LMS/BRP/S15632

2016 Annual Inspection Report of the Burris Park, California, Site

February 2017

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Abbreviations

DOE	U.S. Department of Energy
FIMS	Facilities Information Management System
FY	fiscal year
IC	institutional control
LM	Office of Legacy Management
LTS&M	Long-Term Surveillance and Maintenance
mCi	millicurie
mrem/yr	millirem per year
NRC	U.S. Nuclear Regulatory Commission
pCi	picocurie
pCi/g	picocurie per gram
Sr-90	strontium-90
UC Berkeley	University of California—Berkeley

1.0 Inspection Summary

The Burris Park, California, Site, (formerly the Burris Park Field Station) is located in the central part of a 57-acre park owned and maintained by Kings County Parks and Grounds Division. The site consists of a 50-foot by 50-foot fenced area surrounding a 42-foot by 42-foot reinforced concrete enclosure. This area once consisted of 6-foot by 6-foot soil-filled concrete plots used to test the effectiveness of removing strontium-90 (Sr-90) from the soil. University of California—Berkeley (UC Berkeley) scientists applied 72 millicuries of Sr-90 evenly to the soil in the late 1950s to conduct these tests under a contract with the Atomic Energy Commission. The site was decommissioned by filling and capping the plots with metal-mesh reinforced concrete in 1963. Although no further remediation is required, in November 2014, the U.S. Department of Energy (DOE) Office of Legacy Management (LM) accepted maintenance-only responsibility for the site and its remaining radioactive contents.

DOE conducted maintenance during 2015, to remove fallen tree debris, perennial vegetation, and old farm equipment and to repair the fence. Radiological surveys were taken of the entire area and its contents to ensure worker safety prior to starting maintenance activities. A Facilities Information Management System (FIMS) Inspection was conducted in September 2015 to take photos and record site assets, including fencing, the concrete enclosure, and the bronze plaque.

The first site annual inspection and the subject of this report took place on December 6, 2016. The site was found to be in good condition with no immediate maintenance needs or cause for a follow-up inspection identified. Some improvements to reduce the growth of vegetation and burrowing rodents were discussed among the inspection team and are scheduled for fiscal year 2018. No sampling is required at the site; however, DOE will conduct radiologic surveys every 5 years to ensure the pad enclosure remains intact and protective of human health and the environment.

A Long-Term Stewardship discussion was held by DOE immediately following the site inspection, with the county, the state, Navarro Research and Engineering, Inc., and UC Berkeley representatives in attendance. The meeting was held at the Burris Park Convention Center, adjacent to the site. The long-term strategy of the Burris Park site was discussed, and the path forward was agreed upon. The stewardship discussion points and decisions are documented in Appendix A, of this inspection report.

2.0 Inspection Requirements

The *Burris Park, California, Site Long-Term Surveillance and Maintenance Plan* (LTS&M Plan) (DOE 2016) establishes how DOE LM will maintain the site; ensure institutional controls and protective measures are working effectively; and communicate schedules, plans, and outcomes of annual inspections with the regulator, land owner, and other interested parties.

Table 1 is a crosswalk of this inspection report to the LTS&M Plan.

Table 1. LTS&M Requirements for the Burris Park, California, Site

Requirement	Long-Term Surveillance Plan	This Report
Institutional controls	Section 3.1	Sections 2.1–2.4
Management of site records	Sections 3.2, 3.4	Section 4.0
Annual inspections and reports	Section 3.6	Section 3.0
Follow-Up or contingency inspections	Section 3.6 and Table 1	Section 3.0
Routine maintenance and repairs	Section 3.6 and Table 1	Sections 2.1–2.4

2.1 Institutional Controls

DOE Policy 454.1, *Use of Institutional Controls* (DOE Policy 454.1), applies the term "institutional controls" (ICs) to include legal instruments (e.g., land use restrictions), physical or engineering controls (e.g., fences, signs), and methods of providing information to people (e.g., fact sheets, interpretive displays) that help minimize the risk of human and environmental exposure to contaminants and maintain the remedies at a site. The following engineering and physical controls are currently associated with the site under DOE's broad application of ICs: (1) A concrete containment structure, which entombs the remaining 20 millicuries of the Sr-90 isotope after 57 years of natural radioactive decay; (2) A bronze plaque providing historical information and secured into the southeastern corner of the concrete pad; (3) A chain-linked fence with a locked gate to prevent public access to the concrete enclosure; and (4) Updated signs that provide current information and contact numbers in the event of an emergency. These ICs, as well as legal instruments, public information, and dissemination mechanisms are further detailed in the sections below.

2.2 Concrete Enclosure and Historical Plaque

Antique farm equipment, wood debris, and two fallen dead trees were removed from the concrete pad in March 2015. Two live trees were cut down and also removed at this time to ensure continued protectiveness of the concrete enclosure. The surface of the concrete pad was washed off and inspected. Minor cracks were scanned by a radiological control technician; no results were above background. The historical bronze plaque located on the southeast corner of the pad was cleaned of dust and debris and remains in good condition. No maintenance or deferred maintenance needs for these ICs were identified. PL–1 through PL–3 are representative photographs that show the current condition of the ICs.

2.3 Fence

Fence maintenance was completed in March 2015. Barbed wire was removed, metal rails were straightened or replaced, the southeast corner post was replaced, and the entrance gate was adjusted for easier access. PL–4 and PL–5 show the condition of this IC. A few of the wire hooks used to secure the fencing to the posts are missing or broken. Fence hooks will be purchased and sent to the county park custodian, who volunteered to fix the fence. No further maintenance is required for this IC. The expected longevity of the fence is about 25 years. DOE will plan to replace the entire fence and gate in 2040.

2.4 Signage

Signs on each side of the fenced area were replaced with signs (two per side) that provide DOE LM as the correct contact for the site. PL–6 shows the old signage, and PL–7 shows the new signage. The county, on behalf of the new Burris Park museum curator and UC Berkeley, requested one of each of the old signs for historical purposes. DOE will ship the two old signs to the Kings County Parks and Grounds Superintendent prior to next scheduled inspection.

3.0 Site Inspection Results and Report

The *2016 Annual Inspection Checklist, Burris Park, California, Site,* was developed as a tool to insure that all aspects of the site were evaluated and results documented. The completed checklist is located in Appendix B. Major items, requirements, and actions in the checklist include protocols for notification of affected parties, ensuring site access, addressing the inspection requirements mandated by the LTS&M Plan, and providing the existing condition and any required maintenance conducted or follow-up work needed before or during the next inspection.

The first annual inspection of the site was conducted on December 6, 2016, at 9:00 a.m. Attendees included:

Cliff Carpenter, DOE LM Site Manager

Darina Castillo, DOE LM Manager

Elizabeth Holland, DOE LM Real Property

Tim Breshears, Kings County Parks and Grounds Superintendent

Roger Lupo, Radiation Health Branch of the California Department of Public Health

Michele Miller, LMS Site Manager

Darlene DePinho, LMS Environmental Compliance

Nathaniel Killebrew, Kings County Burris Park Custodian

Jim DeZetter, Environment Health & Safety at UC Berkeley

Historical information, stewardship highlights, and agenda for the impending inspection were sent to all parties involved on November 29, 2016.

The overall site condition was determined to be good. A few minor improvements will be made during the 2017 site visit or by the park custodian. These include: removing grass clumps that are emerging, removing dead vegetation that is beginning to collect within the fenced area, adding more wire clips to better secure the fence to the posts, and adding sealant to a few cracks in the concrete pad to prevent water intrusion.

Future maintenance activities at the site may include:

- Managing the physical condition of the site
  - minimal landscaping
  - removing vegetation
  - applying herbicide or pesticide
  - repairing fence, gate, and signs
- Conducting periodic radiological surveys to confirm the integrity of the concrete protective cap
  - Using fillers, sealants, or resurfacing agents to reseal the cap and ensure continued protection of human health and the environment

Longer term improvements and commitments are discussed in Section 5.0.

4.0 Site Records and Public Information

DOE maintains a webpage and a fact sheet for the site, both of which are updated annually and are current. Although a verbal access agreement has been in place since 2014, a formal agreement was finalized on December 5, 2016, and is now a matter of record. All inspections, maintenance actions, and correspondence are documented and maintained as records. DOE complies with National Archives and Records Administration records archiving and destruction protocols.

5.0 Burris Park Site Path Forward Summary

The *Burris Park Site Path Forward* consists of a detailed stewardship strategy designed to get input from regulators, the county, and other interested parties, when considering the future of the park and the surrounding areas, as well as a regulatory perspective as to how the site can be managed to best protect the community and the environment. During the long term stewardship discussion on December 6, 2016, the group came to a consensus on several issues, most of which are discussed in the updated Path Forward document provided in Appendix A.

A few of the most significant points for the path forward include the following:

1) In the fall of 2018, DOE will conduct work at the site to regrade the area, add fabric and stone cover between the pad and the fence, and reverse the gate so that it opens outward for easier access.
2) DOE will replace the entire fence once it reaches the 25-year life expectancy in 2039.

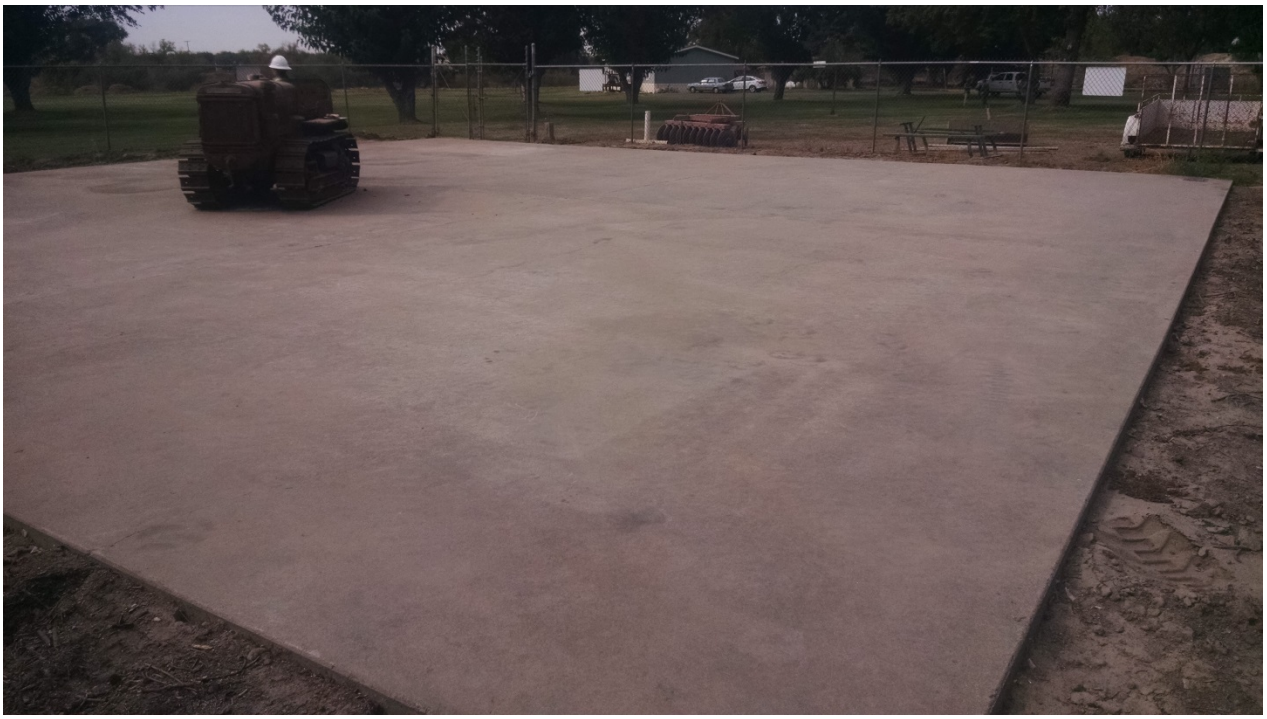
3) DOE will retain responsibility for the site and maintain the fence and concrete containment until Sr-90 activity within the enclosure reaches background concentrations. This is expected to occur around year 2240, unless the State of California establishes Sr-90 standards sooner.

4) The park custodian will continue to apply herbicide and pesticide as needed to control vegetation and vermin.

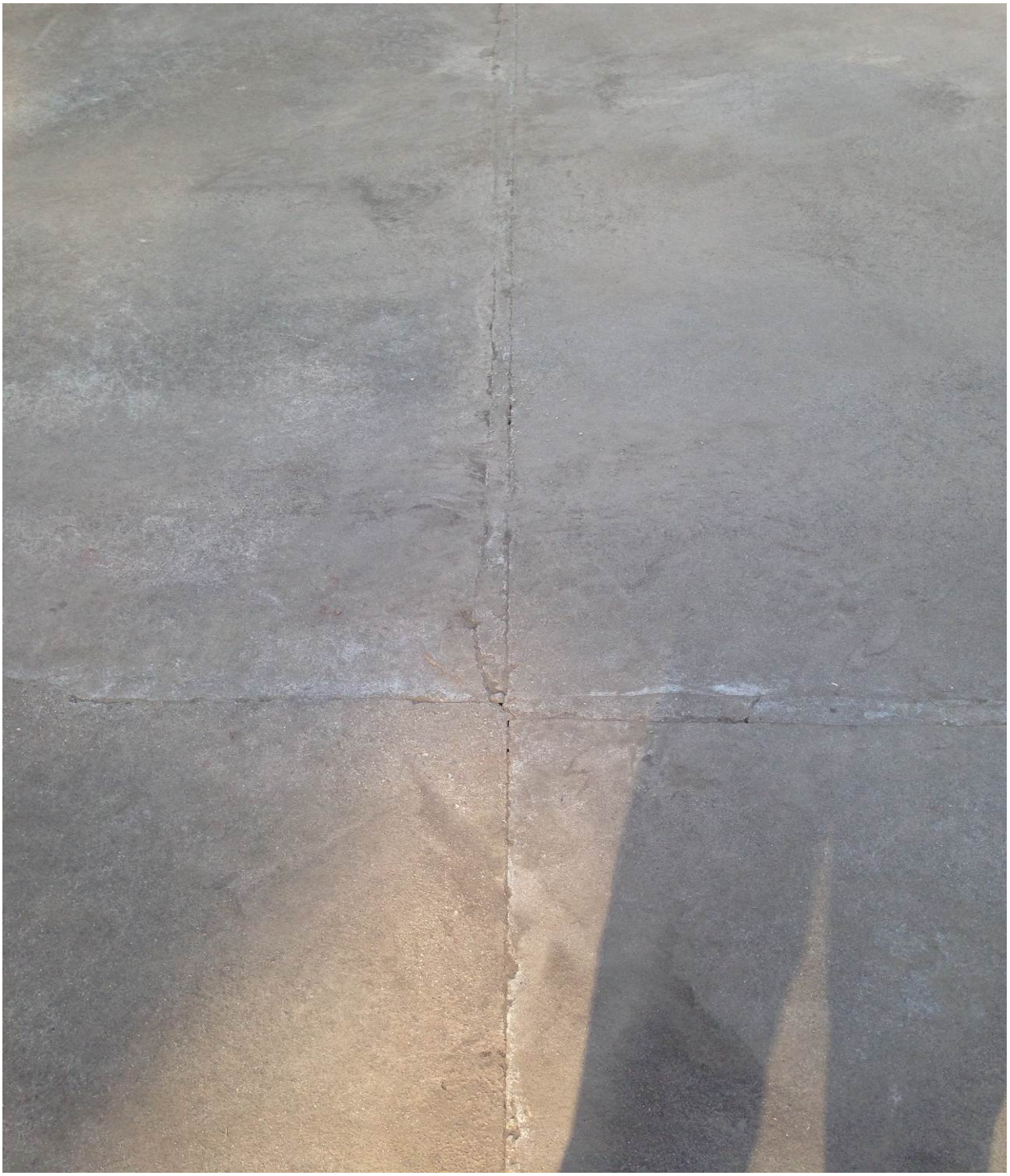
5) The county samples the onsite potable water well every 3 months. The state has agreed to get a split of the sample and analyze for gross alpha and gross beta during a scheduled sampling event. These results will be shared with DOE.

6.0 Photographs

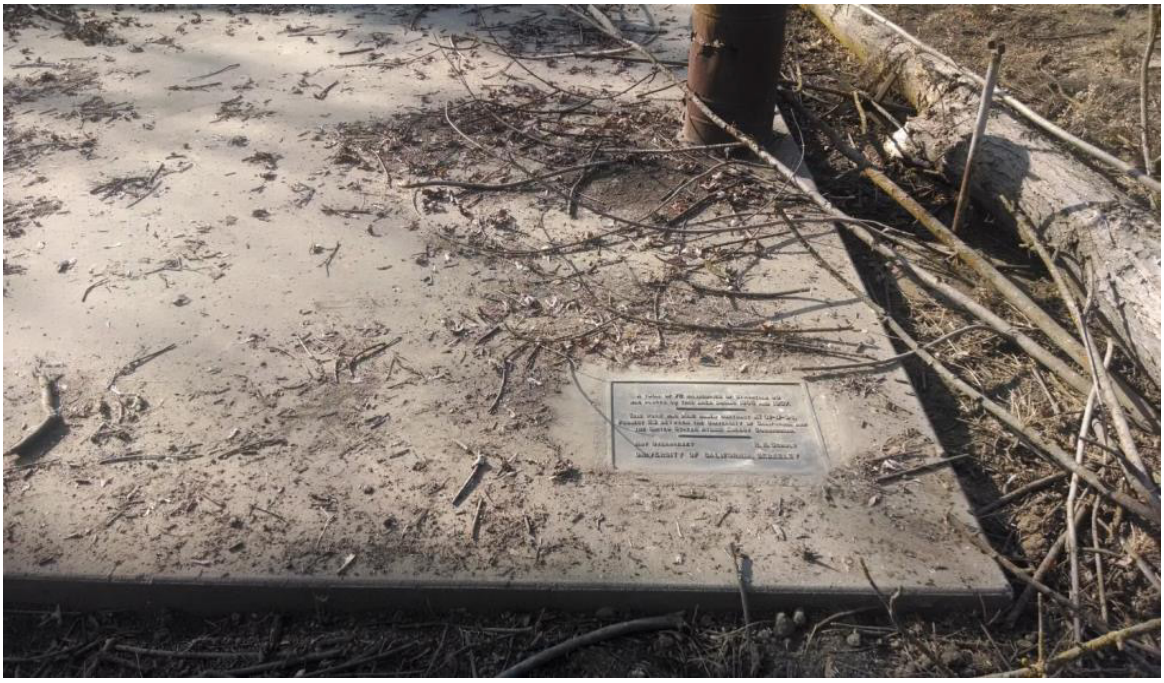
Photo Location Number	Photograph Description
PL–1	Concrete pad surface looking northeast
PL–2	Concrete pad surface looking east
PL–3	Bronze plaque (before pad was cleaned) looking north
PL–4	Fence looking south
PL–5	Fence gate looking northeast
PL–6	Old signage
PL–7	New signage on north fence looking southwest
PL–8	Inspection participants



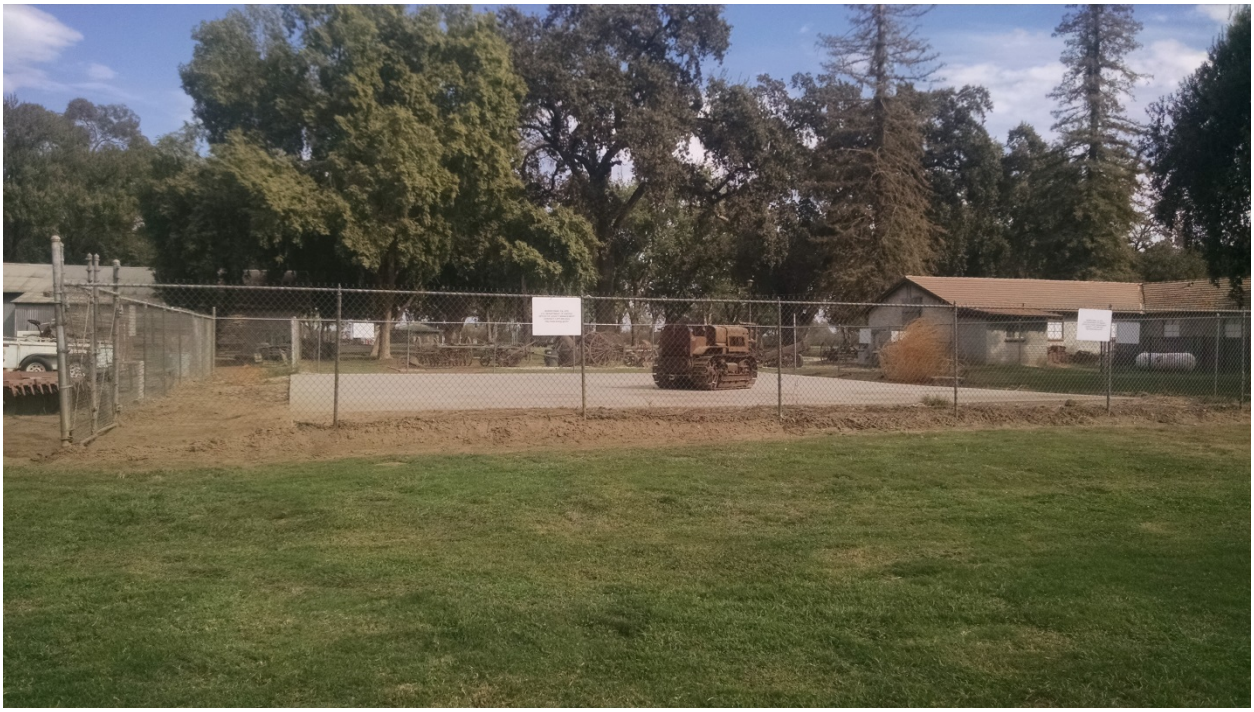
PL–1. Concrete pad surface looking northeast



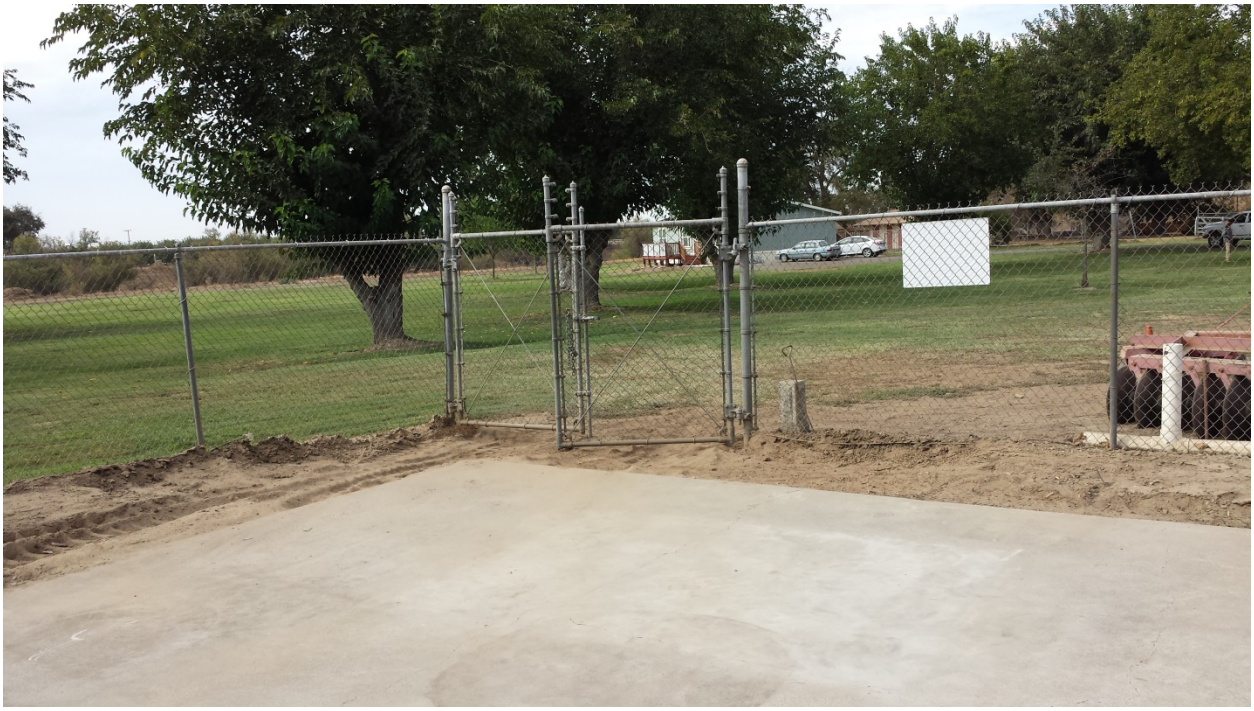
PL–2. Concrete pad surface looking east



PL–3. Bronze plaque (before pad was cleaned) looking north

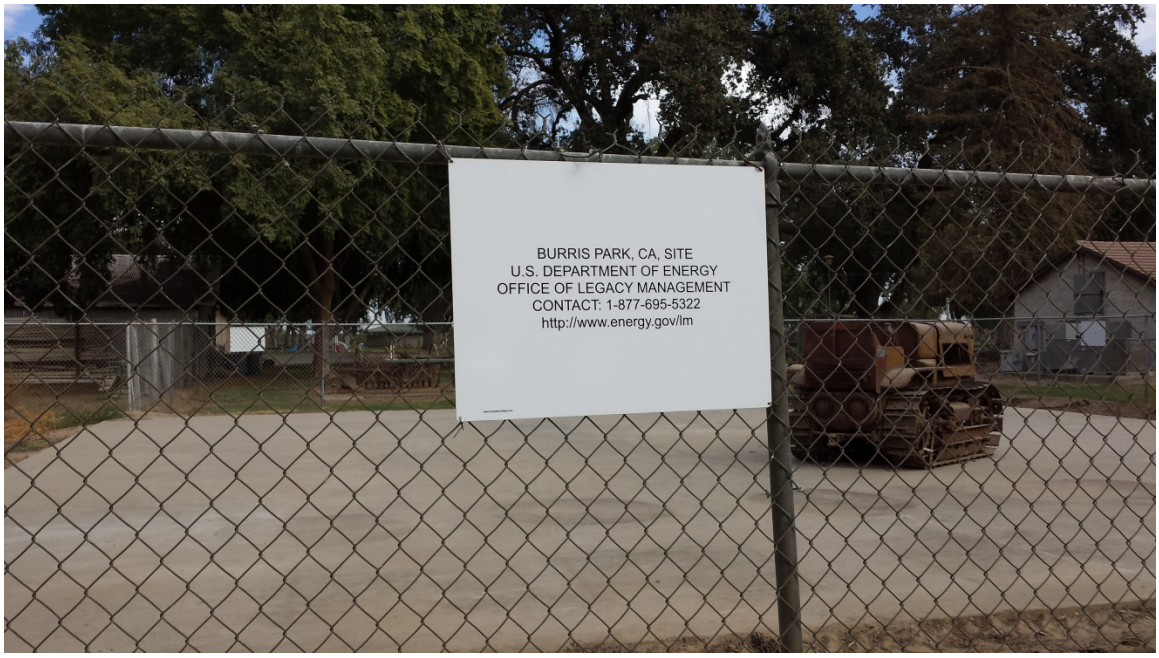


PL–4. Fence looking south

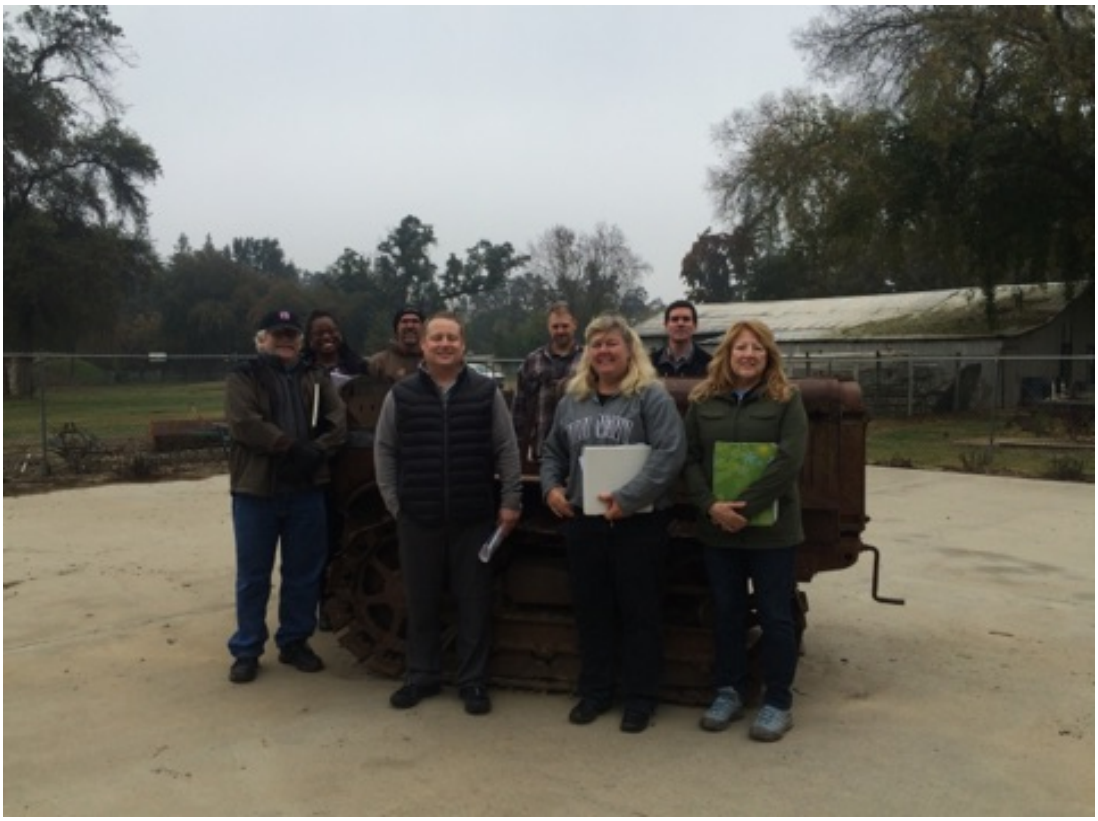


PL–5. Fence gate looking northeast

PL–6. Old signage



PL–7. New signage on north fence looking southwest



PL–8. Inspection participants

7.0 References

2014. S. Alderson, S.M. Stoller, email communication to M. Widdop, S.M. Stoller, U.S. Department of Energy Office of Legacy Management, April 15.

DOE (U.S. Department of Energy), 2016. *Burris Park, California, Site Long-Term Surveillance and Maintenance Plan*, LMS/BRP/S12974, Office of Legacy Management, September.

Appendix A

Burris Park Site Path Forward

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Attendees

Cliff Carpenter, DOE LM Site Manager
Darina Castillo, DOE LM Manager
Elizabeth Holland, DOE LM Real Property
Tim Breshears, Kings County Parks and Grounds Superintendent
Roger Lupo, Radiation Health Branch of California Department of Public Health
Michele Miller, LMS Site Manager
Darlene DePinho, LMS Environmental Compliance
Nathaniel Killebrew, Kings County Burris Park Custodian
Jim DeZetter, Environment Health & Safety at University of California—Berkeley

Site Statement of Work

The Burris Park, California, Site (formerly the Burris Park Field Station) has been identified by the U.S. Department of Energy (DOE) Office of Legacy Management (LM) as a site selected and operated by the University of California—Berkeley (UC Berkeley) to conduct strontium-90 (Sr-90) research on behalf of DOE (formerly the U.S. Atomic Energy Commission) in the early 1960s. The site also requires continued long-term surveillance and maintenance. Specifically, the site consists of a 50-foot by 50- foot fenced area enclosing a 42-foot by 42-foot former research area covered by a reinforced concrete cap. The site is part of a 57- acre county park owned and maintained by the Kings County Parks and Grounds Division.

The *Burris Park, California, Site Long-Term Surveillance and Maintenance Plan* (LTS&M Plan) (DOE 2016) establishes that DOE LM will maintain the institutional controls and protective measures, which include: access agreement, fencing and signs, management of the physical condition of the site, preservation of historical records to retain site knowledge, and responses to stakeholders' inquiries.

Stewardship Strategy

- The 57-acre county park continues to be owned and maintained by the Kings County Parks and Grounds Division. The California Department of Industrial Relations requires that any subcontractor used by the DOE LM obtain an Industrial Relations permit to be registered with the county prior to performing work in the parks. Burris Park closes for the winter during the last weekend in October.
- The Kings County Parks and Grounds Division will maintain an access agreement with DOE LM for the 50-foot by 50-foot fenced area within the county park, known as the Burris Park Site.
- DOE LM will conduct annual inspections for the first 3 years (2016−2018) and every 5 years thereafter.
- In fiscal year (FY) 2018, DOE LM will cover the soil between the concrete pad and the fence with landscape fabric or plastic liner and rock to prevent vegetation from growing and to deter burrowing animals.
- The Kings County Parks and Grounds Division will continue to perform, at no cost to the government, vegetation management around the protective concrete pad and within the fence line surrounding the site.
- The fence surrounding the site has a life of 25 years and will be replaced in FY 2039.
- LM will reseal, reinforce, or replace the protective cap as necessary.
- DOE LM provided information regarding the U.S. Nuclear Regulatory Commission (NRC) regulations that stipulates a 25 millirem per year (mrem/yr) screening limit. The resultant soil guideline for a farmer or rancher scenario for SR-90 is calculated to be 36.9 picocuries per gram (pCi/g). A DOE contractor, using RESRAD determined that the initial maximum dose at time zero, resulting from 72 millicuries (mCi) of Sr-90 is calculated to be 677 mrem/yr. Using the RESRAD-generated dose versus time graphic, the year the dose falls below 25 mrem/yr to the farmer/rancher receptor (i.e., activity of less than 36.9 pCi/g) occurs around year 2090 (Alderson, S.M. Stoller 2014). Using 1960 as the year, 72 mCi of Sr-90 were applied to the 14 test plots; Sr-90 has been decaying for 57 years. Therefore, by 2050 (90 years), the site will comply with the protective requirements per the NRC standard for a farmer or rancher.

- During the discussion, it was determined that the protective concrete pad will be maintained and surveyed every 5 years starting in FY 2019 until the cap is no longer required. Roger Lupo maintained the state's current requirement is that the Sr-90 must be managed until radioactivity decays to background levels. Therefore, LM will retain long-term stewardship responsibility until the Sr-90 under the pad is equivalent to background concentrations. This should occur 280 years after initial application (about year 2240).

- Mr. Lupo stated that California is currently looking at a Sr-90 standard resulting in an approximate 12 mrem/year dose rate, which is equivalent to about half the NRC standard.

- Jim DeZetter stated that UC Berkeley currently remediates to background per state requirements.

- Per recommendation, DOE LM will conduct a formal site survey and amend the Access Agreement to include GPS coordinates within the next 3 years.

- It was agreed that by FY 2019, the Kings County Parks and Grounds Division will move the tractor off of the concrete pad.

- Tim Breshears requested that examples of outdoor displays that DOE has used at various DOE LM visitor centers be sent to the new museum curator. Both the county and UC Berkeley requested one of the old signs from the original remedial action. These will be sent within the next month.

- It was explained to DOE LM that every 3 months the county samples the onsite potable water well for gross alpha beta as well as other water-quality parameters. The state requested to be notified of the sampling event to collect a split sample. Both agencies agreed that DOE-LM would be sent a copy of the analytical report to confirm that the remedy continues to be protective. The county will also send all information regarding well depth and construction if it is available.

- Cliff Carpenter, of DOE LM, confirmed that the 2017 inspection would be around the same time next year.

- This document will serve as a record to file and close out the State of California's position that DOE will maintain the site until the Sr-90 reaches background concentration levels or an alternative standard established by the state, whichever comes first.

DOE LM and Navarro Research and Engineering, Inc. would like to thank everyone for attending and engaging in this discussion, and we look forward to meeting with you in the future.

Appendix B

2016 Annual Inspection Checklist Burris Park, California, Site

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2016 ANNUAL INSPECTION CHECKLIST
BURRIS PARK, CALIFORNIA, SITE

Research and remediation was conducted by the University of California, Berkeley (UC Berkeley) on behalf of the Department of Energy (DOE, formerly the AEC) at the Burris Park, California, site (BPS) in the early 1960's. The site requires long-term surveillance and maintenance, specifically for residual Sr-90 located in the soil beneath the 42ft x 42ft concrete protective barrier. The Burris Park Long-Term Surveillance and Maintenance Plan defines how the DOE Office of Legacy Management will maintain the institutional controls and protective measures. DOE uses the checklist below to complete BPS inspections. Any significant actions required will be scheduled to be completed prior to or during the next inspection.

No.	ITEM	REQUIREMENTS	ACTION
1	Protocols	Notify the following of the date of the inspection: • Kings County Parks and Grounds – Tim Breshears • CDPH Radiation Protection – Roger Lupo • UC Berkeley, ESH – Jim DeZetter	Notifications were made via email on 11/29/2016.
2	Access	Access to the site is restricted. The formal access agreement between the DOE and Kings County Parks and Grounds Division has been finalized.	• The formal access agreement was finalized on December 5, 2016. • Adhere to the Burris Park visitor requirements and follow the instructions of our escort. • County to relocate the historical farm equipment from the site before the end of calendar year 2019.
3	LTSM Plan	Current LTSM Plan (September 2016): • Managing Site Records	Both the Burris Park LM Web page and the Site Fact sheet are reviewed and updated annually. Both were reviewed November 2016 and are current.

No.	ITEM	REQUIREMENTS	ACTION
		• Responding to Stakeholder Inquiries	No stakeholder inquires to date (Dec 6) since November 2014.
		• Managing Institutional Controls	Three institutional controls are captured as FIMS Assets: the protective concrete enclosure, the fence, and the bronze plaque. Their condition is updated annually and out-year replacement for the fence has been captured.
		• Annual Inspection- annual for first 3 years, and on a rolling 5-year schedule, thereafter.	2016 is the first formal site inspection per LTSM *Site Inspection addressed under Item 4.*
4	Inspection of Specific Site Surveillance Features	**Site Area** A concrete containment structure with a 42ft x 42ft protective concrete cap entombs the remaining 20 millicuries of Sr-90.	Perform a walkover of the site area. Look for any integrity issues, (e.g., cracks, ponding water, burrowing animals, etc.).
		Pad will be cleaned as necessary, and inspected for cracks and integrity of structure. A radiologic survey will be conducted every 5 years.	Visually inspect the protective concrete barrier to ensure that: • The pad does not contain deep cracks or concrete fragments, and • The corners of the pad are intact. SW corner of pad has been scraped or rubbed off. Monitor this area for any changes. Apply sealant to larger cracks to prevent water intrusion.
		Soil area extends beyond fence-line and will be returned to within the fence line during the 2018 improvements.	Visually evaluate the soil area around the pad to ensure that: • Soil is not eroding or subsiding, • No overgrown or deep-rooted, perennial vegetation is present, and

No.	ITEM	REQUIREMENTS	ACTION
			• No rodent holes are within the fenced area. Regrade and pack soil and remove any (new or old) vegetation during the 2018 improvements.
		Any trees and shrubs will be removed.	The Park Groundskeeper has done a good job of vegetation control.
		Site Perimeter Fence The barbed-wire was removed from atop the fence and the fence and entrance gate were repaired in 2015. Fence needs a few wire clips to fasten the fence to the posts in a few places. These will be sent to the groundskeeper to install. A lock is installed on the gate to limit access. It is in good condition.	Visually inspect the 50ft x 50ft perimeter fence: • Fence condition: good, average, or poor • The gate opens and closes easily and is not bent or tilted, • Area outside the fence: no clutter, no objects leaning against or attached to the fence, • Check and note the condition of the lock. Change the gate hinges to swing outward for better access. Maintain a 3ft access around fence.
		Site Information Plaque and Signs The historical plaque was cleaned and checked to ensure it is secured to the pad. Existing signs along the fence were replaced by signs containing DOE's contact information. Locations: • 1 information plaque describing the content of the containment, and • 8 signs, 2 on each side of fence.	Visually inspect the signage: • Information plaque is present, secure and legible. • Signs are in good condition, legible, level and secured to the fence. Verified contact information. Signs and plaque are in good condition.

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