

17th Technical Training Series



April 3-6, 2017 · Long Beach Hyatt
200 South Pine Avenue · Long Beach, California, 90802



Closed, Illegal and Abandoned Site Program Overview



CalRecycle 17th Technical Training series

April 3, 2017

Presentation by

Glenn K. Young, P.E.

CIA Section Staff



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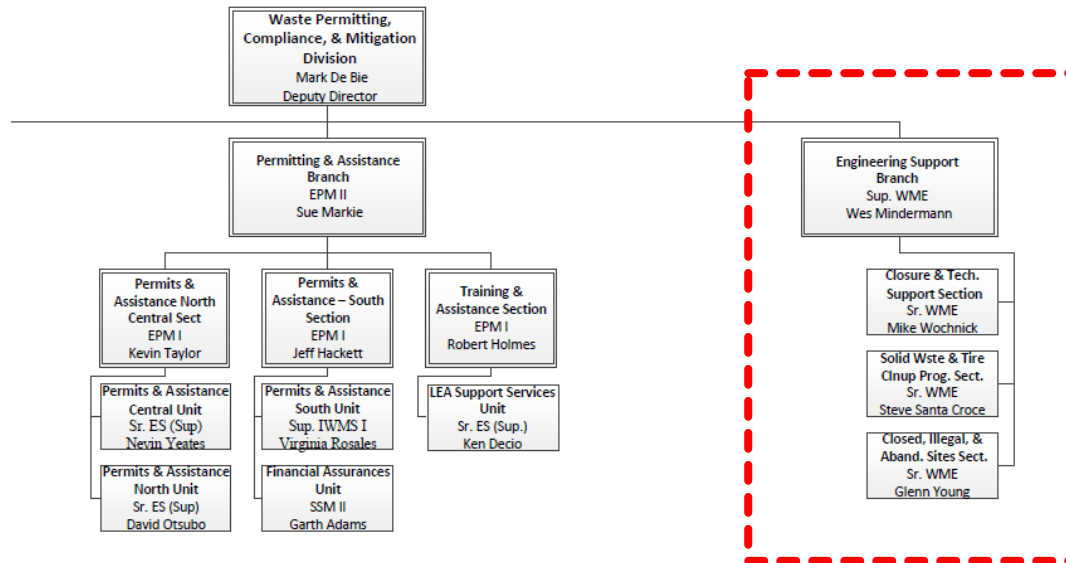


Dawn Plantz



Angela Basquez

Engineer Support Branch



- ▶ Wes Mindermann, P.E. - Branch Chief - Manages Engineer Support Branch
- ▶ Michael Wochnick, P.E. - Closure - Review Closure Plans & Cost Estimates
- ▶ Steve Santa-Croce, P.E. - Solid Waste Clean-up Program - Manages Solid Waste Clean-up Program Trust Fund (Contracts, Clean-ups, Grants)
- ▶ Glenn Young, P.E. - Closed, Illegal and Abandoned Sites Program - Support LEAs in inspection, investigation & remediation of pre-regulations disposal sites
- ▶ Gino Yekta, P.E. - Technical Senior - LFG Emission, Monitoring and Control
- ▶ Todd Thalhamer, P.E. - Technical Senior - Engineering Debris Management & Removal Operations

CIA Site Program Authority

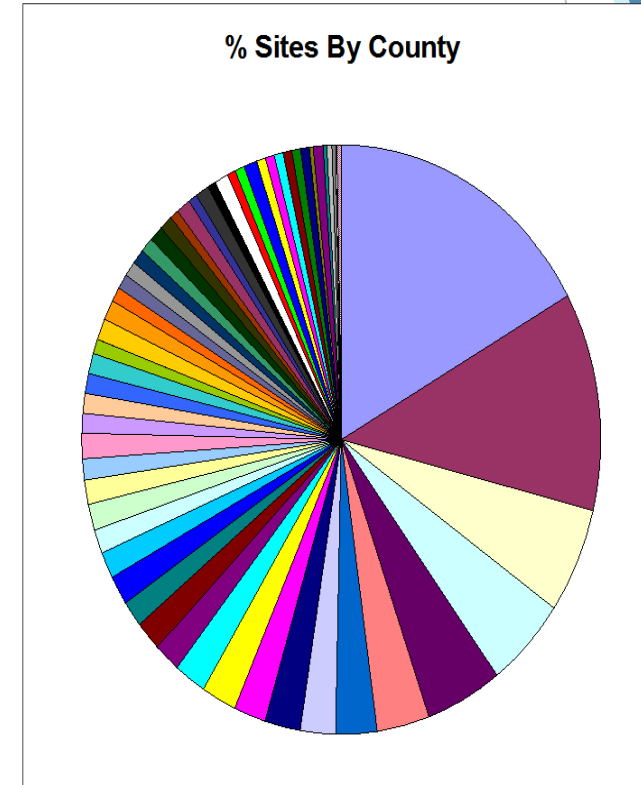
- Public Resources Code Section 45013
 - *[CalRecycle] shall make available guidance and assistance to the enforcement agency regarding the inspection, investigation, enforcement, and remediation of illegal, abandoned, inactive, or closed disposal sites to ensure that public health and safety and the environment are protected.*

CIA Site Program Purpose

- Monitor CIA sites
- Provide enforcement and investigation assistance to LEAs
- Update and maintain CIA site data in the Solid Waste Information System (SWIS)
- Provide guidance and training to LEAs on investigation and enforcement on CIA sites

California CIA Site Universe

- 2500 CIA Sites
- 935 Urban Sites in 6 Counties:
 - ✓ Orange
 - ✓ Los Angeles
 - ✓ San Diego
 - ✓ Kern
 - ✓ San Bernardino
 - ✓ Riverside
- 286 Closed with Permit
- 506 Burn Dump Sites
- 73 Illegal Disposal Sites



CIA Site Program Implementation

- Investigation assistance
- Assist LEAs in quantifying site conditions as they relate to state minimum standards
- Prepare report providing data that assist and support remedial decisions
- Facilitate responsible party/agency involvement in clean-up process

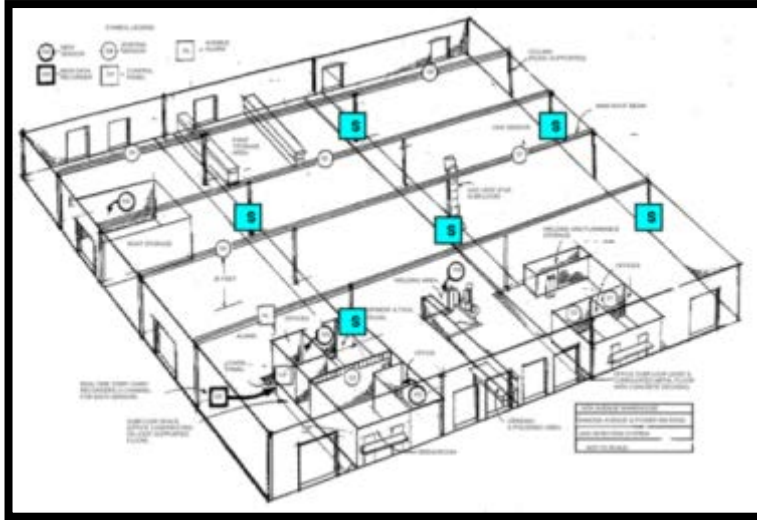
CIA Site Program Status

- Phase I Office Investigations
- Phase II Field Investigations
 - ✓ Installed 7 Continuous Gas Monitoring Networks
 - ✓ Construct 18 Gas Monitoring Networks
 - ✓ Conducted 20 Waste Extents and Cover Investigations
- Environmental and Lab Services (>\$2.2M spent)
- CIA Priority Lists
- SWIS Inspection Report Data Input/QA (1,300 annually)
- LEA Technical Support:
 - ✓ Website Information/Workshops/Conferences

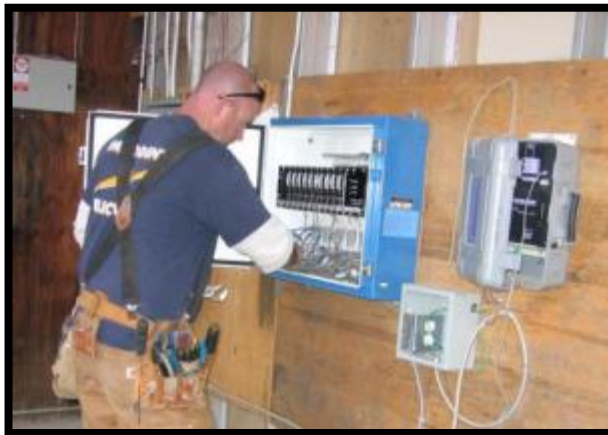
LFG Continuous Monitoring Systems Projects

Site	County	Sensors	Cost (\$K)
14th Avenue Landfill – Lukenbill Heavy Equipment Warehouse	Sacramento	6	\$15
14th Avenue Landfill – Cozzitorto Auto Repair Buildings	Sacramento	8	\$30
Belmont Shores Mobile Home Park	City of Long Beach	8	\$30
La Veta Disposal Station/YMCA	Orange County	8	\$30
Sparks-Rains Landfill	Orange County	8	\$40
Newport Terrace Condominiums	Orange County	8	\$40
Old Pleasanton Landfill	Alameda County	5	\$40

LFG Continuous Monitoring System Projects



Belmont Shores

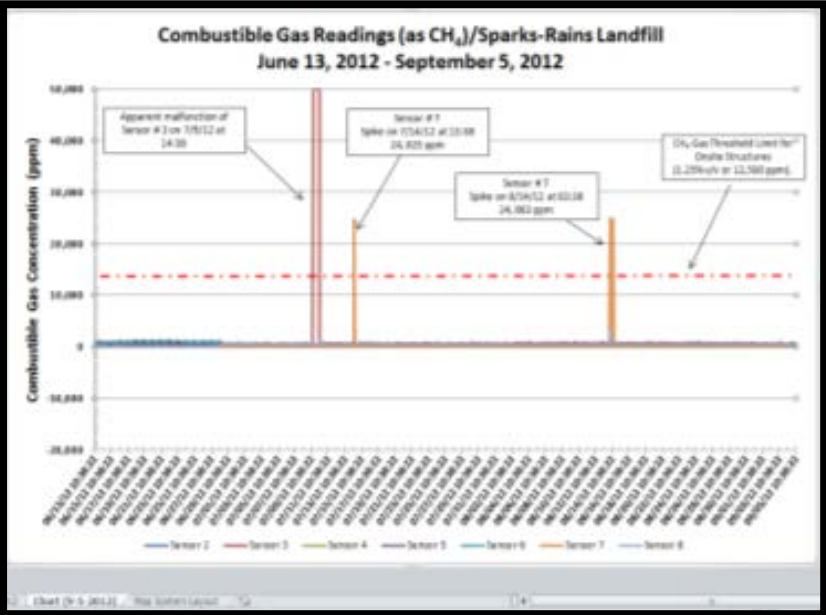


14th Avenue – Lukenbill 's Warehouse



Newport Terrace

LFG Continuous Monitoring System Projects



Spark-Rains LFG Continuous Monitoring System for Westgate and Ridgeway Apartments

CIA Site On-Line Web Resources for Continuous Monitoring

<http://www.calrecycle.ca.gov/SWFacilities/CIA/Field/Gas/ContMonitor/default.htm>

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Closed, Illegal, and Abandoned (CIA) Disposal Sites
Continuous Landfill Gas Monitoring for Structures Located Near Landfills and Disposal Sites (Part 1)

Landfill gas migration from disposal sites into nearby structures is a potential threat to public health and safety. The purpose of the continuous landfill gas monitoring pages (Parts 1-3) is to provide useful information to applying continuous gas monitoring systems to structures on or near landfills and former disposal sites to meet regulatory requirements. A CIRM publication entitled *Continuous Monitoring of Structures at Landfill Gas Sites*, which includes much of the information from this section as well as case studies is available online.

The table of contents below highlights information provided on the pages.

Table of Contents

- Typical Landfill Gas Migration Routes
- Regulatory Requirements for Continuous Landfill Gas Monitoring
- Continuous Landfill Gas Monitoring System Overview
- Continuous Monitoring System Components, Manufacturers, Specifications, and Costs
- Continuous Monitoring System Operations and Maintenance Requirements

Typical Landfill Gas Migration Routes

The diagram below shows how landfill gas, depending on site specific conditions, can migrate from a former disposal site through surrounding soils, utility corridors, etc., into subsurface voids and facility foundations creating potentially harmful situations if not monitored appropriately.

Figure 1: Typical Landfill Gas Migration Routes

Continuous Monitoring of Structures for Landfill Gas Intrusion

Glenn K. Young, P.E. & Abel Martinez-Centeno, MSCE
Closed, Illegal and Abandoned Site Program/California Integrated Waste Management Board

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This report was prepared by staff of the Integrated Waste Management Board to provide technical assistance to local governments and solid waste facility operators in investigating former landfills and disposal sites and in the installation, operation and maintenance of continuous gas monitoring systems. If you require assistance in obtaining access to this report, please contact the Public Affairs Office at (916) 344-6366.

Figure 1: Continuous Gas Monitoring Equipment

Abstract

Federal, State and local laws require that structures located on or near landfills and disposal sites be monitored for landfill gas migration to protect public health and safety from potential explosion hazards associated with methane gas. Continuous Gas Monitoring Systems, when carefully planned, designed, installed, operated, and maintained by qualified consultants and contractors, can provide an effective and economic mitigation measure to indoor landfill gas migration hazards. The Closed, Illegal and Abandoned (CIA) Site Program (<http://www.ciawmb.ca.gov/CIAGP.html>) of the California Integrated Waste Management Board provides technical assistance to local governments in investigating former landfills and disposal sites in urban areas of the state. The CIA program is working on "high-priority" landfill investigations in many of the major population centers in California (Los Angeles, Orange County, San Diego, San Francisco Bay Area, etc.) and can provide field data, case studies, and lessons learned from investigations that may be helpful to other jurisdictions in managing their former landfills and disposal sites.

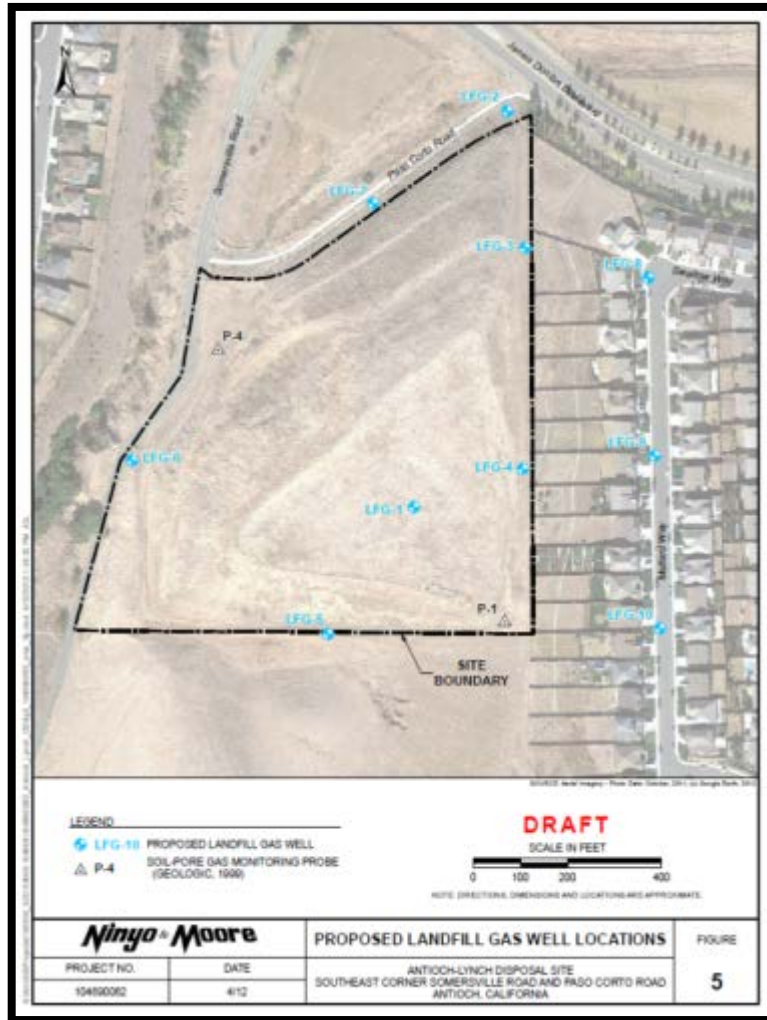
Key Words: Landfill Gas Migration, Continuous Landfill Gas Monitoring, Fixed Gas Detection System, Catalytic & Infrared Gas Sensor, Wireless Transmitters and Receivers, Programmable Logic Control, Controllers, Data Loggers, Continuous Gas Monitoring Data.

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LFG Monitoring Networks Installed

SITE	County	Wells	Cost (\$K)
14 th Avenue Landfill	Sacramento	10	\$34
Belmont Shores Mobile Home	Long Beach (LA)	33	\$56
YSDA Landfill	Yuba	6	\$25
Eastside Landfill (Hellyer Park)	City of San Jose	6	\$49
Gerber Road Landfill	Sacramento	8	\$35
Canyon Park Dump/Duarte	Duarte (LA)	8	\$37
Disposal Gardens	Torrance (LA)	13	\$35
Cannery Street LF	Orange	4	\$32
Laguna Seca Landfill	Monterey	9	\$30
La Veta Disposal Station	Orange	8	\$45
Warings Dump	Sacramento	3	\$18
Paramount Dump	Los Angeles	23	\$40
Pacific Avenue Landfill	Orange	6	\$40
City of Lodi Landfill	Stanislaus	8	\$40
Old Pleasanton Landfill	Alameda	10	\$40
Antioch-Lynch Disposal Site	Contra Costa	6	\$35
Gage Dump	Los Angeles	15	\$88
Menifee Road Landfill	Riverside	8	\$30

Example LFG Monitoring Well Networks



Antioch-Lynch LF – Contra Costa

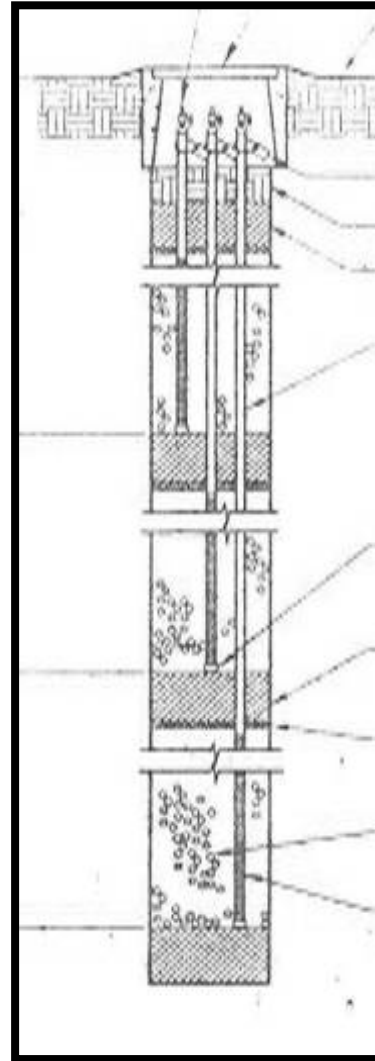


Canyon Park LF – Los Angeles

LFG Monitoring Network Installation



Canyon Park LF - Los Angeles County



14th Avenue - Sacramento County



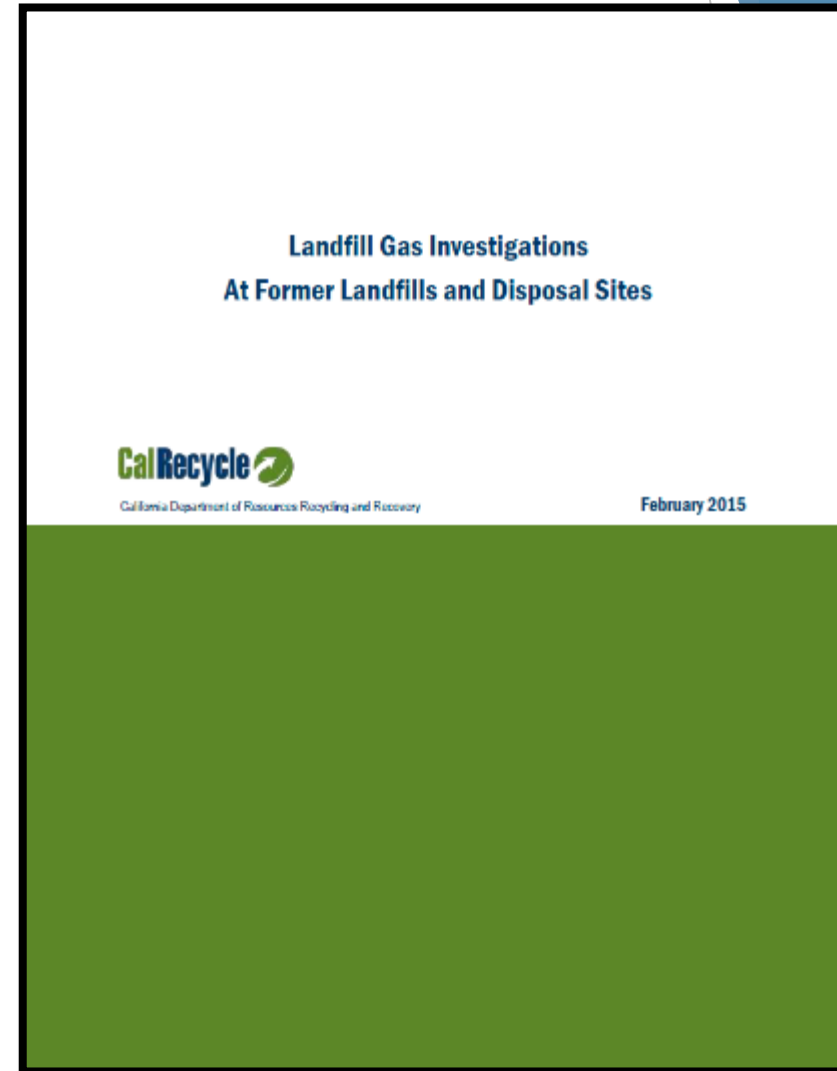
Sparks Rains LF – Orange County



Hellyer Park-Eastside LF -City of San Jose

LFG Monitoring Network Installation

- ▶ New LFG Investigation Guidance Document
- ▶ Available On-line at:
<http://www.calrecycle.ca.gov/publications/Documents/1521%5C20151521.pdf>
- ▶ Conference session will present case studies



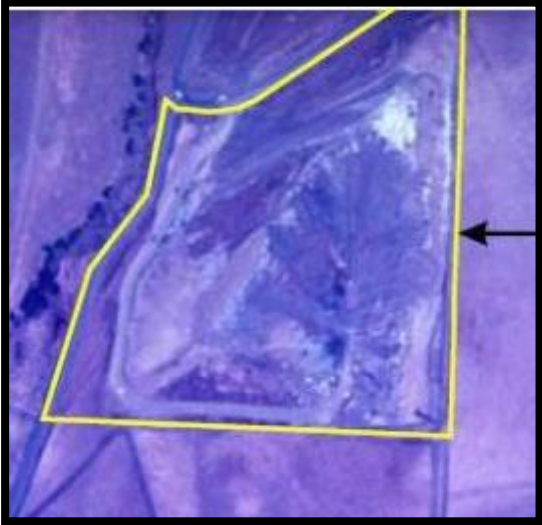
Waste Extents, Characteristics, and Cover Investigations

SITE	COUNTY	No. Locations	Samples	Cost (\$K)
Newport Terrace Condos	Orange	34	20	\$95
Noah Webster School	San Diego	20	17	\$25
West Bryte Burn Dump	Yolo	27	28	\$33
Franklin Field Burn Site	Sacramento	32	32	\$20
Sante Fe Road	Stanislaus	41	61	\$69
Gerber Road LF	Sacramento	19	15	\$30
Warings Dump	Sacramento	18	49	\$30
Homeland Burn Site	Riverside	20	20	\$29
Sunset Cliffs Burn Site	San Diego	20	20	\$29
Fortuna Burn Dump	Humboldt	25	25	\$25
Portola Burn Site	Plumas	15	24	\$7
Truckee Burn Dump	Nevada	23	25	\$25
Benton Dump	San Diego	18	30	\$35
Disposal Gardens	Los Angeles	25	50	\$50
Brown's Fill	San Diego	23	23	\$10
Cruickshank Road Landfill	Imperial	30	60	\$40
Coast Guard Dump	Los Angeles	24	48	\$35
Fishback Illegal Disposal Site	Ventura	30	50	\$50
Corning Burn Dump	Tehama	25	50	\$50
Mira Loma Burn Dump	Riverside	25	50	\$50

Waste Extents - Historical Aerial Photo Analysis



1954



1966



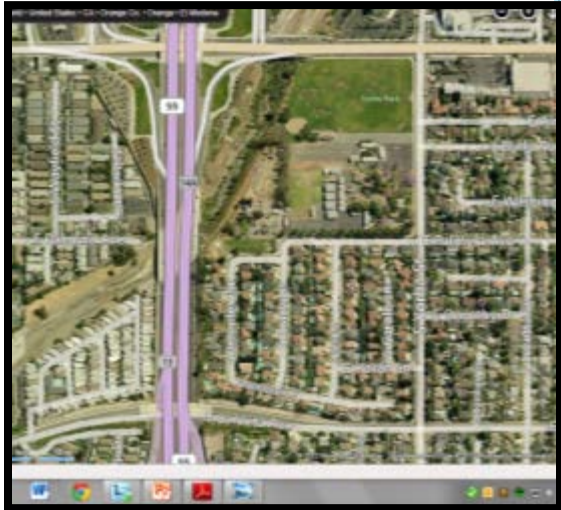
1958



2012



2012



2012

Waste Extents - Geophysical Surveys



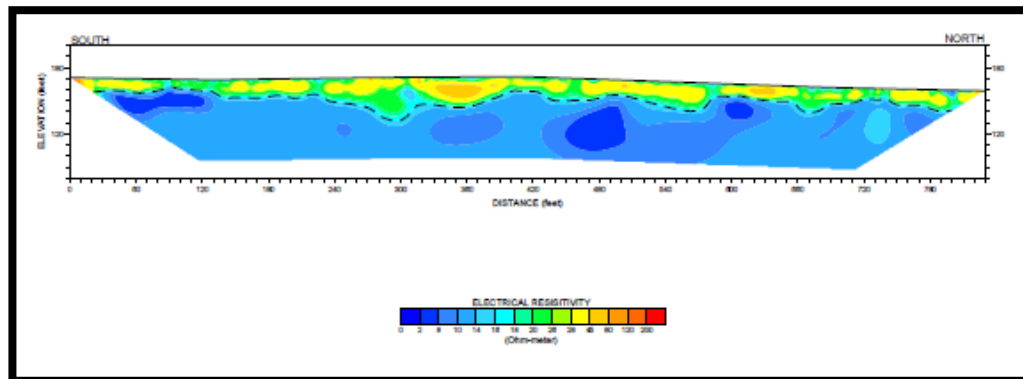
Electromagnetic (EM) Survey –
Disposal Gardens – Los Angeles



Resistivity Survey –
Sparks Rains LF - Orange



Magnetometer Survey –
Benton Dump, San Diego



Resistivity Survey Cross Section - Eastside LF (Hellyer Park) – San Jose



Newport Terrace Condos



Belmont Shores Mobile Homes



Noah Webster School



Soil-Gas Push Probe Inserts



Sampling Sleeve – Boring Logs



Direct Push Boring Diameter 2"

Waste Extents/Cover Investigation - Drilling



Benton Dump – San Diego



Paramount Dump – Los Angeles



Pacific Avenue – Orange



Disposal Gardens – Los Angeles

Waste Extents/Cover Investigation - Trenching



Sante Fe Rd - San Joaquin



Franklin Field - Sacramento

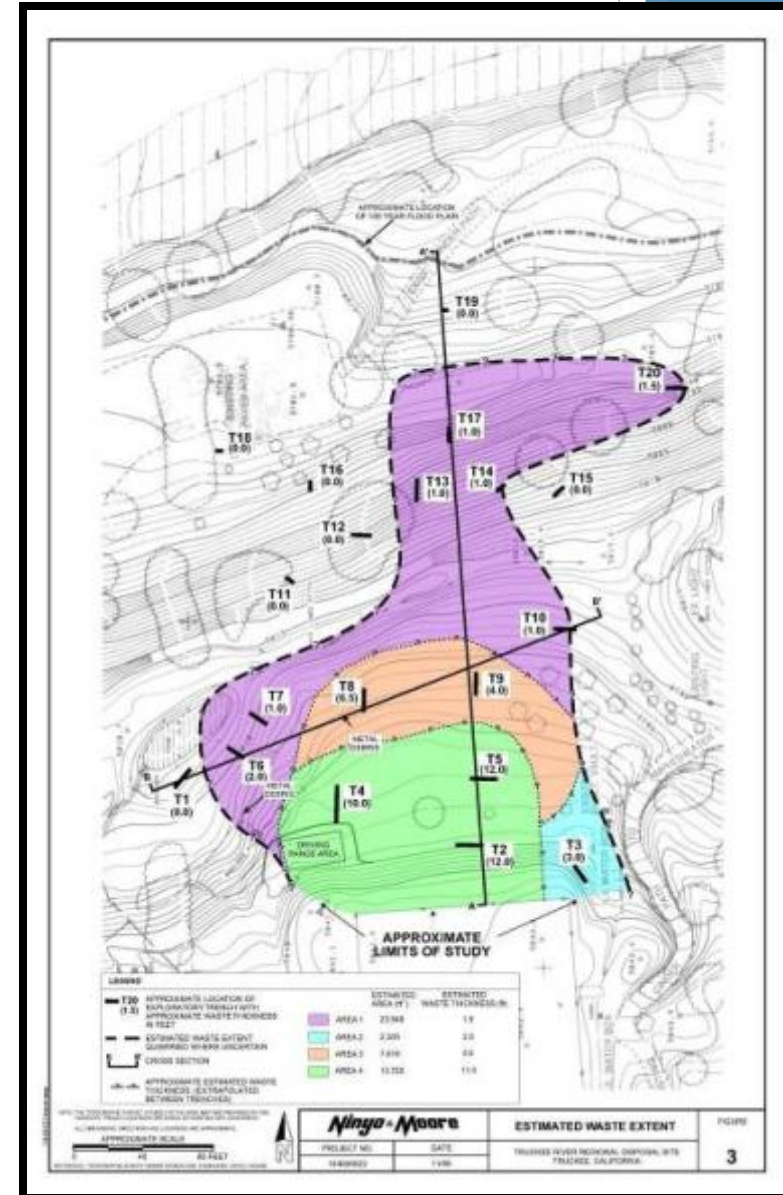
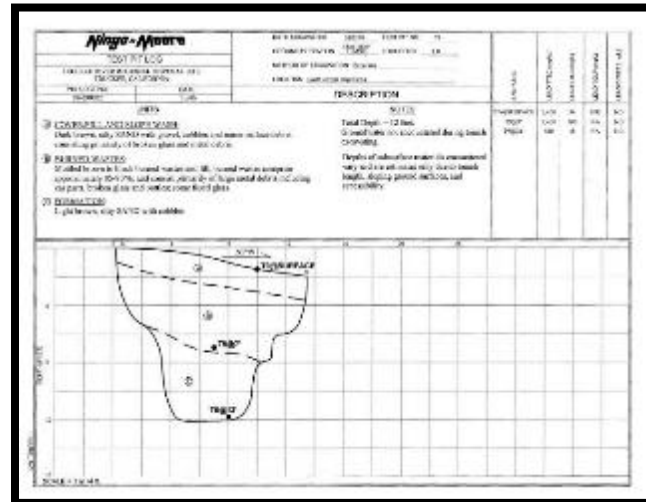


Homeland Burn Site -Riverside



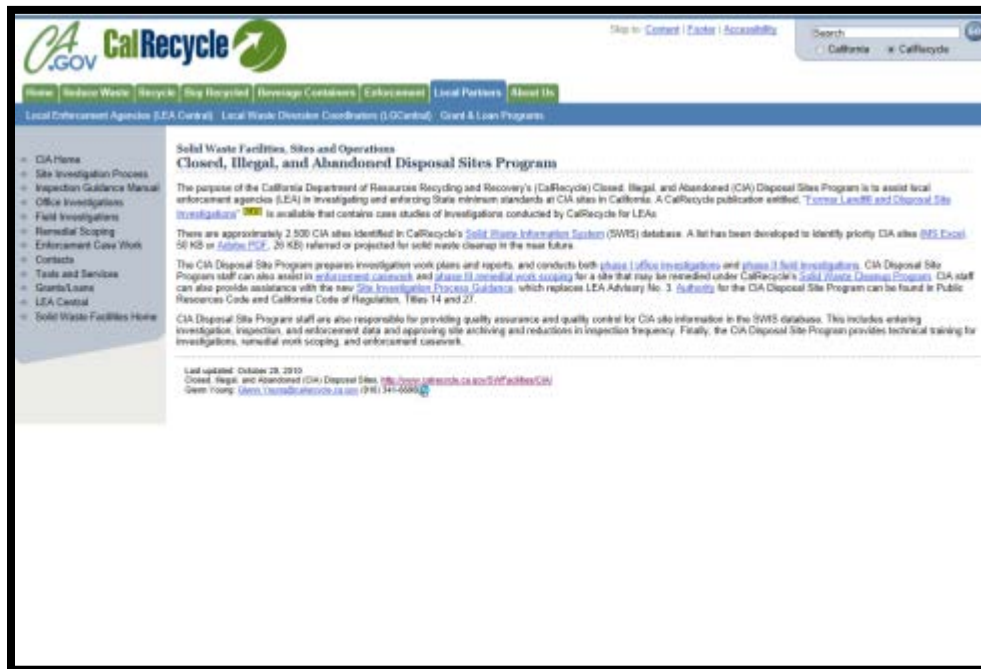
Fortuna Burn Dump - Humboldt

Waste Extents Data/Map



CIA Site Program On-Line Web Resources for Investigation

<http://www.calrecycle.ca.gov/SWFacilities/CIA/default.htm>



The screenshot shows the CalRecycle website interface. At the top, there is a search bar and navigation links for Home, Solid Waste, Recycle, Big Recycled, Beverage Containers, Enforcement, Local Partners, and About Us. Below this, there are links for Local Enforcement Agencies (LEA Central), Local Waste Diversion Coordinators (LWCentral), and Grant & Loan Programs. The main content area is titled "Solid Waste Facilities, Sites and Operations" and "Closed, Illegal, and Abandoned Disposal Sites Program". It includes a sidebar with a table of contents for various investigation and enforcement topics. The main text describes the program's purpose, the availability of a case study PDF, and the types of investigations conducted. It also mentions the program's role in providing quality assurance and quality control for CIA site information in the SWIS database.



The document is titled "Former Landfill and Disposal Site Investigations" and is authored by Glenn H. Young, P.E., Senior Waste Management Engineer. It is published by CalRecycle, the California Department of Resources Recycling and Recovery. The document includes a copyright notice and a disclaimer. The main body of the document features two side-by-side aerial photographs of a former landfill site in Long Beach, California. Below the images is a caption and an abstract. The abstract discusses the risks associated with former landfills and disposal sites, particularly in developed areas, and describes the investigation methods used to assess these sites. The document concludes with a list of key words.

Former Landfill and Disposal Site Investigations
Glenn H. Young, P.E., Senior Waste Management Engineer
CalRecycle, California Department of Resources Recycling and Recovery
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This report was prepared by staff of the Department of Resources Recycling and Recovery (CalRecycle) to provide technical assistance to local governments and solid waste facility operators in investigating former landfills and disposal sites. If you require additional information or access to this report please contact the Office of Public Affairs at (916) 544-4300 or by e-mail at opa@calrecycle.ca.gov.



Figure 1: Aerial view photograph overlay in Google Earth of a former landfill in the City of Long Beach, used for reference only.

Abstract

Former landfills and disposal sites, particularly undocumented sites in developed areas, can pose several hazards to public health and safety. Explosive or oxygen-deficient conditions can be caused by landfill gas migrating through surrounding soils into building structures and utility corridors. Landfill settlement may cause unstable conditions for building foundations and utilities. The Closed, Illegal and Abandoned Site program at the Department of Resources Recycling and Recovery (CalRecycle) provides technical assistance to local public health officials in investigating former landfills and disposal sites. The CIA section has performed several "high-priority" landfill and disposal site investigations in developed areas of California including Los Angeles, Orange, and San Diego counties, the San Francisco Bay Area, and the Sacramento Valley. Several case studies are presented in this paper to illustrate how investigations were conducted to determine the approximate horizontal and vertical extents of former landfills and disposal sites using historical aerial photographs and mapping software, geophysical methods for non-intrusive delineation of waste extents, and finally intrusive investigation methods including drilling, direct-push, and trenching.

Key Words: landfill investigation; waste extents delineation; historical aerial photograph review; Google Earth aerial tool; geophysical survey; intrusive investigation; non-intrusive investigation; drilling; trenching; direct-push; topographic drawing; sample location map; sampling and analysis plans; remedial work plans; and remedial cost estimates.

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CIA Site Program Investigation Projects Resulting in Remediations

Site	County	Remediation	Type
Newport Terrace Condos	Orange	City of Newport	LFG
Noah Webster School	San Diego	DTSC Schools	Risk Study
West Bryte Burn Dump	Yolo	County	Cover
Franklin Field Burn Site	Sacramento	SWCP Grant	Cover
Gerber Road LF	Sacramento	Owner/Solar	Interim Cap
Warings Dump	Sacramento	SWCP Project	Cover
Elvas Ave Dump (St. Francis)	Sacramento	SWCP Grant	LFG Control
Homeland Burn Site	Riverside	County	CC/Cover
Fortuna Burn Dump	Humboldt	SWCP Project	CC/Cover
Truckee Burn Dump	Nevada	SWCP Grant	Cover
Benton Dump	San Diego	SWCP Grant	Cover
Brown's Fill	San Diego	SWCP Project	CC/Cover
Cruickshank Road Landfill	Imperial	SWCP Grant	Cover
Duarte Golf Course	Los Angeles	Owner	Gas Control

CIA Site Program Investigation Results



Newport Terrace Condos - LFG Control System



Franklin Field Burn Dump - Capping & Grading (SWCP Grant)

CIA Site Program Investigation Results



**Truckee Regional Park Burn Dump – Capped –
SWCP Grant**

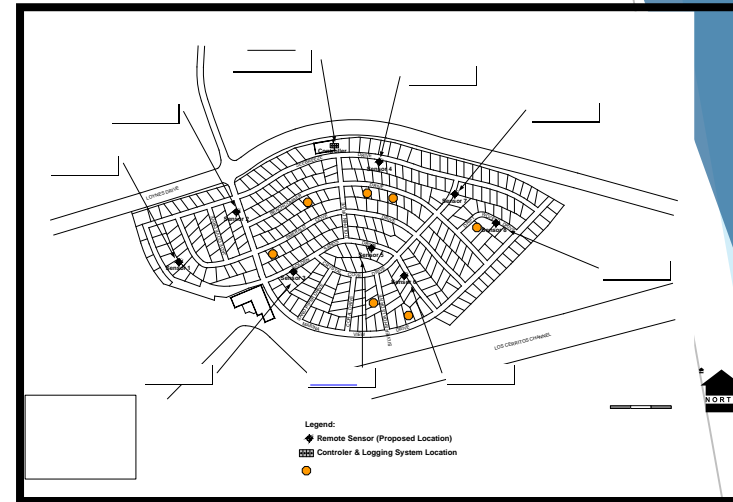


**Elvas Avenue (St. Francis HS) – LFG
Control System**

CIA Site Program Investigation Results



Duarte Golf Course – Canyon Park LF – SWCP Grant to correct Drainage & Erosion/RPs hired consultant/contractor to remedy LFG Violation



Belmont Shores Mobile Home Park – LFG Investigation Resulted in Park Owner installing combustible gas alarms in all trailers and sealing cracks in foundation



CIA Site Program Investigation Results



Happy LEA – Pete Oda/Los Angeles County

Where to Find CIA Site Program Stuff



- See CIA website for general “how-to” information
<http://www.calrecycle.ca.gov/SWFacilities/CIA/>
- See SIP Process to “triage site” for reduction in inspection frequency or to initiate board managed investigation or remediation
<http://www.calrecycle.ca.gov/SWFacilities/CIA/SIP/>
- See Phase I & II web pages for conducting office and field investigations (and examples)
<http://www.calrecycle.ca.gov/SWFacilities/CIA/Office/>
<http://www.calrecycle.ca.gov/SWFacilities/CIA/Field/>
- See Inspection Guidance for what to inspect for and benchmarks for determining violations
<http://www.calrecycle.ca.gov/Publications/default.asp?>

“We are here to support our LEAs in protecting public health & safety and the environment from closed, illegal and abandoned disposal sites ...”



CIA Site Program Coordinating Partners

- Solid Waste Clean-up Program - Steve Santa Croce
- Closure Section - Mike Wochnick
- Health & Safety Program - Diane Kihara
- Enforcement Branch - Georgianne Turner
- Staff Counsel - Steve Levine
- Contracts/Accounting - Melissa Monnier
- LEA Evaluation - Debbie Knight
- LEA Support Branch - Paulina Lawrence