



Forensic Audit Technical Memorandum

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TABLE OF CONTENTS

1.0	Introduction and Background.....	1
1.1	Site Description	2
1.1.1	Keller Canyon Landfill	2
1.1.2	Former Hunters Point Naval Shipyard	2
1.2	Background of Fraudulent Activities	3
2.0	Forensic Audit.....	3
2.1	Exhibits.....	4
2.2	Review of Documents and Logs	4
2.3	Site Visits	5
2.3.1	Former Hunters Point.....	5
2.3.2	Keller Canyon Landfill	5
3.0	Findings.....	5
4.0	Conclusions and Recommendations.....	6
5.0	Proposed Sampling Scope	6
6.0	References	6
	TABLES	8



TABLES

Table 1: Forensic Audit Tracking Log

APPENDICES

Appendix A: List of Special Wastes



ACRONYM LIST

BRAC	Base Realignment and Closure
CA	California
EHD	Environmental Health Division of the Contra Costa County Health Services Department
EPA	United States Environmental Protection Agency
Hunters Point	Hunters Point Naval Shipyard
HRA	Historical Radiological Assessment
IOC	Isotopes of Concern
IR	Installation Restoration
Keller Canyon	Keller Canyon Landfill Company
LUP	Land Use Permit
Navy	Department of the Navy
NAVSEA	Naval Sea Systems Command
NRC	Nuclear Regulatory Commission
NRDL	Naval Radiological Defense Laboratory
RASO	Radiological Affairs Support Office
RFP	Request for Proposal
RSY	Radiological Screening Yard
SOP	Standard Operating Procedure
Tetra Tech	Tetra Tech EC, Inc.
TRC	TRC Solutions, Inc.
USGS	United States Geological Survey



EXECUTIVE SUMMARY

This Technical Memorandum summarizes the results of a forensic audit initiated per request of the Contra Costa Environmental Health to evaluate the potential for the unauthorized disposal of radioactive waste at Keller Canyon Landfill originating from the former Hunters Point Shipyard. This Memorandum is intended to be a “live” document that includes data summaries and recommendations for additional inquiry; as such, it can be updated as additional data are accumulated.

An April 22, 2018 San Francisco Chronicle news story raised concerns about intentional misclassification of low-level radioactive waste and its potential shipment to several local landfills, including Keller Canyon Landfill (Keller Canyon). In response to these concerns, Contra Costa Environmental Health, the Contra Costa County Board of Supervisors, and the City of Pittsburg took several steps. On May 1, 2018, the Contra Costa Board of Supervisors approved the hiring of an independent contractor to assist the county in determining if low-level radioactive waste was disposed of at Keller Canyon. On May 15, 2018, the county convened an agency/stakeholder workgroup to provide a scope of services for an investigation by an independent consultant. A community meeting was held on June 21, 2018 in order to:

- Provide background information about the Hunters Point remediation project
- Present an overview of the current radiological data
- Present an overview of the disposal processes at both Hunters Point and Keller Canyon
- Document community health concerns

The County issued a Request for Qualifications (RFQ) and reviewed several contractor submittals before selecting a team led by TRC Solutions Inc. (TRC) to conduct an independent forensic audit of documents from Hunters Point and Keller Canyon and to make a determination of the need for sampling. The TRC team included a radiation health physicist, landfill experts, geologists, a geophysicist, and an occupational medicine physician.

The TRC Team presents the findings of the forensic audit of available documents and data in order to answer the basic project question: **Is it possible that soil destined for the Keller Canyon Landfill originating from the Former Hunters Point Naval Shipyard could have had some composition of radioactive materials that avoided detection?**

The forensic audit began in October 2018 and concluded in May 2019. Documents reviewed included special waste authorizations, soil analytical data reports, Hunters Point work plans and reports, Standard Operating Procedures (SOPs), portal monitor calibration records, and landfill data in response to database queries for material loads. We evaluated data that supported or reduced the certainty that radiologically contaminated materials were received at Keller Canyon from Hunters Point.

Based on the review of available documents, it is our collective professional judgement that it is very unlikely that radiologically contaminated materials from Former Hunters Point Naval Shipyard operations were disposed of at Keller Canyon. However, limited environmental field sampling should be performed at Keller Canyon to provide additional certainty that radiologically contaminated materials were not disposed of at Keller Canyon.

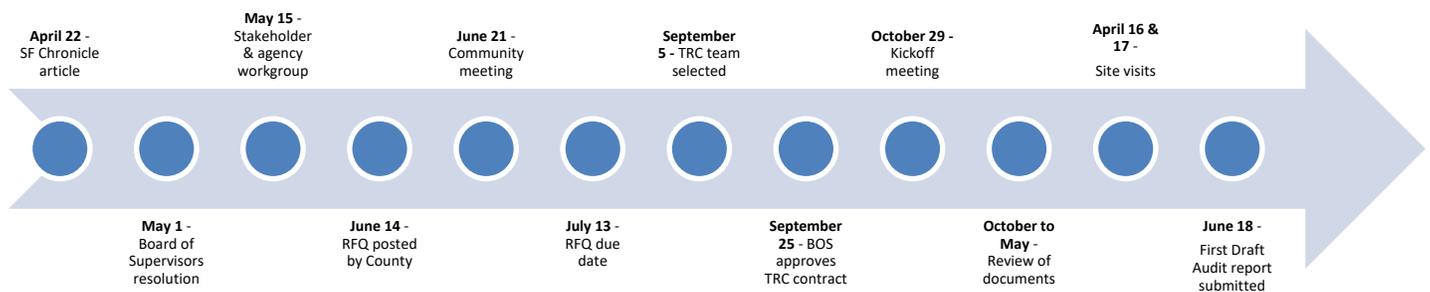
1.0 Introduction and Background

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Figure 1. Project Timeline (2018 – 2019)



The findings and conclusions are outlined in the following sections:

- Section 1 – Project introduction, site descriptions, and background of fraudulent activities at Hunters Point
- Section 2 – Consulting procedures, processes, and list of documents and data reviewed
- Section 3 – Findings

- Section 4 – Conclusions and recommendations

1.1 Site Description

1.1.1 Keller Canyon Landfill

Republic Services, Inc. operates the Keller Canyon Landfill (Keller Canyon Landfill or KCL), a Class II sanitary landfill, which means it accepts “designated” and nonhazardous wastes. For examples of designated waste, see Appendix A. This contrasts with Class III landfills, which only accept nonhazardous (municipal) waste, and Class I landfills, which may accept hazardous and nonhazardous wastes. Only specifically designated disposal facilities are allowed to accept low-level radioactive waste that is not naturally occurring, and none of them are located in Contra Costa County.

Keller Canyon Landfill is located in Contra Costa County on Bailey Road approximately one-half mile south of Highway 4. The landfill is situated on more than 2,000 acres with primary infrastructure including the landfill administration offices, maintenance facility, leachate and water storage, gas to energy power plant, landfill gas control facilities, and stormwater management facilities. Landfilling activities occur on 244 acres of this area with the remainder serving as buffer or facilities management space. The facility currently accepts approximately 3,500 tons of material per day for disposal from various jurisdictions within the San Francisco Bay Area. Other materials such as clean soil, yard waste, wood waste and beneficial re-use items such as concrete and asphalt are accepted as well. The projected viability of the Keller Canyon Landfill is approximately 50 years from the beginning of operations in October 1992. Currently, a maximum of 320 vehicle in-bound trips per day are permitted at the facility. Access to the facility is via Bailey Road south from Highway 4 in Pittsburg with operating hours of 7:00 a.m. to 4:00 p.m. on weekdays and 7:00 to 1:30 p.m. on Saturdays. The facility is closed on Sundays.

1.1.2 Former Hunters Point Naval Shipyard

Hunters Point was founded as a commercial dry dock in 1869 and owned by private companies before the United States Navy purchased it in 1939. From 1945 to 1974, the Navy predominantly used the shipyard as a repair facility and was also partially occupied by the Naval Radiological Defense Laboratory (NRDL) from 1948 to 1969. In 1974, the Navy ceased shipyard operations and the site was elected for closure as part of the 1991 Base Realignment and Closure (BRAC) process and eventually closed in 1994.

The potential radiologically impacted sites identified in the Historical Radiological Assessment (HRA) (NAVSEA 2004) and included in this evaluation are located within specific land parcels and utility corridors at Hunters Point. Radiological data collection and removal actions were previously conducted by contractors at these parcels (Parcels A, B, C, D, E, F, and G) in accordance with plans approved by the Department of the Navy (Navy) and applicable regulatory agencies based on the HRA (NAVSEA 2004) and release criteria documented in the Navy’s Action Memorandum (Navy 2006). Recommendations followed for remediation of radiologically impacted areas based on former operations and activities performed at Hunters Point (e.g., decontamination of ships that participated in atomic weapons testing and activities at the NRDL). Areas with low-level radioactive contaminants addressed through radiologic removal actions by Tetra Tech included storm drains and sanitary sewer lines, associated surrounding soil, and soil associated with current and former building sites.

1.2 Background of Fraudulent Activities

In October 2012, a Navy official with the Radiological Affairs Support Office (RASO) identified a discrepancy associated with systematic soil sampling data from a Survey Unit within a former building footprint suggesting it may have been collected from a different location than presented in the final report (Tetra Tech 2014). These data were collected by Tetra Tech EC, Inc. (Tetra Tech), the contractor in charge of the remedial activities at the Former Hunters Point during that time. Tetra Tech responded to the RASO inquiry by conducting an investigation from 2012 to 2013 to determine the source of the identified data discrepancy. A report was issued documenting Tetra Tech's investigation regarding the discrepancy and was reviewed and commented on by the Navy; the report was concluded in April 2014, and corrective actions were identified and implemented (Tetra Tech, 2014).

Additional claims of misrepresentation of data were made by former Tetra Tech workers. In response, the Navy performed a review and assessment of historical radiological data collected by Tetra Tech at the Former Hunters Point and recommended conducting follow-up site assessment and soil sampling activities at the Former Hunters Point (Navy 2017). Because the Navy could not provide assurance that the evaluation identified every instance of data manipulation or falsification, it was also recommended that the Navy and regulatory agencies work collaboratively to initiate a sample collection program to confirm that remedial activities provided the necessary and intended protection of human health and the environment (Navy 2017).

There were also suggestions that soil/material sent off-site may have been misrepresented. Some of this material may have been sent to local landfills, including Keller Canyon, which reportedly accepted soil/material from Hunters Point from October 2009 through November 2017 (Republic Services, 2019).

As a Class II landfill, Keller Canyon is authorized to accept non-hazardous solid wastes, and is prohibited from accepting and disposing of radioactive material. Keller Canyon utilizes radiation detection monitors for incoming waste loads to prevent inadvertent acceptance of shipments containing radioactive material. Nearby residents living in the City of Pittsburg and Bay Point have documented their concerns about the implications of potentially misrepresented data and the associated potential disposal of radioactive waste at Keller Canyon originating from Hunters Point.

2.0 Forensic Audit

The following sections summarize forensic audit activities conducted from October 2018 to May 2019. The audit began with receipt of background reports detailing the radiological investigation at the Former Hunters Point, including review of work plans and Standard Operating Procedures (SOPs) that were used during the investigations at Hunters Point. Also reviewed as part of the Audit was the assessment of anomalous soil samples associated with the misrepresentation of data and Special Waste profiles for soil received at Keller Canyon. Following the initial review of documents provided by the County, a Request for Information (RFI) was submitted to the Navy BRAC and Keller Canyon in November 2018 for additional laboratory reports, field logs, calibration logs, bills of lading/truck tickets, and clarifications on Special Waste Authorizations for soil profiles.

After receipt of information from the Navy BRAC and Keller Canyon, authorization for site visits was requested. These visits were scheduled in order to obtain final clarification of documents, review onsite logs, observe current routine site activities, and to discuss the forensic audit objectives and goals. A site visit was performed at Hunters Point on April 16, 2019 and at Keller Canyon on April 17, 2019. Final requests regarding Special Waste Authorizations from Keller Canyon were requested as the final action item following the visit to Keller Canyon.

2.1 Exhibits

At the start of the audit, a list of documents and logs associated with soil tracking was categorized based on where the documents were generated during the soil removal and disposal activities. Table 1 summarizes the list of documents and logs requested to provide a tracking summary of documentation reviewed, the purpose of the review, and its impact on the investigation. Although documents and logs were requested, not all were received. Freedom of Information Act (FOIA) petitions are currently under review. The tracking summary of the audit process includes correspondence, data requests, and document review status. A formal request for availability of additional documents is in progress.

2.2 Review of Documents and Logs

Documents and data were received from the County, Navy, and Keller Canyon as detailed in Table 1. Following initial review, additional data were requested through the RFI process. At Hunters Point efforts were concentrated on soils and materials sent to Keller Canyon based on the landfill classification and Special Waste Authorizations. Based on review of the anomalous soil samples at Parcel C and Parcel E (Tetra Tech 2014) and subsequent Nuclear Regulatory Commission (NRC) conclusions (NRC 2016), fraudulent misrepresentation of soil results was proven to have occurred during 2011 and 2012, but the soils were not released for unrestricted reuse or disposal. Although, such soils were stated to not have been disposed under the Special Waste Authorization, the documented misrepresentations created a probability that procedures may not have been followed during other previous site surveys at other parcels. For soil that would have been transported to Keller Canyon Landfill, there would only be chemical data associated with the soils, radionuclide concerns would not be applicable. In other words, soils in parcels that include Installation Restoration (IR) sites¹ may be located adjacent to low-level radiologically contaminated areas, but were not considered impacted by radiologic material. Although soil was hand screened for radionuclides and marked in the field, there is no documentation of soil segregation and excavation processes at the IR sites. Because of this lack of documentation and because soil may have been located adjacent to radiologically impacted areas, the 2008 to 2010 timeframe was prioritized based on review of the background site assessments at the following Hunters Point parcels:

Parcel A – This parcel was evaluated in 2002 and 2004 by the United States Environmental Protection Agency (EPA) and transferred to the San Francisco Redevelopment Agency in December 2004 (CDPH 2014). Review of additional documentation from this parcel was removed from further consideration due to the transfer of the property prior to Keller Canyon Landfill accepting materials from Hunters Point.

Parcel B – This parcel contains IR sites, but excavation and off-site soil disposal was completed in 2010. The document and log review timeframe for Keller Canyon concludes in 2010.

Parcel D – Parcel D was divided into D-1 and D-2 in 2008. Prior to 2008, various environmental and radiological assessments were completed. In May 2010, at an IR site in Parcel D-1, a vault was removed, and soil excavation activities were completed. Additional radiological soil removal was completed in Parcel D-1 in October 2010 (TriEco-Tt 2013). In Parcel D-2, radiological removal actions were completed at Building 813 and trench locations by July 2009 (TriEco-Tt 2013).

¹ Installation Restoration Program primarily addresses sites impacted by hazardous substances, pollutants, or contaminants that pose environmental health and safety risks excluding radiological contaminants.



Parcel F – This parcel is located off shore surrounding the wharf and shorelines, so no additional document or logs were reviewed.

A review of SOPs, Special Waste Authorizations, and analytical data from other areas of Hunters Point concluded that although the procedures in place appeared to be appropriate and acceptable in these areas, further evaluation of field logs, calibration logs, portal monitor logs, and bills of lading was necessary to complete a sufficiently comprehensive and independent review.

After reviewing available documents and logs, site visits were conducted at the Former Hunters Point and at Keller Canyon to obtain final response, status, or receipt of requested logs.

2.3 Site Visits

2.3.1 Former Hunters Point

On April 16, 2019, a Site visit at the Former Hunters Point was completed by the TRC team with the coordination and oversight of the Navy BRAC Office and the EHD. In addition, the current radiological contractor representative, APTIM, was on site to answer questions regarding current procedures. The Radiological Screening Yard pads, portal monitors and soil staging areas were visited along with a visit to a vantage point overlooking the entire former shipyard. Interviews of Navy personnel and the current radiological contractor revealed that procedures concerning the Radiological Screening Yard pad scanning and portal monitor operation during 2008 to 2010 were not documented as they are currently. The historical documents and logs requested are listed as not available (See Table 1), either because they were never generated during field activities (e.g., not required at that time), or as unavailable (e.g., due to ongoing litigation and subject to pending FOIA requests). The SOPs were revised to provide more documentation and logs for soil screening following the Navy investigation of anomalous soil samples in 2012. As a result of the historically documented deficiencies at Hunter Point and the documented fraudulent activities, we decided to focus on KCL as the primary source of data.

2.3.2 Keller Canyon Landfill

On April 17, 2019, a Site Visit at the Keller Canyon Landfill was completed by the TRC team with the coordination and oversight of the Keller Canyon Landfill and the EHD. A brief overview of landfill construction, operations, and the status of community concerns were discussed. A tour of the landfill allowed those present to observe current waste placement in an active cell and the operation of portal monitors. A review of onsite portal monitor calibration records was performed with no significant findings. An additional request for specific Special Waste Authorizations during the 2008 to 2010 timeframe (including analytical data) was made and subsequent Keller Canyon databases were queried to review truck loads, bills of lading, and tonnage tracking data. These queries identified that a specific authorization had been changed from its originally intended disposal location at Keller Canyon, and was instead diverted to another Republic Services landfill outside Contra Costa County. For that reason, this Special Waste Authorization was removed from further consideration in the forensic audit. Other Special Waste Authorizations during the 2008 to 2010 timeframe were reviewed with no significant findings, but would need to be further cross-referenced with bills of lading to confirm receipt at the landfill.

3.0 Findings

Available data were evaluated in order to answer the following question: **Is it possible that soil destined for the Keller Canyon Landfill and originating from the Former Hunters Point Naval Shipyard could have had some composition of radioactive materials that avoided detection?**

A tour of Keller Canyon and review of radiation monitoring logs as well as a review of available documents demonstrated that procedures were in place to prevent inadvertent deposition of radiologic waste at the landfill. Similarly, a review of SOPs, Special Waste Authorizations, and analytical data from Hunters Point concluded that the procedures in place appeared to be appropriate and acceptable.

Based on these findings, it is very unlikely that radiologically contaminated material was transported from Hunters Point to Keller Canyon. However, there are several investigations still ongoing regarding the fraudulent sampling activities of the Navy contractor (Tetra Tech) at Hunters Point as well as an extensive resampling effort. Additionally, in several cases, secondary supporting documentation was lacking to confirm that SOPs and procedures were followed (e.g., lack of individual truck manifests). These concerns detract from the ability to state unequivocally that no radiologically impacted materials were transported to Keller Canyon from Hunters Point.

4.0 Conclusions and Recommendations

Based on this review of data, reports, logs, interviews, and site visits, it is concluded that it is very unlikely that radiological materials of concern (i.e., radionuclides specific to Hunters Point contamination and in exceedance of background) were disposed of at Keller Canyon. To obtain greater certainty that no radiologically contaminated material from Hunters Point was received at Keller Canyon, limited environmental field sampling could be performed at Keller Canyon.

5.0 Proposed Sampling Scope

Based on observations of Keller Canyon Landfill operations, a scoping survey could be conducted. Media to be sampled could include leachate (since the water runoff system used at Keller Canyon is self-contained and recirculated through the landfill) and methane. The methane gas system uses multiple filter systems and these methane filters could be sampled. Surface soils from the cells active prior to 2010, and soil or sediment from the sediment basin could also be sampled as necessary. Details of a limited sampling scope for leachate and/or methane can be developed which would focus on detection of radionuclides specific to those identified at Hunters Point and at levels exceeding background in the subject media at Keller Canyon Landfill.

6.0 References

Contra Costa County. 2015. *Land Use Permit 2020-89, Conditions of Approval, Keller Canyon Landfill*. September 22 (Permit Review Modification).

Department of the Navy (Navy). 2006. *Hunters Point Naval Shipyard Final Base-wide Removal Action Memo, Action Memorandum*. April 21.

List of Special Wastes, Cal. Code Regs. tit. 22 § 66261.120.

Navy. 2017. *Draft Radiological Data Evaluation Findings Report for Parcels B and G Soil, Former Hunters Point Naval Shipyard, San Francisco, California*. September.

Naval Sea Systems Command (NAVSEA). 2000. *Historical Radiological Assessment, Hunters Point Annex, Volume 1, Naval Nuclear Propulsion Program, 1966-1995*. August.

NAVSEA. 2004. *Historical Radiological Assessment, Volume II, Use of General Radioactive Materials, 1939-2003*. August 31.



Nuclear Regulatory Commission (NRC). 2016. *Tetra Tech EC, Inc., Notice of Violation and Proposed Imposition of Civil Penalty - \$7,000 – NRC investigation Report 1-2014-018*. July 28.

Armstrong, T (Republic Services). "Fwd: 2008-2010 Material from Hunters Point". Message to Carrie Plath. May 2, 2019. Via email.

Tetra Tech EC, Inc. (Tetra Tech). 2014. *Investigation Conclusion Anomalous Soil Samples at Hunters Point Naval Shipyard, Revision 1*. April.

TriEco-Tt, a Joint Venture of TriEco LLC and Tetra Tech EM Inc (TriEco-Tt). 2013. *Final Third Five-Year Review of Remedial Actions, Hunters Point Naval Shipyard, San Francisco, California*. November 8.

TABLES

Table 1
Investigation of Potentially Radioactive or Hazardous Waste in Keller Canyon Landfill
Forensic Audit Tracking Log

Record Date	Primary Author or Document Source	Recipient	Title of Document/ Record	Correspondence Type	Requested Information or Response	Purpose	Items Provided	Impact to Forensic Audit	Status of Review	Follow-up/ Clarification Required?
October 2018	Contra Costa Environmental Health	TRC	Keller Canyon Landfill (KCL) Special Waste Authorization (SWA) Profiles	Data Deliverable	Documents provided by Contra Costa County Environmental Health at start of contract.	To confirm soil authorized for disposal at KCL.	SWA 4212Y914327 for dates 5/27/2010 through 12/7/2011.	Provided tracking of soils and analytical data.	Reviewed	Request additional information regarding SWA 204Y79408.
October 2018	Contra Costa Environmental Health	TRC	2007 Radiological Work Plan	Data Deliverable	Documents provided by Contra Costa County Environmental Health at start of contract.	To review the work plan as background data.	Work Plan	Indicated the flow of materials through the operational site to disposal egress.	Reviewed	Revised Work Plan requested.
October 2018	Contra Costa Environmental Health	TRC	Investigation Conclusion Anomalous Soil Samples at Hunters Point Naval Shipyard, Revision 1	Data Deliverable	Documents provided by Contra Costa County Environmental Health at start of contract.	To review the investigation for possible misrepresentation of sample results.	Report dated April 2014	Provided the report summarizing the discrepancy identified after review of the radiological systematic samples.	Reviewed	Completed
November 2018	Navy Base Realignment and Closure (BRAC)	TRC	2015 Final Radiological Work Plan	Email	Revised work plan after standard operating procedures were required to be changed.	To review the work plan to confirm that the procedures were more stringent than previous.	Report dated August 2015	Confirmed that potential areas of potential losses of containment were closed.	Reviewed	Completed
October 2018	Contra Costa Environmental Health	TRC	Nuclear Regulatory Commission (NRC) Investigation Report, Notice of Violation, and Confirmatory Order	Data Deliverable	Documents provided by Contra Costa County Environmental Health at start of contract.	To document violations involving failure by Tetra Tech EC, Inc. to evaluate concentrations and potential radiological hazards of residual radioactivity in soil at former Hunters Point Naval Shipyard (HPNS) and formal documentation of violation and preliminary settlement agreement.	Letters from NRC to Tetra Tech EC, Inc. dated 2/11/2016, 7/28/2016, and October 11, 2016.	Potential materials could have been inappropriately released for unrestricted use.	Reviewed	Follow-up with requests for more information regarding waste that left HPNS.
October 2018	Contra Costa Environmental Health	TRC	Draft Radiological Data Evaluation Findings Report for Parcel B, C, E, and G Parcels	Data Deliverable	Documents provided by Contra Costa County Environmental Health at start of contract.	To review the reports that detail historical radiological data collected by Tetra Tech EC, Inc. at HPNS and assessments made regarding the potential for data falsification or manipulation.	Parcel C soil, Parcel E soil, and Parcels B and G Soil reports from 2017.	Provided the background information regarding the soil sample data manipulation and falsification allegations at HPNS and re-evaluation of results to determine if re-analysis, confirmation sampling, or physical inspection of archived samples is required.	Reviewed	Follow-up with focus on timeframe of 2008 to 2010 based on potential misrepresented data and lack of documented procedures noted during review of these documents.
11/29/2018	TRC	Navy BRAC	Request for Information (RFI) - Investigation of Potentially Radioactive or Hazardous Waste in KCL	Email	Portal monitor information, monitoring data logs and radiological screening data for special waste shipments sent to KCL requested. Three questions regarding review of disposal documentation included in RFI: 1) Special waste transmittal sheet (dated 10-16-2009, expiration 10-31-2010) to determine agreed upon parameters 2) Special Waste Department Decision of Acceptance 01-10-2011- IR-39 materials 3) Document (letter dated 01-10-2011) - analyzed for NORM, TENORM or radioactive isotope	1. To document and provide background to explain what was expected to be disposed 2. To explain the need to expand parameters or explain the delay in transit 3. To document what type of materials would be most probably deposited in KCL if there was an incompatible materials shipment event	RFI detailing the reason for request, project background, Special Waste Transmittal Sheet and waste acceptance information.	The absence of these documents set up the primary data holes, or areas that require additional documentation, in the uncertain belief that no suspect materials were transported from HPS to KCL.	--	Navy BRAC provided information as detailed in line items below.
11/29/2018	TRC	Republic Services	RFI - Investigation of Potentially Radioactive or Hazardous Waste in KCL	Email	Documents and information requested: -Complete waste EPA manifests and/or Bills of Lading -Radiological screening process -Landfill Radiation Portal Monitor information -Radiation Monitor calibration and records of instrument checks Questions regarding review of disposal documentation and landfill operations specific to: -Chemical and radiological analyses -Daily cover or other locations where soil was deposited -Landfill monitoring -Quality assurance/quality control testing, monitoring, or actions	To identify the level of protection at the KCL from potentially radioactive materials, and to estimate the likelihood of an incident occurring of inadvertent deposition of radioactive material from the HPNS operations.	RFI detailing the reason for request and project background.	An estimation of the level of protection nor the likelihood of incident could not be made based on the information reviewed prior; therefore, secondary information that inferred probability was reviewed.	--	Republic Services Provided information as detailed in line items below.
12/11/2018	Republic Services	TRC	Response to RFI	Email	Additional reference clarification and confirmation to specific documents.	To follow-up on RFI.	Response and update on RFI items.	Established communication with KCL.	--	Completed
12/12/2018	TRC	Republic Services	Response to RFI	Email	Continue follow-up for additional information regarding specific SWAs.	To establish the area of highest probability of concern for probable mis-assignment of materials.	Enclosure 1 Special Waste Department Decision 10/31/2010 Enclosure 2 - Special Waste Department Decisions 1/28/2011	SWAs were identified as origins of concern.	--	Completed
1/3/2019	Navy BRAC	TRC	Response to RFI	Email	Responded with planning and Standard Operating Procedure (SOP) documents, and additional Navy resource fact sheets.	To provide the methodology of screening and movement of materials through the operational areas of concern.	Final Base-wide Radiological Management Plan, Final HPS SOP-026 Gamma Screen of Trucks 2005 Final HPS SOP-007 Tt Portable rad meters 2005 Arcadis SOP - Stockpile and Drum Inspection and Verifications_June2015	Processes and procedures revised identified and confirmed the list of records and documents required to be additionally requested and reviewed.	Completed	Follow-up with additional requests for specific field documentation and logs.
1/23/2019	Navy BRAC	TRC	Response to RFI	Email	Responded with details on laboratory analyses for chemicals of concern and radionuclides in soil from Installation Restoration Sites.	To review soil sampling and disposal requirements for Installation Restoration Sites that were remediated during the HPNS radiological survey or materials removal activities, and identify timeframes of soil disposal.	Allied Waste Sample Strategy Special Waste Profile Change form - IR39 IR56 and IR39 Characterization Results IR39 Analytical Results IR39-56 Data	Evaluate actions taken by parties involved and confirm non-hazardous soil designation. This information does not provide radionuclide survey or sampling results to confirm that the Installation Restoration soils did not have to potential to be contaminated with radionuclides in exceedance of background.	Reviewed	Follow-up with questions regarding RA-226 analyses or in-house radiological screening at the analytical laboratory (Test America) and soil movement, labeling and mixing during removal of soils from the Installation Restoration sites.

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1/29/2019	Republic Services	TRC	Response to RFI	Email	Requested information in original RFI.	To review, confirm, and analyze KCL portal monitoring procedures, logs, and calibrations; list of required analytes and materials were not analyzed for NORM, TNORM, or other isolated or grouped radioactive isotopes; confirmed the corrective actions taken during the February 2015 asphalt disposal incident; and overall review of SWAs.	Memo with response to questions and access a Sharefile folder.	Concurrence was established.	Reviewed	Completed
2/27/2019	TRC	Navy BRAC	Chemical Lab Data Follow-up	Email	Additional questions regarding chemical lab data (focused on (IR-39 and IR-56).	To determine Detectability, Precision and Bias.	Detailed summary of specific Test America analytical lab reports and summary of review of background reports for soil removals at the Installation Restoration sites.	Focus Forensic Audit to soil removal, movement, sampling, and documentation for cross referencing and establish concurrence.	Reviewed	Follow-up with the Navy ongoing regarding the documentation of soil movement in Installation Restoration sites and obtaining concurrence on the probability that soils were radiologically contaminated.
2/27/2019	TRC	Republic Services	RFI Follow-up	Email	Additional questions regarding: Alarm point Screening levels Portal monitor speed limit Permit or licensing for Norm/Tenorm for the landfill Quality control testing performed Daily cover Typical leachates	To establish the potential for false positive, false negatives, and environmental fluctuations.	Specific list of follow-up questions to Republic Services.	Baseline evaluations could not be made because of lack of evidence.	Reviewed	Follow-up from Republic Services requested.
2/27/2019	Navy BRAC	TRC	Chemical Lab Data Follow-up	Email	Data addendum requested for Test America Lab Reports.	To clarify statements and QC documents.	Feedback and response still pending due to pre-transportation and disposal radiological samples for that waste profile from the requested time frame has proven more difficult than expected.	Clarification could not be made, but no effect on evaluation.	Reviewed	Follow-up with the Navy ongoing.
2/28/2019	TRC	Navy BRAC	Chemical Lab Data Follow-up	Email	Requested clarification regarding Test America lab reports. IR-39 and IR-56 screening - tests performed and results soils at IR-39, Building 500 series - potential that surrounding soils were not screened for radioactive materials.	To assess impact of adjacent impacted soils on Special Authorization materials.	KCL Special Waste Profile that includes the Test America report in question.	Assessment could not be made, probability inferred until Test America reports are reviewed.	Reviewed	Follow-up with the Navy ongoing.
3/15/2019	Navy BRAC	TRC	Chemical Lab Data Follow-up	Email	Data addendum requested for Test America Lab Reports.	To clarify statements and QC documents.	Responses provided on specific waste profiles related to the KCL. Not able to pull up additional records on the radiological sampling done prior to waste profiling from 2010.	Clarification could not be made, non-effect on evaluation	--	Completed
3/22/2019	TRC	Republic Services	KCL Site Visit	Email	Coordination for a site visit to KCL.	To provide onsite perspective of operations.	Introduction and provide background information on project.	To review alarm point, observe portal speeds, observe daily cover operations, and observe and learn about the landfill operations specific to KCL and provide basis for environmental sampling.	--	Completed
3/25/2019	Republic Services	TRC	KCL Site Visit	Email	Reply and follow-up to schedule visit/ meeting.	To provide onsite perspective of operations.	--	--	--	Completed
4/1/2019	TRC	Republic Services	KCL Site Visit	Email	Follow-up Schedule site visit at KCL.	To provide onsite perspective of operations.	--	--	--	Completed
4/2/2019	Navy BRAC	TRC	Chemical Lab Data Follow-up	Email	Provided responses to previously requested laboratory reporting inquires and HPNS screening logs.	To receive and review the full impact of the sampling events.	The missing pages are QC data pages and Navy needs to get permission from the contractor to release. Navy has not yet received the pages from Test America. Navy updated the info on the in-house radiological sampling done by Test America in that it is standard language included and a gross alpha/beta scan is done on all samples from sites with potential radioactivity for health and safety screening and are for internal lab purposes only. Provided summary of soil that was removed from the Installation Restoration sites were screened at the radiological screening yard pads. No screening logs provided.	Incomplete data set on the material to be considered for disposition at KCL under SWA.	Reviewed	Completed
4/5/2019	TRC	Contra Costa County Environmental Health, Navy BRAC, and Republic Services	KCL and HPNS Site Visits Scheduled	Email	Schedule Site Visits.	To provide onsite perspective of operations.	April 16, 2019 (afternoon) – Former HPNS – meeting request with specific time and agenda forthcoming April 17, 2019 – KCL – meeting request with specific time and agenda forthcoming	To observe landfill operations and tour the former HPNS parcels, radiological screening yard (RSY) pads, and portal monitors.	--	Completed
4/12/2019	Republic Services	TRC	KCL and HPNS Site Visits Scheduled	Email	Follow-up site visit at KCL.	To provide onsite perspective of operations.	--	--	--	Completed
5/2/2019	Republic Services	TRC	2008 - 2010 Material from HPNS	Email	TRC requested data from Republic Services for material disposal information during 2008 to 2010.	Based on KCL acceptance of Special Wastes from HPNS and review of soil removal and disposal operations at HPNS.	Database query for specific date range with SWAs, dates, and tonnage.	Not all noted reported Special Authorization numbers assigned to HPNS were deposited at KCL.	Reviewed	Completed

**Table 1
Investigation of Potentially Radioactive or Hazardous Waste in Keller Canyon Landfill
Forensic Audit Tracking Log**

Record Date	Primary Author or Document Source	Recipient	Title of Document/ Record	Correspondence Type	Requested Information or Response	Purpose	Items Provided	Impact to Forensic Audit	Status of Review	Follow-up/ Clarification Required?
5/3/2019	TRC	Navy BRAC; other Navy participants; and Contra Costa County Environmental Health participants	HPNS Site Visit - Radiological Forensic Audit for KCL (KCL) - Site Visit Notes and Action Items	Email	Navy: 1) Confirm that portal monitor records are not archived by contactor. 2) Provide community outreach materials that have been used during the cleanup actions and any current information about quarterly meetings as well as schedule.	To confirm info obtained during site visit and list action items.	Meeting Notes from 4/16/19 site visit to HPNS Shipyards.	Provide perspective on operations and identify the remaining action items and last request for documents and logs.	--	Completed
5/3/2019	TRC	Republic Services & Contra Costa County Environmental Health participants	KCL Site Visit - Radiological Forensic Audit for KCL - Site Visit Notes and Action Items	Email	Republic Services: Obtain volume (tonnage received) records and/or bill of lading from 2008-2010 for SWA 204Y7908 and provide documents or status of location of documents.	To confirm info obtained during site visit and list action items.	Meeting Notes from 4/17/19 site visit to KCL .	With multiple operations on going, without manifest or weigh bills it is impossible to tie any one payload to any one operation.	--	Completed
5/6/2019	Navy BRAC	TRC	HPNS Site Visit - Radiological Forensic Audit for KCL - Site Visit Notes	Email	Response to site visit notes.	To document a "typical" load of material from excision through transport to disposition at KCL.	Clarifications on site visit notes: 1. Radiological scanning of the RSY pads is done with cart-based detectors and verified with hand held instruments if elevated levels are detected. 2. The protocol for trucks carrying soil being covered is not new, but has been in place for several years. 3. Portal Monitor logs are available from 2014. This was not so much a corrective measure as a recognition of a need to maintain documentation and an update of contracts. 4. Correction that community meetings are 3 times per year. The next meeting is planned for June 2019 but may be postponed based on the resampling schedule. Public Bus tours scheduled May 18th, 2019.	While visualization of the process was helpful, it was noted that the most essential documents were either not digitized or archived.	Reviewed	Completed
5/8/2019	Contra Costa County Department of Conservation and Development	TRC & site visit participants	KCL Site Visit - Radiological Forensic Audit for KCL - Site Visit Notes and Action Items	Email	Item #3 under Discussion Items Addressed says the portal monitors were set off at least three times in the past 19 years. Each time, the monitors were evaluated and, "corrective actions performed." What "corrective actions" were taken?	To clarify issues related to reported portal monitor alarms and events.	--	Corrective actions is a process of communication and identifies the cause for an occurrence. There is no negative impact to the evaluation.	Reviewed	Completed
5/9/2019	Republic Services	TRC	KCL Site Visit - Radiological Forensic Audit for KCL - Site Visit Notes and Action Items	Email	Email correspondence between CCC Health Services, TRC, and Republic Services.	To define all SWA Numbers granted to HPNS that would have been disposed at KCL.	Action Item: Obtain volume (tonnage received) records and/or bills of lading from 2008-2010 for SWA 204Y7908. Republic Services researched the matter to confirm that no HPNS material was received at KCL under this authorization. This number format doesn't correspond with Republic Services standard SWA standard numbering system. The correct number was identified as 204Y79408, which was inadvertently included in the voluminous production of Special Waste profiles provided in the Contra Costa County Environmental Health initial request for information (October 2018). Material under this special waste profile was received at another facility, not KCL. Republic Services verified this by doing a database search for any materials received at KCL under that Special Waste Authorization number. The search showed that no soil tonnage received. This is consistent with the remainder of the tonnage data that correlates to loads sent from HPNS with loads received at KCL that was previously reported to the Contra Costa County Environmental Health.	Not all noted reported Special Authorization numbers assigned to HPNS were deposited at KCL.	Reviewed	Completed
7/19/2019	Contra Costa County Environmental Health	TRC	KCL portal monitor alarm events	Email	Email requesting the portal monitor alarm data was requested by Contra Costa County Environmental Health on July 8, 2019.	To memorialize whether the portal monitors performed as intended.	List of dates when the portal monitor alarms were triggered.	Documented that the portal monitors function as specified for the type of material documented in the reports reviewed.	Reviewed	This was a follow-up from the review of logs during the site visit at the landfill in April 2019.

APPENDIX A

22 CCR § 66261.120

§ 66261.120. List of Special Wastes.

(a) The following is a non-inclusive list of wastes which may be classified as special wastes pursuant to section 66261.122:

- (1) ash from burning of fossil fuels, biomass and other combustible materials;
- (2) auto shredder waste;
- (3) baghouse and scrubber wastes from air pollution control;
- (4) catalyst from petroleum refining and chemical plant processes;
- (5) cement kiln dust;
- (6) dewatered sludge from treatment of industrial process water;
- (7) dewatered tannery sludge;
- (8) drilling mud from drilling of gas and oil wells;
- (9) refractory from industrial furnaces, kilns and ovens;
- (10) sand from sandblasting;
- (11) sand from foundry casting;
- (12) slag from coal gasification;
- (13) sulfur dioxide scrubber waste from flue gas emission control in combustion of fossil fuels;
- (14) tailings from the extraction, beneficiation and processing of ores and minerals;

Note: Authority cited: Sections 208 and 25140, Health and Safety Code.

Reference: Sections 25117 and 25140, Health and Safety Code.