(Date)_NS-(am, noon, or pm)**

Date:	File Name:	NS	Source	Start time:	End Time:	GPS:	Surveyor: (initial)
						Long: Lat:	
						Long: Lat:	
						Long: Lat:	
						Long: Lat:	
						Long: Lat:	
						Long: Lat:	
						Long: Lat:	
						Long: Lat:	
						Long: Lat:	
						Long: Lat:	
						Long: Lat:	
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						Long: Lat:	
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						Long: Lat:	
						Long: Lat:	
						Long: Lat:	
						Long: Lat:	
						Long: Lat:	



**HUNTERS POINT PARCEL A SURVEY
RS 700 QA FIELD LOG**

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**HUNTERS POINT PARCEL A SURVEY
SURVEY EQUIPMENT LOG**

Please print all information

Names	Date	Check out	Check in	Meter	Serial Number	Detector	Serial Number	Broken
				<input type="checkbox"/> Ludlum 3 <input type="checkbox"/> Ludlum 19 <input type="checkbox"/> Ludlum 2220 <input type="checkbox"/> Ludlum 2221 <input type="checkbox"/> Other _____ :		<input type="checkbox"/> None <input type="checkbox"/> Ludlum 44-9 <input type="checkbox"/> Ludlum 44-10 <input type="checkbox"/> Other _____		
				<input type="checkbox"/> Ludlum 3 <input type="checkbox"/> Ludlum 19 <input type="checkbox"/> Ludlum 2220 <input type="checkbox"/> Ludlum 2221 <input type="checkbox"/> Other _____ :		<input type="checkbox"/> None <input type="checkbox"/> Ludlum 44-9 <input type="checkbox"/> Ludlum 44-10 <input type="checkbox"/> Other _____		
				<input type="checkbox"/> Ludlum 3 <input type="checkbox"/> Ludlum 19 <input type="checkbox"/> Ludlum 2220 <input type="checkbox"/> Ludlum 2221 <input type="checkbox"/> Other _____ :		<input type="checkbox"/> None <input type="checkbox"/> Ludlum 44-9 <input type="checkbox"/> Ludlum 44-10 <input type="checkbox"/> Other _____		
				<input type="checkbox"/> Ludlum 3 <input type="checkbox"/> Ludlum 19 <input type="checkbox"/> Ludlum 2220 <input type="checkbox"/> Ludlum 2221 <input type="checkbox"/> Other _____ :		<input type="checkbox"/> None <input type="checkbox"/> Ludlum 44-9 <input type="checkbox"/> Ludlum 44-10 <input type="checkbox"/> Other _____		
				<input type="checkbox"/> Ludlum 3 <input type="checkbox"/> Ludlum 19 <input type="checkbox"/> Ludlum 2220 <input type="checkbox"/> Ludlum 2221 <input type="checkbox"/> Other _____ :		<input type="checkbox"/> None <input type="checkbox"/> Ludlum 44-9 <input type="checkbox"/> Ludlum 44-10 <input type="checkbox"/> Other _____		
				<input type="checkbox"/> Ludlum 3 <input type="checkbox"/> Ludlum 19 <input type="checkbox"/> Ludlum 2220 <input type="checkbox"/> Ludlum 2221 <input type="checkbox"/> Other _____ :		<input type="checkbox"/> None <input type="checkbox"/> Ludlum 44-9 <input type="checkbox"/> Ludlum 44-10 <input type="checkbox"/> Other _____		
				<input type="checkbox"/> Ludlum 3 <input type="checkbox"/> Ludlum 19 <input type="checkbox"/> Ludlum 2220 <input type="checkbox"/> Ludlum 2221 <input type="checkbox"/> Other _____ :		<input type="checkbox"/> None <input type="checkbox"/> Ludlum 44-9 <input type="checkbox"/> Ludlum 44-10 <input type="checkbox"/> Other _____		
				<input type="checkbox"/> Ludlum 3 <input type="checkbox"/> Ludlum 19 <input type="checkbox"/> Ludlum 2220 <input type="checkbox"/> Ludlum 2221 <input type="checkbox"/> Other _____ :		<input type="checkbox"/> None <input type="checkbox"/> Ludlum 44-9 <input type="checkbox"/> Ludlum 44-10 <input type="checkbox"/> Other _____		
				<input type="checkbox"/> Ludlum 3 <input type="checkbox"/> Ludlum 19 <input type="checkbox"/> Ludlum 2220 <input type="checkbox"/> Ludlum 2221 <input type="checkbox"/> Other _____ :		<input type="checkbox"/> None <input type="checkbox"/> Ludlum 44-9 <input type="checkbox"/> Ludlum 44-10 <input type="checkbox"/> Other _____		
				<input type="checkbox"/> Ludlum 3 <input type="checkbox"/> Ludlum 19 <input type="checkbox"/> Ludlum 2220 <input type="checkbox"/> Ludlum 2221 <input type="checkbox"/> Other _____ :		<input type="checkbox"/> None <input type="checkbox"/> Ludlum 44-9 <input type="checkbox"/> Ludlum 44-10 <input type="checkbox"/> Other _____		



**HUNTERS POINT PARCEL A SURVEY
SURVEY EQUIPMENT LOG**

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**HUNTERS POINT PARCEL A SURVEY
SITE LEAD JOB ACTION SHEET
WEEK _____**

NAME _____ (PRINT)

RHB Contact Numbers (report injuries, violence, and confirmed investigation locations)

Roger Lupo (916) 440-7955 desk
(916) 806-4923 mobile

Gonzalo Perez (916) 440-7942 desk

Task List

Tasks are not limited to those below. The chart is for ease of record keeping, noting tasks completed on reverse. Survey team inspections are an ongoing task and are not listed.

TASKS (initial/check when completed)	Begin Week	Mon	Tues	Wed	Thur	Fri	End of Week
Acquire water before arriving on site							
At HQ:							
<input type="checkbox"/> Load and organize survey forms and procedures							
<input type="checkbox"/> Load incomplete survey data sheets							
<input type="checkbox"/> Load survey instruments and supplies							
High Temperature Forecast (check and record each morning)		____ °F					
Timekeeping (HPSPASurv-6), ensure all staff and visitors sign in							
<input type="checkbox"/> Distribute State-issued PPE							
Safety Briefing (0730-0800)							
<input type="checkbox"/> Discuss hazards- slip/trip/fall, heat injuries, hydration, PPE		<input type="checkbox"/>					
<input type="checkbox"/> Ensure staff and visitors complete and sign CDPH 2444							
<input type="checkbox"/> Restroom facility locations		<input type="checkbox"/>					
<input type="checkbox"/> Review water access procedure		<input type="checkbox"/>					
<input type="checkbox"/> Discuss issues from previous days		<input type="checkbox"/>					
<input type="checkbox"/> Distribute survey assignments		<input type="checkbox"/>					
Water supply check (1130-1200)							
Water distribution – hourly when T ≥ 85°F							
End-of-Day Debrief (1530-1600)							
<input type="checkbox"/> Discuss issues/problems		<input type="checkbox"/>					
<input type="checkbox"/> Timekeeping, ensure staff sign out		<input type="checkbox"/>					
<input type="checkbox"/> Water supply check for next day		<input type="checkbox"/>					
<input type="checkbox"/> Collect and file completed survey packets							
<input type="checkbox"/> Collect and file incomplete survey packets		<input type="checkbox"/>					

Continued Next Page



**HUNTERS POINT PARCEL A SURVEY
SITE ASSISTANT/TECH JOB ACTION SHEET
WEEK _____**

NAME _____ (PRINT)

RHB Contact Numbers (report injuries, violence, and confirmed investigation locations)

Roger Lupo (916) 440-7955 desk
(916) 806-4923 mobile

Gonzalo Perez (916) 440-7942 desk

Task List

Tasks are not limited to those below. The chart is for ease of record keeping, noting tasks completed on reverse. Survey team inspections are an ongoing task and are not listed.

TASKS (initial/check when completed or N/A)	Begin Week	Mon	Tues	Wed	Thur	Fri	End of Week
At HQ: Load survey instruments and supplies for week with Site Lead							
<input type="checkbox"/> Record supplies on HPSPA-4							
<input type="checkbox"/> Record instrument inventory on HPSPA Surv-11							
Safety Briefing (0730-0800)							
<input type="checkbox"/> Check out survey meters HPSPASurv-8		<input type="checkbox"/>					
<input type="checkbox"/> Supervise AM QA by staff RAU-2		<input type="checkbox"/>					
Water supply check (1130-1200)							
Water distribution – hourly when T ≥ 85°F							
Supervise Noon QA (1200-1230)							
End-of-Day Debrief (1530-1600)							
<input type="checkbox"/> Supervise PM QA by staff		<input type="checkbox"/>					
<input type="checkbox"/> Survey Instrument Check In		<input type="checkbox"/>					
<input type="checkbox"/> Check instruments are turned off		<input type="checkbox"/>					
Charge batteries							
<input type="checkbox"/> Cameras		<input type="checkbox"/>					
<input type="checkbox"/> Inspector 1000		<input type="checkbox"/>					
<input type="checkbox"/> Falcon 5000		<input type="checkbox"/>					
Maintain QA records							
Report broken equipment:							
<input type="checkbox"/> Site Lead		<input type="checkbox"/>					
<input type="checkbox"/> Roger Lupo							
End of Week:							
<input type="checkbox"/> Pack and load equipment							
<input type="checkbox"/> Confirm inventory on HPSPA Surv-11							
<input type="checkbox"/> Return equipment to HQ							
At HQ:							
<input type="checkbox"/> Refresh supply of batteries and other consumables		<input type="checkbox"/>					
<input type="checkbox"/> Plug in Falcon 5000		<input type="checkbox"/>					
<input type="checkbox"/> Store equipment/supplies at HQ		<input type="checkbox"/>					
<input type="checkbox"/> Assemble equipment and supplies for next survey week		<input type="checkbox"/>					



**HUNTERS POINT PARCEL A SURVEY
SURVEY INSTRUMENT LOG
WEEK _____**

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