



# Santa Susana Field Laboratory

## NASA's Interim Source Removal Action

The following describes the steps NASA is taking to implement an Interim Source Removal Action (ISRA) to address surface water discharge on property NASA administers in Areas I and II at the Santa Susana Field Laboratory.

NASA is in the process of investigating property the agency administers in Areas I and II as part of an overall cleanup program at the Santa Susana Field Laboratory (SSFL). NASA is committed to conducting a cleanup of its property to a level that is protective of public health and the environment and meets regulatory requirements. Currently, NASA is implementing a short-term action used to prevent or mitigate risks to human health or the environment before a final remedy has been selected. NASA's Interim Source Removal Action (ISRA) is designed to remove potential sources of contaminants and improve the quality of surface water discharge.

Surface water discharge at the SSFL results from rainfall from intermittent (and largely seasonal) storm events. Rain water falling on the higher areas at the center of the SSFL is directed into primary drainages, which discharge past measuring points called outfalls into regional drainage systems. (See side bar)

Outfalls at the SSFL are regulated by the National Pollutant Discharge Elimination System (NPDES) permit program and the Clean Water Act. Boeing is the permit holder for all outfalls at the SSFL. The California Regional Water Quality Control Board (RWQCB) Los Angeles Region oversees the permit (NPDES Permit No. CA0001309). Outfall 009 is located in the north-central portion of the SSFL on land NASA administers in Area II. Another drainage point, Outfall 008 is located on Boeing-owned land in the eastern portion of the SSFL.

Outfall 009 lies within the Northern Drainage watershed, which encompasses approximately 536 acres on SSFL property and the adjacent Sage Ranch Park and American Jewish University properties to the north. Storm water from Outfall 009 flows northward through predominantly undeveloped land draining to Meier Canyon and on to Arroyo Simi, Arroyo Las Posas, and Callegua Creek. (See Figure 1)

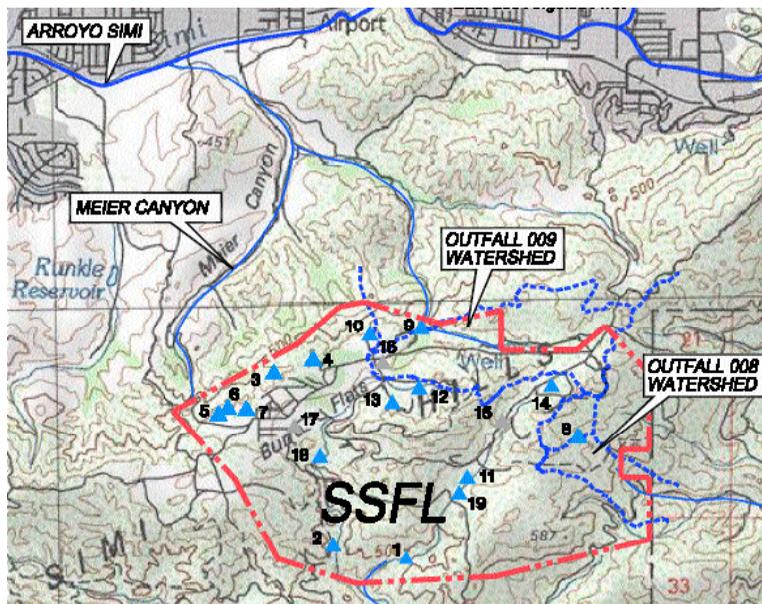


Figure 1 Northern Drainage Watershed

for your information

Outfalls 008 and 009 have had detections of certain chemicals above water quality standards. These outfalls would benefit from source removal and are the subject of a recent order issued by the RWQCB (California Water Code Section 13304 Cleanup and Abatement Order, December 2008).

The NPDES permit requires surface water discharge monitoring at 16 outfalls across the entire SSFL, including four (Outfall 009, 12,13 and 18) that are located on property administered by NASA. During storm events, chemicals in the soil – some naturally occurring and some resulting from past practices at the SSFL - potentially can be mobilized by surface water runoff (through soil erosion) and contribute to the chemicals measured in surface discharge water.

A number of facilities associated with historical operations at the SSFL are present in the Outfall 009 watershed and are being investigated by NASA as part of an ongoing cleanup program with oversight from the Department of Toxic Substances Control (DTSC).

The NPDES Permit established monitoring in the Northern Drainage as Outfall 009 in July 2004. The NPDES Permit has since been amended four times, and most recently renewed in May of 2009. Between 2004 and March 2009, a total of 36 samples have been collected at Outfall 009. Chemicals detected, called constituents of concern (COCs), are cadmium, copper, lead, mercury and dioxins.

### **Implementing an ISRA**

NASA's objective in implementing an ISRA is to improve surface water quality within the Outfall 009 watershed by identifying, evaluating, and remediating areas of contaminated soil. Implementing an ISRA involves a systematic process (described below) with emphasis placed on minimizing impacts to the streambed adjacent to habitat during cleanup activities, protecting water quality during and after cleanup activities, and restoring the streambed and surrounding habitat following cleanup activities.

### **Identifying and Evaluating Source Areas**

It was first necessary to identify the source areas having soils that contain COCs with the potential for mobilizing in storm water runoff. NASA compiled a database of existing surface soil samples (zero to two feet below ground surface). The focus was on surface soils as they are more likely than deeper soils to migrate into surface water. NASA conducted an initial evaluation and identified Preliminary Evaluation Areas (PEAs). These locations had concentrations of cadmium, copper, lead, mercury and dioxins greater than their respective background comparison concentrations. (Note: soil background comparisons established by the Department of Toxic Substances Control are under review.)

Sampling was performed in and around the former operational areas as a follow up to previous sampling. Locations found to contain COCs in excess of permit limits were added to the list of PEAs. Radiological screening of all soils was done to ensure their proper disposal.

Twelve PEAs were identified in Outfall 009. Six PEAs are located on NASA-administered property, five are on Boeing land and one PEA is shared between NASA and Boeing. (See Figure 2)

**The six NASA PEAs:**

**Expendable Launch Vehicle (ELV-1)**

**Sewage Treatment Plant (PEA-AP/STP-1)**

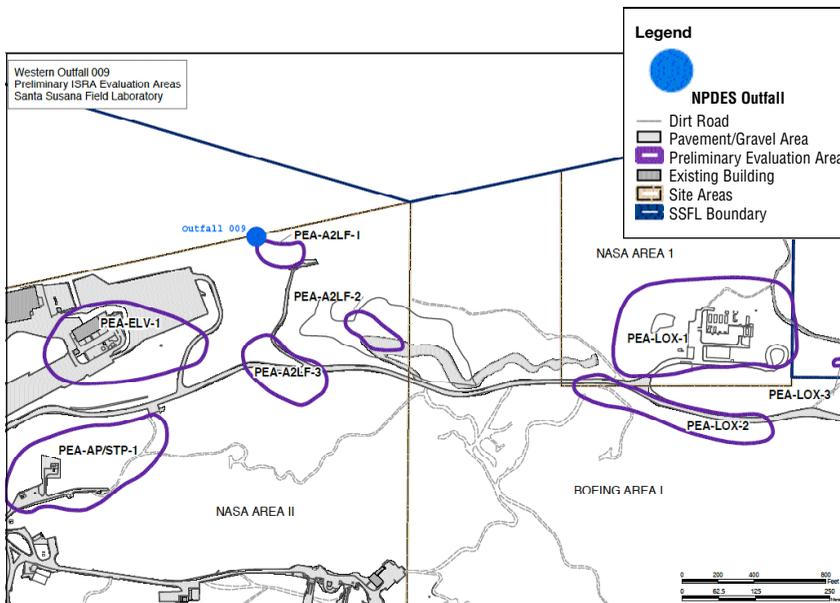
**Three at the Area II Landfill (PEA-A2LF-1,-2,-3)**

**LOX Plant (PEA-LOX-1) in Area I**

**NASA and Boeing share PEA-LOX-3.**

After PEAs were defined, a comprehensive assessment of COC concentration, mass, magnitude and chemical makeup was done.

Next, physical conditions were reviewed such as the PEA's proximity to drainages and asphalt coverings to highlight the PEAs having the greatest potential for contributing COCs to the surface water drainages.



**Figure 2** NASA's Preliminary Evaluation Areas (PEAs)

**Removal Alternatives**

**Excavation**

removing contaminated soils for disposal at an off-site permitted disposal facility.

**Low Permeability Soil (Clay) Cap**

completely covering the area with a thick layer of compacted clay.

**Geomembrane Cap**

covering the area with an impermeable man-made layer protected with a 12-inch layer of clean soil or gravel.

**Asphalt Cap**

similar to conventional road paving to serve as an impermeable cap.

**Diversion/Collection Surface Controls**

diverting storm water around the area to be collected and treated.

**Chemical Surface Controls**

mixing a chemical additive to the area soil to bind soil particles and reduce erosion.

**Solidification/Stabilization**

stabilizing soil using a cement process.

**Evaluating Source Removal Alternatives**

NASA reviewed source removal alternatives to evaluate their potential to remove the COCs from surface water. Each of the alternatives was considered for its short-term and long-term effectiveness, long-term reliability, implementability, environmental impact and sustainability, and cost. In addition, alternatives were screened to ensure that methods used during implementation of the remedial action would protect the streambed, habitat and water quality during soil removal and would restore the area following cleanup activities.

Excavation was identified as the most appropriate removal alternative at locations A2LF-1 and A2LF-3 (See Figure 2). During NASA's evaluation of its remaining PEAs, all removal alternatives will be considered as potential actions before a specific method is selected.

### **Source Removal is Underway**

Excavation has begun and involves the removal of the contaminated soil in A2LF-1 and A2LF-3 and its disposal at a permitted disposal facility. In places with adequate access, soil removal is being performed using an excavator or backhoe. Otherwise, a vacuum truck will be used. Confirmation soil sampling will document that remaining COC concentrations are at or below background levels. Sampling of surface water during the rainy season will evaluate the effectiveness of these removals. Following excavation, the areas will be restored to minimize erosion and promote vegetation.

The proposed ISRA schedule submitted to the RWQCB in May 2009 calls for a phased implementation. Phase I began in November 2009 for the NASA A2LF-1 and A2LF-3 areas within the Outfall 009 watershed. Implementation of follow-on phases will occur in 2010 and 2011, with completion expected by September 2012. ■

### **For further information, please contact**

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