DATE: July 3, 2018

TO: Anthony Chu, Chief
Division of Radiation Safety and Environmental Management
California Department of Public Health

FROM: Gonzalo L. Perez, Chief
Radiologic Health Branch
California Department of Public Health

SUBJECT: Hunters Point Shipyard Parcel A-1
Health and Safety Survey

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California Department of Public Health

Division of Food, Drug and Radiation Safety
Radiologic Health Branch
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HUNTERS POINT SHIPYARD, PARCEL A-1
HEALTH AND SAFETY SURVEY WORK PLAN

Survey Dates: July 16 through Fall 2018

PREPARED BY: VICTORIA BRANDT	DATE
REVIEWER: ROGER K. LUPO	DATE
APPROVER: GONZALO PEREZ	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.

Contents

Hunters Point Shipyard, Parcel A-1, 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) perform a phased approach radiological survey to assess the health and safety of the public and the environment in Parcel A.

Figure 1 Hunters Point Shipyard, from Navy website

CDPH staff will perform an investigation survey in Parcel A-1. This CDPH survey is limited to investigating ionizing radiation. CDPH has regulatory authorities and recognized expertise in the area of radiological health. The Environmental Management Branch and the Radiologic Health Branch have been serving as radiological contamination remediation consultants for the Department of Toxics Substances Control (DTSC).

LOCATION

Former Naval Shipyard Hunters Point, Parcel A, San Francisco, California, covers approximately 75 acres, and has been subdivided into Parcel A-1 and Parcel A-2. Parcel A-1 has since been developed for residential use, including sculpting of the hilltop prior to building townhomes and condominiums. Some parts of Parcel A-1 are currently under construction or are planned for future construction. Parcel A was transferred from Navy possession to the City of San Francisco in 2004. See Figure 1[1] for location of Parcel A. At this time, the area labeled

Figure 2 Aerial view of Parcel A-1

[1] https://bracpmo.navy.mil/brac_bases/california/former_shipyard_hunters_point/hpns_parcels.html; access date: May 18, 2018

as Parcel A-2 in Figure 1 is currently impassible.

The topography of Parcel A-1 includes extremely steep slopes, which are considered impassable to the public. Surveying these steep slopes would require specialized equipment that CDPH Radiological Health Branch (RHB) does not own. The green line approximates the border of Parcel A-1, see Figure 2[2].

In the areas, which have already been developed into housing, CDPH will perform a radiation survey of the publicly accessible area of Parcel A-1 to assess the radiological health and safety of the public and the environment. Surveying residential units is beyond the scope of this survey.

SURVEY SCOPE

This will be a radiation survey of publicly accessible areas to assess the radiological health and safety of the public and the environment. This radiological survey is limited to outdoor, publicly accessible areas. Radiological survey of the ground floors of residences and businesses is beyond the scope of this survey. Extensive soil sampling and scanning soils and vegetation for pure alpha and pure beta emitters is beyond the scope of this survey. This gamma survey will be supplemented by additional investigations depending on survey results. *This is not a MARSSIM[3] survey because MARSSIM statistics do not apply to discrete radioactive sources or to radioactive materials in soils at depths greater than six inches.*

The CDPH is performing this health and safety survey to ensure that residents of Parcel A-1 are not exposed to unsafe levels of radiation above background.

SURVEY GOALS

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

- Background locations and materials suitable to the site conditions to be determined at the start of the Parcel A-1 survey.
- Gamma walkover survey of soil, vegetated and hardscaped areas around existing buildings and in publicly accessible areas using 2” by 2” scintillation detectors
- Using the Radiation Solutions RS-700 gamma mapping system with GPS, perform gamma scan of roads, sidewalks, other accessible hardscaped areas, and accessible areas where vegetation is absent or less than four inches in height

[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: May 23, 2018
[3] Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575

- 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 the background average plus three sigma is found, the following investigation confirming the measurements will be collected before initiating the Notification Plan:

1. Anomalous Measurement Confirmation – Perform static one-minute counts at 4-inch, 12-inch heights centered on highest count rate point, using 2" by 2" scintillation detector; record measurements, location, date and time.
2. 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. Surveyor will durably mark the location and initiate the Notification Plan.

SURVEY ORGANIZATION

RHB staff will be performing the following tasks:

- Gamma Walkover survey
  - Teams of two staff each will perform a walking radiological scanning survey on Parcel A-1 using 2"x2" NaI(Tl) 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. See Appendix 1 Gamma Walkover Survey Procedure
- RS 700 Gamma Scan Survey w/ GPS
  - Radiological Assessment Unit (RAU) will use the RS-700 towed gamma scan array to map in the streets and flat accessible grounds. This gamma mapping may be occurring concurrently with the walkover survey, as the street closure schedule permits.
  - Data from the RS 700 must be analyzed and mapped to present it in a meaningful form
  - RAU will use the following procedures on the usage of the RS-700 system;
    - Radiation Solutions RS 700 Gamma Mapping Overview
    - Radiation Solutions RS 700 Procedure
    - Technical Basis Document, RS 701 Radiation Mapping System
- 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 teams, two staff each

- 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, providing water, shade breaks and notifications.

NOTIFICATION PLAN

Upon discovery of a confirmed anomalous measurement

1. Provide telephone notification to RHB Chief with details of anomaly.
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.

APPENDIX 1: GAMMA WALKOVER SURVEY PROCEDURE

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

<table>
<tr><th></th><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th></tr>
<tr><td>0730-0800</td><td rowspan="2">Travel</td><td colspan="3">Briefing, Instrument QA Check</td><td rowspan="2"></td></tr>
<tr><td>0830-1130</td><td colspan="3">Survey</td></tr>
<tr><td>1130-1200</td><td colspan="4">Lunch Break</td><td>QA Check</td></tr>
<tr><td>1200-1230</td><td colspan="4">Briefing, Instrument QA Check</td><td>Lunch</td></tr>
<tr><td>1230-1530</td><td colspan="4">Survey</td><td rowspan="2">Travel</td></tr>
<tr><td>1530-1600</td><td colspan="4">Debrief, Instrument QA Check</td></tr>
</table>

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

employee request, shade breaks greater than 5 minutes

- Temperatures between 85° and 95° Fahrenheit – up to 1 quart water per person per hour
- Temperature ≥95° 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” NaI 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” NaI 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

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.

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

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: HPSPASURV 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

HPSPASURV-11: SURVEY INSTRUMENT LOG

RAU-2: SURVEY INSTRUMENT QA LOG

Survey Unit Number _____

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

Survey Instrument

Meter:	☐ Ludlum 3 ☐ Ludlum 19 ☐ Ludlum 2220 ☐ Ludlum 2221 ☐ Other _____	**Serial Number:**	**Calibration Date:**
Detector:	☐ None ☐ Ludlum 44-9 ☐ Ludlum 44-10 ☐ Other _____	**Serial Number:**	

Background Measurements

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

BACKGROUND #1			**BACKGROUND #2**			**BACKGROUND #3**		
Count time:			Count time:			Count time:		
Units: ☐ cpm ☐ microR/hr								
Location:			Location:			Location:		
☐ Asphalt ☐ Cement ☐ Soil ☐ Plants ☐ Rocks			☐ Asphalt ☐ Cement ☐ Soil ☐ Plants ☐ Rocks			☐ Asphalt ☐ Cement ☐ Soil ☐ Plants ☐ Rocks		
	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

California Department of Public Health
CDPH

HUNTERS POINT PARCEL A SURVEY

DATE_________________________

Instrument Specific/Survey Unit Specific Action Levels

Meter: ☐ Ludlum 3 ☐ Ludlum 19 ☐ Ludlum 2220 ☐ Ludlum 2221 ☐ Other ________________

_______________ ☐Asphalt ☐Cement ☐Soil ☐Plants ☐Gravel ☐Other_________________
2” Average + 3σ

_______________ ☐Asphalt ☐Cement ☐Soil ☐Plants ☐Gravel ☐Other_________________
2” Average + 3σ

_______________ ☐Asphalt ☐Cement ☐Soil ☐Plants ☐Gravel ☐Other_________________
2” Average + 3σ

Static Measurements

No.	Flag	Measurement (☐ cpm ☐ uR/hr)	Location Description	Substrate	Follow up (initial)
	☐			☐ Asphalt ☐ Cement ☐ Soil ☐ Plants ☐ Gravel	
	☐			☐ Asphalt ☐ Cement ☐ Soil ☐ Plants ☐ Gravel	
	☐			☐ Asphalt ☐ Cement ☐ Soil ☐ Plants ☐ Gravel	
	☐			☐ Asphalt ☐ Cement ☐ Soil ☐ Plants ☐ Gravel	
	☐			☐ Asphalt ☐ Cement ☐ Soil ☐ Plants ☐ Gravel	
	☐			☐ Asphalt ☐ Cement ☐ Soil ☐ Plants ☐ Gravel	
	☐			☐ Asphalt ☐ Cement ☐ Soil ☐ Plants ☐ Gravel	
	☐			☐ Asphalt ☐ Cement ☐ Soil ☐ Plants ☐ Gravel	
	☐			☐ Asphalt ☐ Cement ☐ Soil ☐ Plants ☐ Gravel	
	☐			☐ Asphalt ☐ Cement ☐ Soil ☐ Plants ☐ Gravel	
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	☐			☐ Asphalt ☐ Cement ☐ Soil ☐ Plants ☐ Gravel	
	☐			☐ Asphalt ☐ Cement ☐ Soil ☐ Plants ☐ Gravel	
	☐			☐ Asphalt ☐ Cement ☐ Soil ☐ Plants ☐ Gravel	
	☐			☐ Asphalt ☐ Cement ☐ Soil ☐ Plants ☐ Gravel	

Sign_________________________
RHB/EMBHealth Physicist

Sign_________________________
RHB/EMB Health Physicist

Static Measurement Follow-up

SURVEY INSTRUMENT

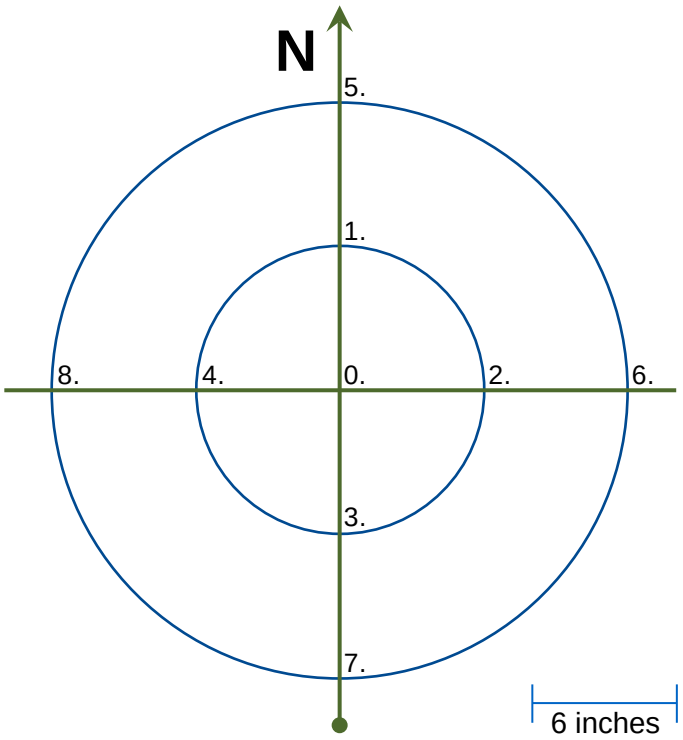
Meter:	☐ Ludlum 3 ☐ Ludlum 19 ☐ Ludlum 2220 ☐ Ludlum 2221 ☐ Other _____	**Serial Number:**	**Calibration Date:**
Detector:	☐ None ☐ Ludlum 44-9 ☐ Ludlum 44-10 ☐ Other _____	**Serial Number:**	

SURVEY UNIT _____ **STATIC MEASUREMENT DESIGNATION:**_____

Start time:	End Time:	Survey Team Members: _____
Resident observed survey? Y / N		
Center location description:		
Photo number:		

STATIC MEASUREMENTS – NAI DETECTOR[1]

	MEASUREMENT HEIGHT		
	CONTACT	2 INCHES	12 INCHES
0.			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
___			
___			
___			
___			
___			
Bkgd			



[1] Required measurements = green and white cells. Optional measurements = grey cells.

OBSERVATIONS:

Sign_____
RHB/EMBHealth Physicist

Sign_____
RHB/EMB Health Physicist

Gamma Spectroscopy Follow-up

Start time:	End Time:	Resident observed survey? Y / N

Falcon 5000 file name:			
Detector height:		Count Time:	
Photo Number:			

Inspector 1000 Serial Number:		LaBr Detector Serial Number:	
Inspector 1000 file name:			
Detector height:		Count Time:	
Photo Number:			

INSPECTOR 1000 DATA

POSITION	MEASUREMENT HEIGHT (MICROR/HR)			RADIONUCLIDES IDENTIFIED
	CONTACT	2-INCH	12-INCH	
0.				

OBSERVATIONS/NOTES

Action Level Calculation Worksheet

Survey Unit _____

SURVEY INSTRUMENT

Meter:	☐ Ludlum 3 ☐ Ludlum 19 ☐ Ludlum 2220 ☐ Ludlum 2221 ☐ Other _____	**Serial Number:**	**Calibration Date:**
Detector:	☒ None ☒ Ludlum 44-9 ☐ Ludlum 44-10 ☒ Other _____	**Serial Number:**	
Height:	☐ 2" ☐ 12" ☐ other_____	**Count time:** ☐ N/A ☐ 60 s ☐ other_____	

STANDARD DEVIATION CALCULATIONS

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

N = 5 measurements collected

Background #1			☐ Asphalt ☐ Cement ☐ Soil ☒ Plants ☒ Rocks
Average:		**Height:** ☐ 2" ☐ 12"	
i	Measurement x_i	Measurement – Average $(x_i - \overline{x})$	(Measurement – Average)^2 $(x_i - \overline{x})^2$
1			
2			
3			
4			
5			
		$sum =$	
		$sum \div 4 =$	
		$sigma = \sigma = \sqrt{sum \div 4} =$	
		$3 \times \sigma =$	
Background #1 Action Level:		$Average + (3 \times \sigma) =$	

Record Action Level on HPSPASurv-1

OBSERVATIONS/NOTES

.....

.....

.....

.....

.....

Sign_____
Calculated by

Sign_____
Calculation checked by

Background #2			☐ Asphalt ☐ Cement ☐ Soil ☐ Plants ☐ Rocks
Average:		**Height:** ☐ 2" ☐ 12"	
i	Measurement x_i	Measurement – Average $(x_i - \overline{x})$	(Measurement – Average)^2 $(x_i - \overline{x})^2$
1			
2			
3			
4			
5			
		$sum =$	
		$sum \div 4 =$	
		$sigma = \sigma = \sqrt{sum \div 4} =$	
		$3 \times \sigma =$	
Background #2 Action Level:		$Average + (3 \times \sigma) =$	

Record Action Level on HPSPASurv-1

Background #3			☐ Asphalt ☐ Cement ☐ Soil ☐ Plants ☐ Rocks
Average:		**Height:** ☐ 2" ☐ 12"	
i	Measurement x_i	Measurement – Average $(x_i - \overline{x})$	(Measurement – Average)^2 $(x_i - \overline{x})^2$
1			
2			
3			
4			
5			
		$sum =$	
		$sum \div 4 =$	
		$sigma = \sigma = \sqrt{sum \div 4} =$	
		$3 \times \sigma =$	
Background #3 Action Level:		$Average + (3 \times \sigma) =$	

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
- ☐ _____
- ☐ _____
- ☐ _____

NOTES

HUNTERS POINT PARCEL A SURVEY
RS 700 SURVEY UNIT FIELD LOG

SURVEY LOCATION: ☐ Parcel A-1 ☐ Parcel A-2

Survey Unit	Survey Date	File Name	Surveyors	Extra File(s)
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐

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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.

	MONDAY			**TUESDAY**		**WEDNESDAY**		**THURSDAY**		**FRIDAY**		
Name (print name)	**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
			☐ vest ☐ hard hat ☐ glasses									☐ vest ☐ hard hat ☐ glasses
			☐ vest ☐ hard hat ☐ glasses									☐ vest ☐ hard hat ☐ glasses
			☐ vest ☐ hard hat ☐ glasses									☐ vest ☐ hard hat ☐ glasses
			☐ vest ☐ hard hat ☐ glasses									☐ vest ☐ hard hat ☐ glasses
			☐ vest ☐ hard hat ☐ glasses									☐ vest ☐ hard hat ☐ glasses
			☐ vest ☐ hard hat ☐ glasses									☐ vest ☐ hard hat ☐ glasses
			☐ vest ☐ hard hat ☐ glasses									☐ vest ☐ hard hat ☐ glasses
			☐ vest ☐ hard hat ☐ glasses									☐ vest ☐ hard hat ☐ glasses
			☐ vest ☐ hard hat ☐ glasses									☐ vest ☐ hard hat ☐ glasses
			☐ vest ☐ hard hat ☐ glasses									☐ vest ☐ hard hat ☐ glasses

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Survey Location: _____ **Survey Dates:** _____

Source: _____ **Source Activity:** _____

S/N or ID: _____ **Source Activity Date:** _____

Source Position: _____

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:	
					Long: Lat:	
					Long: Lat:	
					Long: Lat:	
					Long: Lat:	

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Please print all information

Names	Date	Check out	Check in	Meter	Serial Number	Detector	Serial Number	Broken
				☐ Ludlum 3 ☐ Ludlum 19 ☐ Ludlum 2220 ☐ Ludlum 2221 ☐ Other ______________	:	☐ None ☐ Ludlum 44-9 ☐ Ludlum 44-10 ☐ Other ______________		
				☐ Ludlum 3 ☐ Ludlum 19 ☐ Ludlum 2220 ☐ Ludlum 2221 ☐ Other ______________	:	☐ None ☐ Ludlum 44-9 ☐ Ludlum 44-10 ☐ Other ______________		
				☐ Ludlum 3 ☐ Ludlum 19 ☐ Ludlum 2220 ☐ Ludlum 2221 ☐ Other ______________	:	☐ None ☐ Ludlum 44-9 ☐ Ludlum 44-10 ☐ Other ______________		
				☐ Ludlum 3 ☐ Ludlum 19 ☐ Ludlum 2220 ☐ Ludlum 2221 ☐ Other ______________	:	☐ None ☐ Ludlum 44-9 ☐ Ludlum 44-10 ☐ Other ______________		
				☐ Ludlum 3 ☐ Ludlum 19 ☐ Ludlum 2220 ☐ Ludlum 2221 ☐ Other ______________	:	☐ None ☐ Ludlum 44-9 ☐ Ludlum 44-10 ☐ Other ______________		
				☐ Ludlum 3 ☐ Ludlum 19 ☐ Ludlum 2220 ☐ Ludlum 2221 ☐ Other ______________	:	☐ None ☐ Ludlum 44-9 ☐ Ludlum 44-10 ☐ Other ______________		
				☐ Ludlum 3 ☐ Ludlum 19 ☐ Ludlum 2220 ☐ Ludlum 2221 ☐ Other ______________	:	☐ None ☐ Ludlum 44-9 ☐ Ludlum 44-10 ☐ Other ______________		
				☐ Ludlum 3 ☐ Ludlum 19 ☐ Ludlum 2220 ☐ Ludlum 2221 ☐ Other ______________	:	☐ None ☐ Ludlum 44-9 ☐ Ludlum 44-10 ☐ Other ______________		
				☐ Ludlum 3 ☐ Ludlum 19 ☐ Ludlum 2220 ☐ Ludlum 2221 ☐ Other ______________	:	☐ None ☐ Ludlum 44-9 ☐ Ludlum 44-10 ☐ Other ______________		
				☐ Ludlum 3 ☐ Ludlum 19 ☐ Ludlum 2220 ☐ Ludlum 2221 ☐ Other ______________	:	☐ None ☐ Ludlum 44-9 ☐ Ludlum 44-10 ☐ Other ______________		

Sign___________________________
Site Assistant/Tech

Page ____ of ____

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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 **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:							
☐ Load and organize survey forms and procedures							
☐ Load incomplete survey data sheets							
☐ Load survey instruments and supplies							
High Temperature Forecast (check and record each morning)		____°F	____°F	____°F	____°F	____°F	
Timekeeping (**HPSPASurv-6**), ensure all staff and visitors sign in							
☐ Distribute State-issued PPE							
Safety Briefing (0730-0800)							
☐ Discuss hazards- slip/trip/fall, heat injuries, hydration, PPE		☐	☐	☐	☐	☐	
☐ Ensure staff and visitors complete and sign **CDPH 2444**							
☐ Restroom facility locations		☐	☐	☐	☐	☐	
☐ Review water access procedure		☐	☐	☐	☐	☐	
☐ Discuss issues from previous days		☐	☐	☐	☐	☐	
☐ Distribute survey assignments		☐	☐	☐	☐	☐	
Water supply check (1130-1200)							
Water distribution – hourly when T≥ 85°F							
End-of-Day Debrief (1530-1600)							
☐ Discuss issues/problems		☐	☐	☐	☐	☐	
☐ Timekeeping, ensure staff sign out		☐	☐	☐	☐	☐	
☐ Water supply check for next day		☐	☐	☐	☐	☐	
☐ Collect and file completed survey packets							
☐ Collect and file incomplete survey packets		☐	☐	☐	☐	☐	

Continued Next Page

HUNTERS POINT PARCEL A SURVEY
SITE LEAD JOB ACTION SHEET
WEEK_____

TASKS (initial/check when completed)	Begin Week	Mon	Tues	Wed	Thur	Fri	End of Week
Completed survey packets:							
☐ Check for completeness		☐	☐	☐	☐	☐	
☐ Check for signatures		☐	☐	☐	☐	☐	
☐ Log and file completed surveys		☐	☐	☐	☐	☐	
☐ Email status report to R. Lupo							
End of Week:							
☐ Collect State-issued PPE							
☐ Launder vests and sweatbands							
☐ Pack, load supplies for next week							
☐ Return supplies/equipment to HQ							
☐ Replenish survey forms supply							
☐ Return laundered PPE to HQ							

NOTES:

ADDITIONAL PAGES ATTACHED: ☐ **YES** ☐ **NO** _____ (Initial)

Sign_____
Site Lead Health Physicist

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

NOTES:

ADDITIONAL PAGES ATTACHED: ☐ **YES** ☐ **NO** _____ (Initial)

HUNTERS POINT PARCEL A SURVEY
SURVEY INSTRUMENT LOG
WEEK____________________

SITE LEAD: ____________________________ **DATE:** ____________________________________

Instrument Log

HQ: Check out	Survey Meter			Detector			Calibration Date	HQ: Check in
	Mfg.	Model	Serial Number	Mfg.	Model	Serial Number		
☐								☐
☐								☐
☐								☐
☐								☐
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Page ____ of ____

Sign____________________________
Site Assistant/Tech Health Physicist

Sign____________________________
Site Lead Health Physicist

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Sign_____
Site Assistant/Tech Health Physicist

Sign_____
Site Lead Health Physicist

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH
RADIOLOGIC HEALTH BRANCH
1500 Capitol Avenue, Sacramento, CA

Instrumentation QA/QC Log

Meter:	Mfg.	Model:	Serial #	Calibration Date:
Detector:	Mfg.	Model:	Serial #	Due Date:

NIST TRACEABLE SOURCES

	Isotope	Serial #	Cert. Date	Activity	Units	DPM
1						
2						
3						

Measurement Standards and test equipment used are traceable to the National Institute of Standards and Technology or to Physikalisch-Technische Bundesanstalt (PTE), to the extent allowed by the Institute's calibration facilities.

INSTRUMENTATION QA/QC LOG

Date	Initials	Voltage (V)	Background	Source	Source	Source
		Battery	Location	Activity on Date	Activity on Date	Activity on Date