STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION

STAFF REPORT FOR REGULAR MEETING OF FEBRUARY 4, 2010
Prepared on January 13, 2010

ITEM NUMBER: 11

SUBJECT: **Land Disposal Program Update**

SUMMARY:

This status report provides a Land Disposal program update including a program overview, staffing, a summary of the economic impacts on the solid waste industry, priorities, fiscal year 2008-2009 achievements, proposed work for fiscal year 2009-2010, and brief summaries for selected landfills throughout the Central Coast region.

DISCUSSION:

Program Overview: Land Disposal program staff oversee 63 waste disposal sites throughout our region. Fourteen of the 63 disposal sites are active and the remaining sites are closed, inactive, or undergoing closure. Fifty-eight land disposal sites are covered by either individual (32 sites) or general (23 sites) waste discharge requirements (WDRs). Disposal sites in the region range in size from active, hundred acre, multi-cell, state-of-the-art facilities (e.g., Monterey Peninsula and Santa Maria Landfill) to small, unpermitted one- to two-acre closed sites (e.g., Creston and San Martin sites). A summary table is included as an attachment to this staff report (Attachment 1).

The overall trend in landfilling during the last fifteen years has been towards larger, regional facilities (Tajiguas, Monterey Peninsula, Johnson Canyon, Las Flores, etc.) and away from smaller landfills. As such, a number of smaller sites have moved through closure/final cover installation and are now in the post-closure, maintenance, and monitoring phase. Examples of these smaller site closures include landfills at Foxen Canyon, Pacheco Pass, New Cuyama, and Jolon Road. In mid 2010, the Crazy Horse Landfill in Prunedale will close and the Salinas Valley Solid Waste Authority (SVSWA) plans to divert its waste stream to Johnson Canyon Landfill in Gonzales. Additionally, all residential waste historically accepted at the City of Watsonville and Buena Vista Landfills is currently transported and disposed of at the Monterey Peninsula Landfill due to their favorable disposal rates.

This shift to larger regional sites reflects promulgation of revised regulations at the state (Chapter 15 of Title 23, pre-Title 27), and federal (Subtitle D) level in the early 1990s. These state and federal landfill regulations required low-permeability liner and leachate collection systems for all new landfill cells. These more protective landfill regulations were borne out of studies, including the California's Solid Waste Assessment Test (SWAT) program, indicating a very high correlation between unlined landfills and groundwater impacts. All the land disposal sites in our region are either unlined or have portions of their waste footprint in unlined areas because they were built prior to the 1990s. However, since the early 1990s all new waste modules/cells are built with engineered liners approved by Central Coast Water Board staff. The liners meet or exceed regulatory performance standards for waste containment for the protection of groundwater and surface water.

Program Staffing: Funding for statewide landfill program staff comes from two sources. Active landfills pay a portion of their tipping fees[1] into an account administered by the Integrated Waste Management Board. The State and Regional Water Boards receive a portion of these fees to oversee water quality-related regulatory compliance (e.g., liner/cover evaluation, slope stability, groundwater monitoring, etc.) at active landfill sites. Annual fees associated with WDRs pay for oversight of closed landfills.

The State Water Board provides funding for approximately 2.6 staff to oversee the land disposal program in this region. In contrast, the State Water Board provided funding for approximately 5.0 staff for this region in 2000. The reduction in resources reflects declining tipping fees from active landfills, although this region received a disproportionately large reduction in personnel authority (i.e., staff positions) relative to other regions.

The Land Disposal unit consists of Hector Hernandez and Martin Fletcher, who work exclusively on landfill issues, and Dan Niles who dedicates approximately 30 percent of his time to landfill sites. Thea Tryon is the Land Disposal program manager (accounting for about 30 percent of her time), and John Robertson is the Groundwater Section manager who oversees the Landfill program in addition to the Site Cleanup, Underground Storage Tank, Department of Defense, and Perchlorate programs.

This fiscal year we are required to carry out our program functions with reduced hours and less funding. The furloughs equate to 14% less staff time and we also have a 3% reduction in our Integrated Waste Management Account fund (active site tipping fees).

Summary of Economic Impacts on the Solid Waste Industry:
According to the Solid Waste Association of North America (SWANA) and the National Solid Wastes Management Association, the state of the local, national, and international economy, is having an impact on all aspects of both public and private solid waste industry. The economic recession is resulting in reduced solid waste generation, resulting in lower tipping fee revenue for solid waste authorities.

A decline in residential and commercial construction and manufacturing is resulting in a reduction in waste. Additionally, when consumers cut back on spending, consumers produce less packaging, resulting in less curbside waste. The economic recession also has fewer consumers eating out, resulting in restaurants buying fewer products and producing less waste. Reduced housing prices are also resulting in lower property tax revenues, which impact municipal and county solid waste management budgets. Lower tipping fees will result in less income and sales tax revenues and reduced federal and state funding of solid waste programs. Recycling market prices are also declining, resulting in lower revenue to support recycling initiatives. The decline in solid waste volumes also impacts the waste haulers and manufacturing of waste related equipment.

Priorities for the Land Disposal Program: The primary focus of the Land Disposal program is to protect and restore beneficial uses of surface and groundwater and minimize public health impacts from landfilled waste. The Land Disposal team's work consists primarily of developing WDRs based on individual siting conditions and proposed liner designs, compliance inspections, evaluations of groundwater monitoring data and proposed liner and cover designs; enforcement tasks for active and closed land disposal sites, proper geologic siting of future landfills, and implementation of best management practices for stormwater runoff.

[1] Tipping fee is the charge levied upon a given quantity of waste received at a waste processing facility.

Groundwater impacts generally result from landfill gas and leachate[2] dissolving into groundwater. The sites posing the greatest risk to groundwater are older, unlined landfills with poor underlying geologic conditions (e.g., high permeability soils and shallow groundwater beneath an unlined portion of a landfill). As an example of priorities in action, since 2001, the Central Coast Water Board has required closure at two sites, Santa Maria (in 2002) and Crazy Horse (pending in 2010) through the adoption of revised WDRs. These are both large facilities with a high proportion of unlined acreage. Closure means that these sites will no longer receive municipal solid waste, and they will construct final cover systems over the existing refuse. Because of the impacts associated with unlined land disposal, Water Board staff will continue to direct facilities toward disposal over liner systems appropriate for the geologic conditions beneath their sites.

In an effort to make sure that landfill staff work on our highest priority sites and projects, we went through a recent prioritization effort. The prioritization effort allows us to focus our reduced resources on those sites that pose the greatest threat to water quality. Using the prioritization strategy, each project manager scored their landfills based on criteria, including threat to water quality, natural siting factors, waste volume and size, status of site (active versus closed), whether engineered corrective actions are in place, public and organizational interests, and whether pending Water Board actions were needed. Based on the combined prioritization criteria scoring for each landfill, we identify the highest and lowest priority work.

Out of 63 landfill sites, we have identified 12 high priority, ten medium priority, and nine low priority sites. Land Disposal staff spends 90 percent of their project management time on the high and medium priority sites and the remaining 10 percent of their project management time on low priority sites. Additionally, through our prioritization effort we identified 34 low risk landfill sites that we do not work on, unless water quality issues arise. Therefore, the prioritization effort, in combination with staffing reductions brought on by the furloughs and funding cuts, have resulted in the following program modifications:

- Focusing our inspections and project management time on those sites with the highest threats to water quality and/or risks to human health as identified through the ranking effort. Inspections allow for early detection of potential future water quality issues, and provide the caseworker with an understanding of the level of compliance effort at individual landfills. Identification and mitigation of inspection-identified landfill issues prevent future long-term water quality impacts.
- Focusing our staff time on review and approval of liner designs, and the subsequent construction of the liners. A properly designed and constructed liner is the best means for protecting water quality in the future.
- Reducing the frequency of Waste Discharge Requirements (WDRs) re-issuance. In the past, Water Board staff updated WDRs every five years for active landfills and every 10 years for closed landfills. Now we will update WDRs on an as needed basis (i.e., if there is an expansion or change in waste footprint) or every 7 years instead of every 5 years for active landfills.
- Reducing the frequency of monitoring requirements for landfills with lower threats to water quality. Less monitoring means less reporting, which results in less staff time spent reviewing reports for sites with lower threats to water quality.
- Reducing the number of inspections at closed landfills and those sites that the Integrated Waste Management Board (Waste Board) also inspects. For closed landfills a well maintained and functioning landfill cover and landfill gas collection system provides the best protection of water quality. Waste Board staff inspects and reports to us the results of landfill cover and landfill gas system inspections.

[2] Leachate is the liquid that drains or 'leaches' from a landfill; it varies widely in composition based on the age of the landfill and the type of waste that it contains. Leachate can usually contain both dissolved and suspended materials.

- Reducing our attendance at roundtables and other administrative related meetings and tasks. This includes updating the Board on the Land Disposal Program every two years instead of annually.

In addition to focusing our efforts on the high priority sites, Water Board staff is working to achieve the larger goal of restoration of our groundwater resources. As a result, landfills are assigned to staff grouped by groundwater basin. This change allows for better development of "groundwater basin knowledge" (water quality, geologic and hydrogeologic conditions, political issues, agency contacts, etc.). This shift will also help move us from an individual site perspective to a groundwater basin management/health perspective. In addition, this shift will help align us to achieve our vision's groundwater measurable goal No. 3 of making 80% of groundwater clean and making the remaining 20% exhibit positive water quality trends.

In general, our work products far exceed the list of priorities described above, and as such, we will continue to evaluate and redefine, as needed, the most important work we do in the Land Disposal Program.

Fiscal Year 2008-2009 Achievements: In the 2008-2009 fiscal year, the Land Disposal Program staff completed updates for two WDRs (Paso Robles and Chicago Grade landfills). The WDR updates resulted in revisions to specific landfill design, monitoring, and operations to protect water quality. For example, Water Board staff required additional groundwater monitoring at both landfills to address data gaps. We also conducted 35 inspections including liner or final cover construction projects at Santa Maria, Johnson Canyon, and John Smith Road. During these liner inspections, Water Board staff identified issues and they were addressed in the field in a cooperative manner to ensure a properly designed liner that will provide protection of groundwater for the future. We also worked with several dischargers to improve their stormwater management programs and wet weather preparedness, resulting in prevention of potential water quality issues during the rain season. This field presence helps assure that construction and management of stormwater adheres to design, waste discharge, and regulatory requirements. Land Disposal staff continues to review groundwater monitoring and other technical reports to ensure water quality beneath landfills is improving and protected from past and future disposal activities. Based on groundwater results, staff adjusts monitoring and reporting programs accordingly to maximize our resources on those sites that require more oversight.

Proposed Work for Fiscal Year 2009-2010: For the fiscal year 2009-2010 (July 2009 to June 2010) we are committed to:

1. Complete two Waste Discharge Requirement (WDR) updates for active landfill sites (Tajiguas and John Smith Road landfills). The Tajiguas WDR update is included in this Board meeting agenda. Each of these active landfills has one or more proposed expansions beyond the permitted footprint authorized in the current WDR. Updating WDRs for each of these sites affords us the opportunity to put in place the appropriate liner design requirements, specific to each individual site's geologic and hydrogeologic setting, for these expansion areas. The tangible outcome from staff's efforts on this is that these liner designs, once constructed, will provide a better level of groundwater protection than achieved by simply requiring the prescriptive performance standard. The updated requirements will also comply with current regulations and we will include requirements that protect water quality and mitigate existing groundwater impacts, as appropriate.
2. Complete a minimum of 30 inspections at our priority landfills. These inspections will include: a) pre-wet weather; b) wet-weather; and (c) liner or cover construction inspections. Inspections help ensure that landfills comply with all regulations/permits and are a proactive means for the identification of problem areas that may cause water quality impairments, if not addressed in a timely manner. Additionally, because we place a premium on the preventative capability of liner

systems, we need to ensure that landfill owners construct liners consistent with the approved designs. We use inspections during key portions of the liner construction, in combination with a requirement of an independent third-party construction quality assurance (CQA) oversight and certification, to assure liner containment integrity, resulting in better groundwater protection.

3. Complete our review of a minimum of 30 self-monitoring reports and a minimum of ten technical reports. Thorough reviews of reports allow staff to identify and focus on those landfills that require corrective action or investigation of water quality related issues. Additionally, technical reports that include liner designs require careful site-specific consideration to ensure designs are protective of water quality for the given groundwater basin.
4. Update Geotracker. An up–to-date Geotracker will allow staff to be more efficient with public participation and requests for information needs, allowing more time for other landfill-related tasks that benefit water quality.

Next Update: The next Land Disposal Program update will be no later than February 2012. Water Board staff will continue to keep the Board involved in our highest priority work through consideration of adoption of WDRs, and through individual site status reports of the Executive Officer's Report, as necessary.

SUMMARIES FOR SELECTED LANDFILLS: In the section below, Water Board staff includes a brief discussion of key information and a summary of activities at selected landfills throughout our region. The landfills are presented in order of priority relative to our recent prioritization efforts.

Crazy Horse Class III Sanitary Landfill, Prunedale, Monterey County

Acreage:	160 acres
Life Span:	Less than one year
Corrective Actions:	Groundwater pump and treat, enhanced bioremediation (southern area; landfill gas extraction (eastern area)
Priority:	High
Lead Staff:	Martin Fletcher

The Salinas Valley Solid Waste Authority (SVSWA) owns and operates the Crazy Horse Class III Landfill (Crazy Horse Landfill) located in Monterey County approximately nine miles north of the City of Salinas. The Crazy Horse Landfill covers approximately 160 acres, of which 72 acres was used for municipal solid waste disposal. The Crazy Horse Landfill began operation in 1934. Since 1972, the SVSWA developed the landfill in phases covering approximately 66 acres of which 51 acres are unlined and 15 acres are lined.

Revised Waste Discharge Requirements (WDR) Order No. R3-2007-0003 requires that the Crazy Horse Landfill close by April 30, 2009. However, the SVSWA requested a one-year extension and the Executive Officer approved the extension on April 3, 2009. The SVSWA closed the Crazy Horse Landfill to the public in May 2009. Since May 2009, SVSWA disposed of waste generated during the construction of onsite gas extraction wells, and green waste. After closure, SVSWA plans to maintain a transfer station at Crazy Horse Landfill to divert municipal solid waste to the Johnson Canyon Landfill, located in Gonzales. The Crazy Horse Landfill is now inactive and it has an intermediate cover, therefore, the percolation of water into the landfill is significantly reduced compared to when the Landfill was active. A final cover system will provide even better protection against percolation of water into waste and is a critical component of the groundwater corrective action for reducing the generation of landfill gas and leachate. Water Board staff expect final cover construction to begin in 2010 and it will likely take up to two years to complete.

Groundwater monitoring results indicate that there are impacts to groundwater from the Crazy Horse Landfill. There are three groundwater plumes, one south, west, and east of the landfill. In 1988, SVSWA installed and began operating a groundwater extraction and treatment system to mitigate groundwater impacts from Module I (Module I plume, located south of the landfill) and the SVSWA installed a final cover on Module I. Based on the groundwater impacts from Module I, the U.S. Environmental Protection Agency placed Module I on the National Priorities List (NPL) and the landfill became a Superfund site in 1990. SVSWA determined the Module I plume remains stable without operation of the groundwater extraction system, and recommends in-situ bioremediation, possibly coupled with targeted groundwater extraction, as the preferred final remedial alternative for this plume. Water Board staff are currently evaluating results from a bioremediation pilot study to evaluate the effectiveness of in-situ bioremediation for the Module I plume. The SVSWA also restarted the groundwater extraction system along the property boundary to ensure VOCs do not migrate to domestic wells nearby. The SVSWA recently characterized the nature and extent of the eastern and western groundwater plumes; and identified enhanced landfill gas recovery and final closure as the best remedial strategies for controlling these plumes. Water Board staff concurs with SVSWA that enhanced landfill gas recover and final closure will be effective remedial strategies for controlling the eastern and western groundwater plumes.

Santa Maria Landfill, City of Santa Maria, Santa Barbara County

Acreage:	290 acres
Life Span:	9-10 years with optional Cell No. 2; 5-6 years without Cell No. 2
Corrective Actions:	Enhanced landfill gas extraction; required closure
Priority:	High
Lead Staff:	Martin Fletcher

The City of Santa Maria owns and operates the Santa Maria Regional Class III Landfill (Santa Maria Landfill), a 290-acre site located along the southern margin of the Santa Maria River, east of the City of Santa Maria in Santa Barbara County. The Water Board adopted revised WDRs for this landfill in 2007.

The Santa Maria Landfill is divided into three basic areas: the Inactive Area, Closed Active Area, and the Lined Active Area. The 68-acre Inactive Area was a burn dump that the City closed in the 1960s, and currently has a protective soil cover and no bottom liner. The 118-acre Closed Active Area has no bottom liner or leachate collection system. Groundwater periodically contacts the waste during high recharge years (last such occurrence in 1998). In 2001, the Water Board adopted an order requiring the City to stop disposal of municipal solid waste (MSW) in this portion of the Landfill by 2002. Approximately 76.6 acres of the northwest portion of this area have received a final cover, with the remaining 41.4 acres awaiting foundation layer soil to bring the landfill to final grade. Nonhazardous hydrocarbon impacted soils (NHIS) are used as foundation layer for the final cover, and provide proper crowning, slopes, and drainage. Water quality impacts are improving due to placement of the final cover over the Closed Active Area and due to an enhanced landfill gas extraction system. The 61-acre Lined Active Area consists of two cells. Cell No. 1 has been active since December 2002 and covers 36 acres; the City has not built Cell No. 2.

The City of Santa Maria plans to move MSW operations to a new location (the proposed Las Flores Landfill) before capacity in Cell No. 1 is exhausted. Water Board staff expect to review and comment on engineering design plans for the Las Flores Landfill during 2010. The Las Flores Landfill will be the only fully-lined waste disposal facility in our region.

As discussed during the October 19, 2007 Water Board meeting, the United States Army Corps of Engineer's (ACOE) levee alongside the Santa Maria Landfill was designed to contain a 500-year flood event; however, in early 2007, the ACOE downgraded the protection provided by the levee to

below a 100-year flood event. As a result, the Federal Emergency Management Agency (FEMA) released a preliminary revised flood map, which placed the landfill area within the 100-year flood zone, along with significant portion of the City of Santa Maria. State and federal landfill regulations require landfills be protected from inundation and washout from a 100-year flood event. However, FEMA retracted the preliminary revised flood maps and at this time it is not known if FEMA plans to reissue revised flood maps. Irrespective of the flood map designation, the City plans to repair the levee in two phases. The City is currently repairing and anticipates completion of the first phase of the levee (west of the Santa Maria Landfill) in 2010. The second phase of the repair (which includes the levee alongside the Santa Maria Landfill) will go out to bid on January 20, 2010 with an estimated completion during Winter 2010/Spring 2011. Upon completion of levee repairs, the levee will provide the Santa Maria Landfill with protection from inundation and washout at levels greater than required by state or federal law.

Cold Canyon Class III Landfill; San Luis Obispo County

Acreage:	121
Life Span:	6-8 years
Corrective Actions:	Final covers over formally closed area, landfill gas collection
Priority:	High
Lead Staff:	Hector Hernandez

Waste Connections, Inc. owns Corral de Piedra Land Company, Inc., which owns the Cold Canyon Class III Landfill (Cold Canyon Landfill) located eight miles south of San Luis Obispo near State Highway 227. Cold Canyon Landfill began operation in 1965 and covers 121 acres including a 14-acre unlined closed landfill and a 74-acre active landfill. The Water Board adopted revised WDRs for Cold Canyon Landfill in 2006 and staff will likely revise the WDRs within two to three years to address anticipated expansion plans, which are currently in the local California Environmental Quality Act (CEQA) process.

The active area consists of unlined and lined cells. The unlined cells are generally at final elevations and are part of the active area only because Waste Connections has not formally closed this area. The active landfill consist of Modules 6, 7, 8, and 9. Waste Connections has filled Modules 6 and 7 to the desired interim elevations and is currently filling Module 8 to the interim elevation such that Module 9 will consist of the vertical expansion above Modules 6, 7, and 8. Without further permitted expansion, Cold Canyon landfill will reach capacity in six to eight years. On March 9, 2009, Water Board staff provided comments, specific to regulatory requirements that protect water quality, on the draft Environmental Impact Report (EIR) for a proposed expansion and operation of the Cold Canyon Landfill. Waste Connections has not submitted a final EIR. Water Board staff anticipates that Waste Connections, Inc. will submit a joint technical document following approval of a final EIR, as a revision of the WDRs will be necessary for a landfill expansion.

Groundwater monitoring data indicates minor VOC impacts to groundwater downgradient of unlined areas. Waste Connections attributes these impacts to landfill gas and Cold Canyon Landfill now has an extensive landfill gas extraction within lined and unlined areas. Water Board staff will continue to evaluate the monitoring results and may require Waste Connections to implement additional corrective actions including installation of a final cover for all unlined areas.

Monterey Peninsula Class III Landfill (also known as the "Marina Landfill"); Marina, Monterey County

Acreage:	475
Life Span:	98 years
Corrective Actions:	Groundwater natural attenuation; liquids controls; landfill gas collection

Priority:	High
Lead Staff:	Dan Niles

The landfill covers 475 acres and is comprised of unlined and lined disposal areas. The landfill serves as a regional disposal facility operated by the Monterey Regional Waste Management District (District) and has an anticipated life of 98 years according to the District. The District also operates extensive materials recovery, recycling, and green waste programs.

In early 2009, the District detected groundwater degradation above background in a monitoring well located between Module 2 and the Salinas River, and subsequently notified Water Board staff regarding observed increases of sulfate and ammonia concentrations in groundwater. The District provided an analysis, which concluded that the groundwater degradation resulted from stormwater discharges originating from the vegetated Module 2 slope, and an area where green wastes and biosolids were processed for soil amendment. Stormwater discharges from these areas collected in a low lying area between Module 2 and the Salinas River, and around groundwater monitoring well G-32. The District implemented immediate changes in site operations to reduce pollutants in stormwater and redirect stormwater from the aforementioned areas to a large stormwater collection basin. Subsequent stormwater sampling and groundwater monitoring preliminarily indicates that the District's hypothesis regarding the suspected source of the sulfate and ammonia was stormwater related, as opposed to a new release from Module 2 waste management unit. The District has not detected VOCs, which may further indicate no releases related to the waste disposal unit.

Other groundwater monitoring data indicate wastes are currently contained and that the landfill gas collection system has provided effective controls for protecting groundwater from landfill generation.

John Smith Road Class I and Class III Landfill; City of Hollister, San Benito County

Acreage:	65.3
Life Span:	19 years
Corrective Actions:	Groundwater pump and treat; landfill gas collection, stormwater runoff controls
Priority:	High
Lead Staff:	Dan Niles

There are two main components to the facility: the closed 8.3-acre hazardous waste (Class I) cell and the active 29-acre municipal solid waste (Class III) area. The 29-acre Class III portion includes lined and unlined areas. The owner, San Benito County, estimates 19 years of remaining capacity.

In March 2009, San Benito County completed construction of Module 2, a 13-acre disposal area expansion, and in August 2009, the County completed a 2.2-acre expansion called Module 3A. The liner designs consist of (from bottom top) prepared subgrade, one foot of low permeability clay, a geosynthetic clay liner, an 80-mil high density plastic liner, and a leachate collection and removal system. This design was an alternative to the prescriptive standards (two feet of clay and a plastic liner), and will be more protective. San Benito County will place a protective soil/operations layer over the liner system prior to waste disposal.

For Module 2, Water Board staff required San Benito County to propose corrective actions for the new waste management unit in response to potentially high groundwater conditions. Title 27 of the California Code of Regulations requires a five-foot separation between groundwater and waste. Corrective actions include reduced infiltration in groundwater recharge areas adjacent to the new waste management unit, expanded groundwater monitoring near the lowest portion of the waste management unit and adjacent to locations with historic high groundwater elevations, and expanded leachate collection and removal system performance monitoring. In the event groundwater rises

within five feet of the waste management unit, Water Board staff will require San Benito County to implement measures to maintain the required five feet of separation. The County's actions, including re-grading over groundwater recharge areas to reduce infiltration by directing stormwater flows away from the waste management unit, appear to adequately maintain separation between groundwater and wastes, although San Benito County will continue to monitor this separation. Module 2 and 3A are tied together by a common leachate collection and recovery system. Water Board staff required re-design and construction of the lowermost module (3A) to provide leak detection and monitoring of liner integrity for the protection of groundwater.

The unlined portion of the landfill, Module 1, continues to receive waste; however, disposal operations will shift to the lined units in 2010. The unlined and lined disposal unit immediately abut, thus continued disposal operations will result in a waste "overlap" as disposal volume increases in the new lined units. In the area were "new waste" will overlap "old waste," San Benito County will line the slope and design existing benches inward to facilitate leachate drainage to the leachate collection and removal system at the base of the new lined units. San Benito County addresses corrective actions related to Module 1 through enhanced landfill gas collection and operation of the groundwater pump and treat system. These actions have successfully reduced volatile organic compound (VOC) concentrations in groundwater below their respective MCLs.

Pacheco Pass Class III and Inert Waste Landfill; Santa Clara County

Acreage:	170
Life Span:	No longer accepting municipal solid waste (final closure for 2010)
Corrective Actions:	Surface water controls; landfill gas collection; groundwater evaluation monitoring
Priority:	High
Lead Staff:	Dan Niles

The 170-acre landfill consists of a 31-acre lined and unlined area for municipal solid waste disposal and a 35-acre area for inert waste disposal. Norcal Waste Systems, Inc. (Norcal) owns and operates the landfill. Norcal also operates a green waste compost facility and a construction/demolition debris recycling facility within the landfill boundary. The green waste compost is comprised of food and yard wastes and expansion of these operations is underway.

Monitoring data indicate low level, but decreasing trends of VOCs in groundwater. Norcal stopped accepting municipal solid waste in September 2008 and plans to install a final cover in 2010. Norcal also expanded the landfill gas collection system. Control of landfill gas and installation of a final cover are key strategies for protecting groundwater. Sometimes landfill gas-derived groundwater impacts increase with the installation of low-permeability final cover, but by improving the landfill gas recovery system, Norcal will mitigate this potential impact.

Water Board staff will review groundwater monitoring data and pollutant trends to evaluate the efficacy of the expanded gas collection system and the final cover (once the final cover is installed). In the future, Water Board staff may require Norcal to implement additional corrective action measures if groundwater impacts are not mitigated. As part of the final closure design, Norcal will install a leachate recirculation system to enhance waste stabilization and eliminate off-site disposal of landfill leachate. The recirculation system is proposed only within lined waste management units equipped with functioning leachate collection and recovery systems that have a history of being in compliance with operational performance standards for liquid heights and sump functionality.

Johnson Canyon Class III Landfill, Gonzales, Monterey County

Acreage:	163 acres
Life Span:	31 years
Corrective Actions:	Landfill gas extraction
Priority:	High
Lead Staff:	Martin Fletcher

The Salinas Valley Solid Waste Authority (SVSWA) owns and Norcal Waste Systems, Inc. operates the Johnson Canyon Class III Landfill (Johnson Canyon Landfill). The Johnson Canyon Landfill is located in Monterey County approximately 2 miles northeast of the City of Gonzales. With closure of the Crazy Horse Landfill during 2009, the Johnson Canyon Landfill is the regional landfill for most of the northern Salinas Valley, which was also formerly served by Lewis Road Landfill (closed in 2002), and Jolon Road Landfill (closed in 1997). The Water Board adopted revised WDRs for the Johnson Canyon Landfill in 2008.

The Johnson Canyon Landfill covers 163 acres with a permitted waste footprint of 96.3 acres divided into 11 (existing/future) modules. Module I is unlined and covers approximately 11 acres. Modules II and III cover 6.8 acres and are lined with one-foot of compacted clay and include leachate collection and removal systems (pre-Subtitle D). Modules IV – X, will be sequentially excavated and constructed with composite liners and leachate collection and removal systems. Module A is a 16.3-acre southward expansion to Modules II – X and also includes a composite liner and leachate collection and removal system.

SVSWA documents low-concentration VOC impacts to groundwater below their respective MCLs. Based on the chemical signature and low concentrations in groundwater, the SVSWA identified landfill gas as the source for the VOCs in groundwater. In 2000, SVSWA installed a gas extraction system and upgraded it in 2005 to include six downgradient gas extraction wells. VOC concentrations have stabilized below MCLs since the upgrade. Additionally the SVSWA submitted a Corrective Action Workplan in November 2009, which proposes an additional downgradient monitoring well, landfill gas extraction improvements, and removal of stormwater retention basins that may have historically percolated water through migrating landfill gas.

Although the Johnson Canyon Landfill has historically had good stormwater handling procedures, removal of several basins required that the SVSWA improve stormwater handling. During 2009, the SVSWA constructed twin concrete v-ditches along the southeast property boundary to keep onsite and offsite stormwater separate. All stormwater from the Landfill will continue to be contained in sediment retention basins and will be reused for dust control in appropriate areas throughout the landfill.

Watsonville Class III Landfill; Santa Cruz County

Acreage:	103
Life Span:	22 years
Corrective Actions:	Final covers over closed areas, leachate and landfill gas collection
Priority:	High
Lead Staff:	Martin Fletcher

The City of Watsonville owns and operates the Watsonville Class III Landfill (Watsonville Landfill) a 103-acre facility located in the coastal region of Santa Cruz County, less than one mile east from the ocean, and approximately 3.5 miles west of the City of Watsonville. The facility includes a 15.3-acre closed unlined cell (Phase I/II), a currently active 11.6-acre lined cell (Phase III), and two additional future modules of 6.9 acres (Phase IV) and 14.2 acres (Phase V). The City of Watsonville

previously estimated that the Watsonville Landfill would reach capacity in 2030. However, all residential waste is currently being transported and disposed of at the Monterey Peninsula Landfill due to their favorable disposal rates; therefore it is likely that overall capacity extends the lifespan significantly beyond 2030.

Groundwater monitoring has documented inorganic constituents and VOC impacts in the vicinity of the unlined Phase I/II landfill, which the City of Watsonville closed in 1997 by installing a final cover. Additionally, the City installed leachate and gas extraction wells into the unlined portion of the Phase I/II closed landfill. The City recently expanded leachate removal and gas extraction efforts by installing two more gas extraction wells and two more dual gas extraction/leachate removal wells into the unlined Phase I/II landfill.

During 2006, the City determined that the Phase III liner was leaking in, or around, its main leachate collection sump. Fortunately, the Phase III sump is double lined and the City is able to pump and remove leachate from the secondary sump liner. To minimize the production of leachate within Phase III, the City installed a posi-shell[3] intermediate wet weather cover on all surfaces of Phase III except the active landfill face. The City removes leachate from the Phase III leachate sump as quickly as possible. A portion of the leachate is used for on-site dust control and a portion is disposed of offsite at the Watsonville Wastewater Treatment Plant. Removal rates for leachate from the secondary sump liner have dropped significantly since the City first detected the leak (currently less than one gallon per month, compared to 800 gallons in the first month the leak was detected) indicating that corrective actions appear to be effective. Groundwater monitoring downgradient of Phase III indicates no water quality impacts that would be indicative of a leachate release. However, Water Board staff are currently evaluating if additional wells are necessary to address the possible evidence of a release due to the sump leak.

City of Watsonville staff have stated that they will propose an improved liner design for the future landfill modules, Phase IV and V; however based on regional disposal trends, recent discussion with City staff, and favorable disposal rates at the Monterey Peninsula Landfill, Water Board staff expect that the City may reevaluate long-term waste disposal at the Watsonville Landfill.

Buena Vista Class III Landfill; Santa Cruz County

Acreage:	126
Life Span:	11 years
Corrective Actions:	Final covers over closed areas, landfill gas collection
Priority:	High
Lead Staff:	Martin Fletcher

Santa Cruz County owns and operates the Buena Vista Class III Landfill (Buena Vista Landfill), located in the coastal region of Santa Cruz County, less than 2 miles east of the ocean and approximately 2.5 miles west of the City of Watsonville. The 126-acre facility consists of a 31-acre cell closed in 1986 (Old Landfill), a 15-acre cell closed in 1995, and a 61-acre active lined cell. The Water Board adopted revised WDRs in 2006 for this landfill.

The active portion of the Buena Vista Landfill consists of seven modules, 1, 2, 3, 4A, 4B, 5, and 6. The County has filled Modules 1, 2, 3, and 6 to interim elevations. The Executive Officer approved the Module 4B liner design in June 2007. Module 4B receives waste during dry weather and module 4A, which is much closer to its planned interim elevation, receives waste during wet weather. In a change to previous long-term plans, and despite available capacity through 2019, Santa Cruz

[3] Posi-shell is a spray-applied, thin layer of fibrous cement, which significantly promotes runoff and reduces the percolation of water into the waste.

County expects to cease onsite solid waste disposal without developing Module 5. The County plans to transport and dispose solid waste at the Monterey Peninsula Landfill in the future.

Santa Cruz County is currently evaluating and developing plans for formal closure of the Buena Vista Landfill and intends to expand and further develop waste diversion, composting, and recycling operations onsite. To address water quality concerns—infiltration and stormwater runoff—raised by Water Board staff regarding composting operations on top of the Old Landfill, Santa Cruz County intends to install a low-permeability working pad and storage tanks to capture and contain first flush stormwater runoff. The County would use collected water in the composting process or use it for dust control during dry weather. Water Board staff support the planned improvements as a temporary measure to address water quality concerns related to composting until permanent operations are established. Any future operations will also require appropriate design to address water quality issues related to infiltration and stormwater runoff.

The County documents low-level VOC concentrations in groundwater near Module 2. Santa Cruz County believes these groundwater impacts are caused by landfill gas due to the presence of VOCs (typically associated with landfill gas impacts) and the lack of inorganics (typically associated with leachate impacts). To remove and prevent migration of landfill gas Santa Cruz County has added more than 30 gas extraction wells to Modules 1, 2, and 3 since 1997. Current groundwater monitoring indicates that landfill gas extraction is reducing landfill gas impacts to groundwater and that final covers and surface grading on the closed areas are also preventing the formation and migration of leachate and/or landfill gas to groundwater. During 2010, Santa Cruz County expects to propose additional gas extraction wells to address recently detected landfill gas migration.

Tajiguas Class III Landfill; Santa Barbara County

Acreage:	78
Life Span:	13 years
Corrective Actions:	Landfill gas collection, groundwater interceptor trench, groundwater management systems, leachate collection and removal from unlined area wells, and up-canyon groundwater extraction
Priority:	High
Lead Staff:	Hector Hernandez

The County of Santa Barbara operates the Tajiguas Class III Landfill (Tajiguas Landfill), which serves the south coast of Santa Barbara County, and the Santa Ynez and Cuyama valleys. The Tajiguas Landfill is located approximately 25 miles west of the City of Santa Barbara in a coastal canyon watershed along the Gaviota Coast. The County of Santa Barbara originally sited the Tajiguas Landfill in 1967 and the Water Board has regulated the Tajiguas Landfill since 1970. The Water Board adopted updated WDRs for the Tajiguas Landfill in 2003, and has a WDR update on this agenda. The Tajiguas Landfill's property boundary encompasses approximately 502 acres and has a total permitted operational area of 357 acres, with an approved and permitted waste disposal footprint of 118 acres. Currently, waste is placed on 88 acres and the permitted waste disposal footprint is comprised of both lined and unlined (pre-Subtitle D) areas. Lined lateral development areas cover approximately 40-acres.

The proposed WDR for the Tajiguas landfill in this agenda addresses the County of Santa Barbara's proposal to modify the approved waste footprint by reconfiguring an approximately 12-acre portion of the 40-acre lined lateral development, resulting in a total of three fill phases instead of four. The proposed reconfiguration does not modify any of the existing operational parameters but would involve physical changes to a portion of the approved location of the waste footprint and associated disturbances for construction activities and equipment operations in the back canyon area of the Landfill site. The County of Santa Barbara proposes to restore portions of Arroyo Quemado within

the Baron Ranch (adjacent canyon) to compensate for impacts of the proposed Landfill reconfiguration project.

As of April 2009, the Landfill holds an estimated 10 million tons (16.6 million cubic yards, at 0.6 tons per cubic yard) of waste. The currently permitted Landfill disposal capacity is 23.3 million cubic yards of waste. Based on current disposal rates, the Landfill would reach permitted capacity in approximately 2023.

The County of Santa Barbara has monitored site groundwater continuously since 1988. Historically, downgradient wells MW-2, MW-4, and side gradient well MW-10 have had total VOC concentrations up to 2.2, 25.4 and 1.3 micrograms per liter µg/l, respectively (December 1996 data). The County of Santa Barbara suspected leachate was the source of VOC detections and as a corrective action, installed a groundwater/leachate collection and removal system (LCRS #1) to capture polluted groundwater. The County of Santa Barbara has since expanded corrective action to include gas extraction, leachate extraction and upgradient groundwater extraction. Total VOC concentrations and the number of detected compounds have declined in response to corrective action implementation. No VOCs have been detected above the primary MCLs in Well MW-4 since early 1998. VOCs in wells downgradient from MW-4 have either not been detected, or detected at very low concentrations for the last 10 to 11 years. Groundwater monitoring data appears to indicate that the environmental control systems in place and corrective actions at the Tajiguas Landfill have effectively minimized impacts from waste disposal on downgradient groundwater.

Jolon Road Closed Class III Landfill, Monterey County

Acreage:	57
Life Span:	Closed
Corrective Actions:	Phytoremediation and natural attenuation
Priority:	High
Lead Staff:	Martin Fletcher

The Salinas Valley Solid Waste Authority (SVSWA) owns the Jolon Road Closed Class III Landfill (Jolon Road Closed Landfill), a 57 acre facility, located three and a half miles southwest of King City in Monterey County. Disposed waste covers approximately 17 acres, (15.7 acres unlined and 1.3 acres lined). Although the facility is now closed to disposal, a transfer station is operated onsite where waste is organized and segregated, diverted or recycled, with residual waste being transported for disposal at the Johnson Canyon Landfill. The Water Board adopted revised WDRs for this landfill in 2007.

The SVSWA completed construction of the Jolon Road Closed Landfill's evapotranspirative final cover in 2008. Vegetation is an integral component of the evapotranspirative cover and can take several growing seasons to adequately establish. Based on inspections performed by Water Board staff during 2009, the final cover at the Jolon Road Closed Landfill has adequate vegetative coverage. Small burrowing animals are a common problem for landfill covers, as such, the SVSWA is working to prevent animals from creating burrows within the final cover using a variety of rodent controls.

Groundwater monitoring at the Jolon Road Closed Landfill continues to document VOCs at trace to just above practical quantitation limits. The VOCs are believed to result from groundwater contact with waste at the toe of the landfill. The SVSWA has implemented a phytoremediation effort immediately downgradient of the landfill to address the trace levels of VOCs and facilitate natural attenuation. The SVSWA also collects the water from a perennial spring (with low concentration VOCs) near the toe of the landfill and uses it for dust control.

Santa Cruz Class III Landfill; Santa Cruz County

Acreage:	100
Life Span:	33 years
Corrective Actions:	Leachate collection and landfill gas collection
Priority:	Medium
Lead Staff:	Martin Fletcher

The City of Santa Cruz owns and operates the Santa Cruz Class III Landfill (Santa Cruz Landfill), a 100-acre facility located three miles west of the City of Santa Cruz. The Santa Cruz Landfill includes 40 acres of unlined disposal area, 6.0 acres of existing lined area (Cells 1 & 2) and 20.3 acres of proposed lined disposal area (Cells 3 & 4). The facility was operated as a burn dump from 1926 - 1969 and currently includes municipal waste disposal, green waste operations, a recycling center, a "gas to energy" plant (through subcontract), and a hazardous materials collection program for temporary storage of waste destined for offsite disposal at a Class I landfill. The Water Board adopted revised WDRs for this landfill in 2006.

In 2007, the City of Santa Cruz established a fill sequence plan whereby filling would take place in unlined areas during the dry season and Cell 2, which is lined, would be filled during the rainy season. Limiting disposal to unlined areas during the dry season allows for a robust intermediate cover with improved grading to reduce the amount of water percolating into the unlined waste disposal area, while also reducing the generation of leachate and landfill gas. The City of Santa Cruz is currently developing a new fill sequence plan for the next two to three years to address site changes. Additionally, the City of Santa Cruz recently delineated the extent of waste disposal in an unlined cell in order to better define a small portion of the future construction boundary for Cell 3, which will be the next lined waste management unit. Cell 3 will be the third in a series of expansions of lined disposal units with leachate collection and removal systems. Cell 3 is currently being excavated.

During the last ten years the City of Santa Cruz has implemented the following improvements: reconsolidation of a burn ash disposal area; excavation and processing of mudstone to improve the quality of daily and intermediate cover; construction of two surface water by-pass tunnels; reconstruction of a portion of the south slope unlined area; construction of lined Cells 1 and 2; and clean-closure and grading of the area once occupied by the former leachate evaporation ponds. Recent improvements have focused on gas extraction, gas migration monitoring, and stormwater handling. Additionally, the City of Santa Cruz continues to operate a groundwater interceptor trench/barrier wall to collect groundwater contacted by leachate from unlined areas.

The Santa Cruz Landfill has an extensive groundwater monitoring well network and monitoring appears to indicate that groundwater impacts have stabilized immediately adjacent to the southern landfill boundary. Water Board staff believe landfill gas extraction, surface water by-pass tunnels, and the groundwater interceptor trench/barrier wall have been integral to improving groundwater downgradient of the Santa Cruz Landfill.

Chicago Grade Landfill, Atascadero, San Luis Obispo County

Acreage:	188 acres
Life Span:	10 years as permitted; 34 years with approval of proposed expansion
Corrective Actions:	Landfill gas extraction
Priority:	Medium
Lead Staff:	Hector Hernandez

The Chicago Grade Landfill and Recycling, LLC owns and Chicago Grade Landifill, Inc. operates the Chicago Grade Class III Landfill (Chicago Grade Landfill), a 188-acre landfill located approximately four miles northeast of the City of Atascadero. The Chicago Grade Landfill's existing waste footprint (Modules 1-3) covers an area of approximately 34 acres. Module 1 is 24.5 acres and unlined; however, approximately 2.5-acres of Module 1 adjacent to Module 2 is lined with a flexible membrane liner (over existing waste) before expanding vertically in the area. The 3.5-acre Module 2 and 6-acre Module 3 include prescriptive (Subtitle D) bottom liner systems. Future disposal areas include Modules 4, 6, and 7 (no Module 5 proposed). Module 4 covers a portion of Modules 3 and 1 and results in approximately 8 additional acres of waste disposal area. Excavation of Module 4 is complete and liner construction activities will begin in early 2010. Chicago Grade Landfill, Inc. is now excavating Modules 6 and using the soil for daily landfill operations. Modules 6 and 7 will add approximately 38 acres of disposal area. The Water Board adopted updated WDRs for the Chicago Grade Landfill at the February 2009 Board Meeting.

With the exception of sporadic detections of dichlorodifluoromethane (Freon), groundwater monitoring has not documented detections of VOCs in the landfill groundwater monitoring wells. Chicago Grade Landfill, Inc. operates 27 landfill gas extraction wells to control migration of landfill gas.

Paso Robles Landfill, City of Paso Robles, San Luis Obispo County

Acreage:	80 acres
Life Span:	43 years
Corrective Actions:	Landfill gas extraction
Priority:	Medium
Lead Staff:	Hector Hernandez

The City of Paso Robles owns the Paso Robles Class III Landfill (Paso Robles Landfill), an 80-acre municipal solid waste facility located approximately nine miles east of Paso Robles. The Paso Robles Landfill's current waste footprint covers 31 acres, but is permitted for 65 acres at full build-out. Two portions of the landfill pre-date state and federal liner requirements and consequently are unlined, the north existing refuse fill area (4.7 acres), and the south existing refuse fill area (14.8 acres). Both unlined areas have interim covers. The south area has reached final grade but landfilling continues over the north area and in lined modules 1, 2A, 2B, and 3A (each 2.1 - 3.2 acres in size). Future modules 3B, 3C, 4, and 5 will include Executive Officer-approved liner designs and leachate collection and removal systems similar to existing Modules 1, 2A, 2B, 3A. The Paso Robles Landfill's proposed final grading plan calls for waste to be placed above existing modules, both lined and unlined, to achieve final grading contours.

Historically, the City documented VOCs in vadose (unsaturated) zone monitoring probes (lysimeters) located in the southwest corner of the south existing refuse fill area. The City of Paso Robles responded to these detections by installing and operating a landfill gas recovery system in 1998 and enhancing the system in December 2003 by adding five vertical and 10 horizontal gas recovery wells. The gas recovery system appears to be successfully addressing the migration of VOCs from the southern unlined area, as demonstrated by declining VOC trends in adjacent lysimeters. Groundwater levels have been decreasing beneath the Paso Robles Landfill and this may result in replacement of affected monitoring locations in order to continue detection monitoring and ongoing evaluation of the decreasing trends in VOC concentrations.

Vandenberg Air Force Base Class III Landfill: Santa Barbara County

Acreage:	172
Life Span:	81 years
Corrective Actions:	Slurry wall with interceptor trench at down-canyon toe of landfill for leachate collection and disposal, landfill gas collection system, stormwater controls
Priority:	Medium
Lead Staff:	Dan Niles

The landfill property comprises 172 acres with a 46-acre active, unlined disposal area. The United States Air Force owns the landfill while the Environmental Compliance and Operations divisions of Vandenberg Air Force Base (the Base) manage disposal operations and compliance activities.

The Base continues waste diversion through reclamation, recycling, and reuse operations. These efforts have reduced waste disposal to a fraction of the Base's permitted volume. Structural improvements to drainage conveyance performed by Base personnel within the northern area of the landfill property (outside the waste footprint) have resulted in reduced localized infiltration/recharge to groundwater. Reduced infiltration in the northern area has resulted in separation between groundwater and the bottom of the unlined waste disposal areas, preventing the need for groundwater extraction at the toe of the landfill where a slurry wall extraction system is located. These combined measures help ensure ongoing protection of groundwater quality.

Base personnel are currently assessing how to achieve effective stormwater controls to reduce the volume of stormwater run-on from an 850-acre area that has historically flowed through the landfill property (not through waste). The stormwater runoff travels through the landfill in drainage channels and underground pipes, eventually discharging off-site down Oak Creek Canyon. Base personnel are evaluating how to re-route the run-on so it does not come through the landfill boundary. Part of the assessment involves ensuring erosion problems are not created elsewhere as a result of re-directed stormwater flows.

City of Lompoc Class III Landfill; Santa Barbara County

Acreage:	115
Life Span:	40 years
Corrective Actions:	None
Priority:	Low
Lead Staff:	Hector Hernandez

The City of Lompoc owns and operates the City of Lompoc Class III Landfill (Lompoc Landfill), a 115-acre facility located in a canyon on the south side of the Santa Ynez River valley, west of the City of Lompoc. Waste disposal is permitted for approximately 40-acres of the site. The City of Lompoc opened the landfill in 1961 and the Water Board has regulated the landfill since 1978. The landfill has approximately 40 years of capacity remaining.

The Lompoc Landfill is unlined; however, the geologic conditions underlying the landfill are favorable due to natural fine-grained silts and clays. The intermediate cover also consists of relatively low permeable soil found onsite, which is compacted and graded to promote runoff and reduce percolation of water into the landfill. City of Lompoc staff has prioritized operations and efforts to reduce the amount of water percolating into the landfill.

The City of Lompoc installed a landfill gas collection system in 1986, but due to lack of methane the gas system was removed in 1992. Historically, the lack of methane and the limited presence of VOCs in groundwater suggest the waste mass is not generating significant amounts of leachate

and/or landfill gas. However, during the last quarter of 2009 the City of Lompoc detected methane in newly constructed gas probes. During 2010, Water Board staff will continue to evaluate gas monitoring to determine if gas extraction is necessary to prevent the migration of landfill gas to groundwater.

City of Santa Barbara Old Dump Site; Santa Barbara County

Acreage:	Unknown
Life Span:	Not Applicable
Corrective Actions:	Not Applicable
Priority:	Very Low
Lead Staff:	Hector Hernandez

The City of Santa Barbara Old Dump Site is regulated by General Waste Discharge Requirements Order No. R3-2004-0006 (General Order) for Post-Closure Maintenance of Closed, Abandoned, or Inactive (CAI) Nonhazardous Waste Landfills within the Central Coast Region.

On June 12, 2008, the City of Santa Barbara submitted a Report of Waste Discharge (ROWD), which proposed assessment activities to define the landfill boundaries and assessment activities to identify potential water quality impacts. In early November 2009, the City of Santa Barbara hired a new consulting firm (Geosyntec Consultants) and they provided Water Board staff with different information than that presented in the 2008 ROWD. According to Geosyntec, a very large area of eastside Santa Barbara (i.e., the old estuary area) was filled with 1925 earthquake rubble, trash, and other inert fill materials. Geosyntec indicates that the City is unable to delineate the "landfill" boundaries because an actual landfill facility does not appear to have existed. Water Board staff has not seen information that determines the extent of the 1925 earthquake rubble.

The City of Santa Barbara will submit a revised ROWD on March 1, 2010 and Water Board staff will review the report to determine next actions, if any.

ATTACHMENT: Central Coast Water Board Land Disposal Sites Summary Table.

ACTION: Information item only.

S:\Seniors\Shared\Land Disposal_Land Disposal Program\Status Reports\2010\LDU Staff Report Update 021310-final.doc