California Climate Action Registry

Summary of Public Comments Submitted and Incorporated Into Draft 2.0 of the Landfill Project Reporting Protocol (LPRP)

November, 2008

ORGANIZATIONS THAT SUBMITTED COMMENTS

1. Solid Waste Industry for Climate Solutions (SWICS)*
2. TerraPass (TP)
3. Dave Armstrong
4. Zeroemissions
5. Ecosecurities
6. DTE Energy
7. BlueSource
8. SCS Engineering

* SWICS members submitted comments as a group. The entities represented by this organization are: Allied Waste Inc., County Sanitation Districts of Los Angeles County, Norcal Waste Systems Inc., OC Waste & Recycling, Regional Council of Rural Counties, Republic Services Inc., Waste Connections Inc., and Waste Management

The comment letters can be viewed in their entirety on our website at the following web address: http://www.climateregistry.org/tools/protocols/project-protocols/landfill.html

SUMMARY OF PUBLIC COMMENTS

A. GENERAL

A.1. Applicability to Mexico (Ecosecurities)

In the California Registry newsletter dated 8/25/08, the Board reports that the Registry offset program will be expanded into Mexico, including 6 Mexican States. We recommend changing language in section 3.1, Location, such that projects outside the U.S. are eligible, with constraint to a geographic limitation that the California Registry reserves the right to expand/revise in the future.

> **RESPONSE:** The California Registry is currently in the process of researching how to adapt a number of our protocols to Mexico. As this will require a Mexico-specific performance threshold and regulatory test, these protocols will be issued separately.

A.2. Request for Variance (Ecosecurities)

A process for requesting deviations by project participants should be developed. Project participants should be included in all discussions of deviations. Verifiers must act as objective third party auditors, not lobbying for or against particular project deviations.

RESPONSE: Agree. A request for variance procedure has been developed.

A.3. Registration Frequency

The sentence in Section 5 regarding registration being annual is inconsistent with language elsewhere in the protocol which allows for registration and verification on a more frequent basis if desired.

RESPONSE: Agree. This language has been edited to clarify that projects must be registered at a minimum annually, but may register more frequently if desired.

A.4. Protocol Validity (Armstrong)

In my opinion, it is a huge mistake to grant emission offset credits to landfill gas projects. Such credits should be reserved for facilities that invest capital for projects that would otherwise not be done. Large "dry" landfills often produce enough gas to be economically feasible to exploit, and the gas has been and will be burned beneficially.

RESPONSE: The California Climate Action Registry (California Registry) appreciates this feedback, but feels strongly that our protocol has the necessary safeguards to prevent non-additional projects.

B. PROJECT START DATE

B.1. Eligibility Start Date (SWICS)

SWICS disagrees with the current project start date of January 1, 2001, as it will disqualify many landfill methane reduction projects which have already occurred from being recognized for credible reductions and ultimately render the project Protocol meaningless. SWICS recommends a project start date of January 1, 1990 to coincide with the baseline year under California's AB 32 program and Kyoto Protocol. At a minimum, the LPRP should allow for a project start date of January 1, 1999. This start date is consistent with the Chicago Climate Exchange (CCX) methane destruction protocol codified in Chapter 9 of its Rules Book or January 1, 1994 to coincide with the creation of the U.S. EPA Landfill Methane Outreach Program (LMOP).

RESPONSE: The California Registry feels that the start-date as contained in the original and revised version of the protocol is appropriate given its basis in the adoption of legislation that established the California Registry. This date is also consistent among all other California Registry project protocols. We are, therefore, not recommending the establishment of an earlier project start-date as recommended by the commenter.

B.2. Rolling Start Date (Ecosecurities)

Forcing project owners to register prior to the operations start date places an unnecessary burden on the project owners. Completing a landfill gas project and ensuring its successful startup is a taxing project management task, and there is no reason why the registration task needs to be completed at that very difficult time. An alternative approach which would send a much clearer signal to project owners would be to adopt a "rolling" online date eligibility criterion, such that a project must be registered on the California Registry or another public carbon registry within a limited window (say, between 12 and 24 months) of its online date. The Voluntary Carbon Standard 2007 has adopted a 2-year rolling online date requirement.

RESPONSE: Agree. The California Registry has included a rolling start date as recommended. Projects must apply for listing within six months of becoming operational. This time frame was chosen to be consistent with the CDM validation practice.

C. ELIGIBLE PROJECT TYPES

C.1. Non-destructive Beneficial Uses of Landfill Gas (SWICS)

The performance threshold should be expanded to represent GHG reductions from non-destructive uses of landfill gas including isolation of constituents for use as raw materials for manufacture, use in creating chemical products, methanol production, and the avoided emissions of fossil fuels associated with all of these activities.

RESPONSE: While the California Registry recognizes the value of these projects and applauds the work being done by the solid waste sector, it feels that these projects fall outside of the scope of this protocol. The necessary calculation methodology for these processes are not covered by this protocol, and there are currently no adequate means of assuring that the indirect emission reductions associated with avoided emissions from fossil fuels will not be double-counted by other entities.

C.2. Bioreactor Technology (SWICS, DTE, Ecosecurities)

As presently written, the California Registry protocol suggests that it will not consider landfill operations that utilize anaerobic bioreactor technologies. Landfills which meet the NESHAP definition of a bioreactor are required to collect landfill gas (LFG) immediately, and therefore are unable to register reductions resulting from the management of that gas. Landfills which contain moisture content less than 40 percent (by weight) and satisfy the other eligibility rules should be eligible to register GHG reductions using this protocol.

RESPONSE: Agree. The California Registry has amended the language in the protocol to reflect the distinction between bioreactor technology and landfill eligibility status. The use of technologies such as leachate re-circulation is permissible. However, any landfill which meets the EPA definition of a bioreactor will remain ineligible under this protocol.

D. PERFORMANCE STANDARD

D.1. Performance Standard Frequency (Zeroemissions)

Needing to pass the Performance Standard Test and Regulatory Test on a yearly basis will be a key risk to project developers who proceed with upfront investments since the revenues will not be sufficiently secure. I would recommend that the California Registry establish a relationship between the frequency of these tests and the amount of reductions verified in each accounting cycle. Small projects will benefit from this measure (similar to Small Scale projects in CDM).

RESPONSE: While the California Registry understands the financial risks involved with the requirement to apply the Regulatory Test annually, we believe it is of the utmost importance to the credibility and proven additionality of CRTs and the carbon market in general that no CRTs be issued unless the Regulatory Test

is passed for each verification period. Therefore, the protocol requires the Regulatory Test to be applied annually.

D.2. NMOC Threshold (SWICS)

The Registry developed an NMOC emissions threshold of 600 lbs/month whereby the eligibility of a project can be determined. The determination of the NMOC emissions threshold analysis was performed assuming an average flare system cost of $350,000 and a carbon adsorption system (CAS) operational period of 5 years. However, the NMOC emissions threshold of 600 pounds per month, which according to Appendix B of the LPRP is equal to the installation and maintenance of a thermal oxidizer unit or flare, is artificially low. This cost assessment, which was provided by a carbon vendor, is conservative in nature and is designed to cover the worst case, theoretical scenario. Carbon vendors routinely provide conservative quotes in an effort to compensate for unforeseen circumstances. The actual O&M costs associated with a CAS would suggest that an NMOC threshold of 2,040 to 4,052 pounds per month is more reasonable and appropriate and is based on actual operating CASs, which have been compiled by SWICS and previously submitted to the California Registry, rather than theoretical data.

RESPONSE: SWICS provided the California Registry with data for only four CAS systems which we feel is not enough information to substantiate the above claims. Therefore, for the estimates of carbon usage, we have utilized data obtained from two separate carbon vendors. Furthermore, we adjusted the threshold upward to account for the conservative nature of the carbon vendor quotes. After a thorough analysis of the cost of both flare and CASs for a wide range of landfill gas flow conditions we have established the NMOC threshold to be 620 pounds NMOC per month.

D.3. Relevance of Recycling and Waste Diversion (SWICS)

The new language added to the LPRP – “The Registry will periodically re-evaluate the appropriateness of the Performance Standard Threshold by updating the market penetration analysis in appendix A. The Registry recognizes the importance of waste diversion and recycling programs” – appears to tie the viability of LFG collection projects to the effectiveness of recycling and diversion programs. This language suggests that if recycling and diversion protocols have not become operational with demonstrated effectiveness by the year 2013, that somehow these LFG protocols could be temporarily suspended. Recycling and diversion activities have no relationship to a landfill owner/operator’s ability to efficiently collect and destroy methane above and beyond the business-as-usual scenario. Furthermore, the two sited activities are completely independent of what landfill owners/operators can exert control over. The cumulative GHG reductions via a GCCS should not be dependent on the effectiveness of recycling and diversion programs.

RESPONSE: Viewpoint acknowledged. This same language was included in Version 1 of the protocol. During the initial development of this protocol the California Registry considered adding suspension language to address a real concern among workgroup members and public commenters that this protocol may lead to perverse incentives for waste landfilling. The CA Registry ultimately chose not to include a suspension date in the protocol, but will continue to work with interested parties to address the need for recycling and waste diversion incentives.

D.4. Regulatory Test (Ecosecurities)

The costs of a regulatory audit are extremely prohibitive, especially for small landfill facilities. In addition, state specific requirements vary and an audit would require expert auditors for all states, whereas a landfill owner/operator will have native knowledge of local rules/regulations pertaining to the landfill. Because the liability rests solely with the landfill owner that attests to compliance with the Regulatory Test, an audit is excessive. The third party verifier should accept an attestation letter of compliance.

RESPONSE: The California Registry has performed some research on the cost of regulatory audits and agrees this requirement could be prohibitive. Therefore, we have developed an Attestation of Regulatory Compliance form, which is to be signed annually by the Project Developer. This form spells out clearly the requirements for compliance and potential consequences for non-compliance.

E. PROJECTS WITH PRIOR INSTALLATIONS

E.1. Separation of Pre-Project and Project Collection Systems (SWICS)

The SWICS understands the importance of the Eligibility Rule I and how the integrity of this rule must be maintained to strengthen the credibility of the Protocol. However, rather than designing a completely separate GCCS (an additional piping system with an independent monitoring system) continuous or weekly flow monitoring can be incorporated into the existing GCCS and allow monitoring of distinct portions of the GCCS . This will keep costs down while accounting for additional GHG reductions. Additionally, this approach would preserve the integrity of the eligibility rule, while providing a cost effective approach for the owner/operator to reduce additional GHG emissions.

RESPONSE: After significant deliberation, the California Registry has come to the conclusion that it is vitally important to draw a firm distinction between what constitutes a new project and a project expansion. To qualify as a new project and ensure additionality, a project must be entirely separate and utilize a new destruction device.

E.2. Lined Separation (TerraPass)

The radius of influence calculations should not be applicable in cases where the old system is on an old, unlined landfill and the new Project system is in an adjacent new, controlled landfill, and the two are physically separated by the landfill liners. In essence, the project boundary would be drawn so as to exclude the old landfill site (and, as appropriate, any gas coming from that site if it is piped into the new system).

RESPONSE: Agree. The California Registry has updated the protocol language to reflect the fact that EROI calculations are not necessary if the project is 100% separated by impermeable liners and does not share any part of the landfill cell.

E.3. Passive Flare Expansion (DTE, BlueSource, SCS)

Section 3.3.1 should be modified. If the existing collection system is comprised of passive flares, the new project should be permitted to use the existing infrastructure to connect with the new wells. In these projects both existing and new wells operate in the same landfill area, and it is not possible to operate and monitor separate systems as currently prescribed. Instead, the methane recovery rates from the existing system can be measured prior to the implementation of the new system. Rather than continue to monitor and manage the existing system separately, this measured value should be subtracted from the total methane measurements made after the new wells become operational.

RESPONSE: Agree. The California Registry has updated the protocol to reflect instances where a pre-project system utilizing a non-qualifying destruction device is replaced with a qualifying destruction device. No separate on-going metering will be necessary, and the pre-project flow will be subtracted from the total project measurements.

E.4. Passive Flare Monitoring (TerraPass)

Since the protocol requires than any pre-existing combustion activities be metered, and that the metering continue throughout the installation and operation of the new project so that the earlier combustion may be subtracted from crediting, any landfill which has made use of passive flares appears to be excluded from the population of landfills eligible for credits. This is truly unfortunate, because small landfills and closed landfills are poor candidates for energy revenue so carbon credits could be a powerful motivation at such sites.

RESPONSE: Per E.3, this type of system would need to meter the gas managed by passive flares in the baseline scenario. Following project implementation no further metering would be necessary.

F. OXIDATION FACTOR

F.1. Relevance of Oxidation Factor (SWICS)

Equation 1 in the LPRP accounts for the total annual project GHG reductions. However, it applies a 10% oxidation factor to the methane which is collected and combusted. A methane oxidation factor associated with conversion of methane in the landfill cover is misapplied. A landfill oxidation factor is normally applied when trying to estimate methane emissions by a landfill in the absence of a LFG collection and control system or for the methane escaping collection. Any references to the use of a methane oxidation factor should be deleted from these calculations, as it is a misapplication of the concept.

RESPONSE: The oxidation factor is correctly applied and necessary to ensure that the quantity of methane destroyed is less than or equal to that which would have been released in the baseline condition. The quantity of gas which can be collected is equal to the total landfill gas generated. The quantity which could escape as fugitive emissions, on the other hand, is only 90% of what is generated due to oxidation. Therefore, only 90% of destroyed methane can

safely be assumed to have been emitted in the baseline scenario. This approach is consistent with the EPA Climate Leaders and RGGI landfill methodologies.

F.2. Area Weighted Oxidation Factor (Ecosecurities)

We recommend including a mechanism to account for landfills where a portion of the wells are located within synthetically capped cells (capping under construction but not complete, for instance). Under this scenario, less than 10% of gas is being oxidized by methanotrophic bacteria because some of the gas is contained within the synthetic cap. You should include a calculation, similar to the method for calculating the radius of influence for new projects at existing facilities, to adjust the 10% deduction according to the percent of gas collection wells located within synthetically capped cells (i.e. if 80% of wells are in capped cells, deduction would become 10% x 80% = 2% *(sic))*.

RESPONSE: Agree in principle. The California Registry understands the logic behind this approach, but feels it is too site specific to incorporate into the project protocol. This exemplifies the type of expert judgment call that we expect project verifiers to make based on the evidence provided and data available to them.

F.3. Site-specific Oxidation Factor (DTE)

As presently written, unless a landfill incorporates a synthetic liner as part of its final cover system, a default methane oxidization rate of 10% is to be used when calculating the baseline scenario. Rather that utilizing the bright line test currently in place, the California Registry should allow developers the opportunity to prove that their projects yield a lower quantity of naturally oxidized carbon dioxide.

RESPONSE: These measurements vary significantly over temporal and environmental conditions. In order to be consistent and conservative, and to avoid the need for extensive project-specific evaluations, the California Registry feels it is appropriate to use a value of 10%.

G. MONITORING

G.1. Calibration Frequency (Ecosecurities)

Quarterly calibration of all monitoring equipment is excessive. The drift observed in most monitoring equipment is minimal, so quarterly calibrations are not remotely necessary to ensure accuracy. This increases project implementation costs and will make costs to small projects too high to proceed. We suggest following manufacturer's specifications, or listing specific monitoring equipment with known higher rates of drift tendency that are required to perform quarterly calibrations.

RESPONSE: The California Registry believes that quarterly calibration is necessary due to the wide variety of monitoring technologies, manufacturers, and applications. While some manufacturers provide sufficient calibration guidance, others may be insufficient for certain applications. The requirement for quarterly meter calibration is consistent with the CCX landfill methodology. However, the California Registry is undergoing a review of specific metering technologies and hopes to issue equipment-specific calibration guidelines consistent with this comment in the future.

G.2. Duplicative meters (TerraPass, Ecosecurities)

We recommend that the California Registry address the requirement to install, maintain, and gather data from duplicative flow meters. The protocol requires meters at each end-use, as well as at the header pipe. We recommend that the requirement be made slightly less expensive though no less accurate, by allowing the project owner to reduce the number of meters by 1.

RESPONSE: Agree. The protocol has been updated to state that project developers need one less meter than previously specified.

G.3. Flow Normalization (Zeroemissions)

The data unit used to measure the LFG (main and for each device) is in ft3, which means that cumulative readings must be taken. In page 24, temperature and pressure (T and P) would need to be taken to normalize (adjust) the flow; however technically it is not possible to normalize the cumulative flow since this would imply that only the last T and P reading was used. I would recommend changing the data unit of the LFG (main and for each device) to the flow unit (ft3/h) since this will be of more use to the landfill operator on site to optimize the LFG extraction and also, numerically, will make more sense in applying a T and P correction rather than using a cumulative figure.

RESPONSE: Agree. The California Registry has updated Equation 2 in order to calculate methane quantity more accurately. This change also addresses the above concern.

G.4. In Device Normalization for Temperature and Pressure (Zeroemissions, SWICS)

Temperature and Pressure would need to be measured to normalize the flow. In the comments against those parameters, it states that if flow meters that automatically measure T and P (Volumetric Flow meters) are used, this measure is not necessary. However, there are other kind of flow meters (like Thermo Mass flow meters) which do not measure T or P, which provide normalized flow readings since they measure temperature and provide mass flows applying the King's Law (mass passing through a device is proportional to the necessary current to keep a differential temperature constant). I would thus recommend extending the type of flow meter choices considering the state-of-the-art available technologies.

RESPONSE: Agreed. The California Registry has updated the protocol to allow any technology which automatically standardizes landfill flow to the specified parameters.

G.5. Alternate Methane Analysis Technologies (Terrapass)

The project monitoring requirements provide for calculated discounts when the project uses periodic methane analysis rather than continuous. We have found at least one gas quality analysis method which does not appear to meet either definition and encourage the California

Registry to consider its inclusion. This third type involves a sampling device which takes a sample of landfill gas every 10 minutes (or similar interval) and deposits the sample into an enclosed cylinder. Every quarter, the cylinder is removed and sent to a certified lab for analysis. This method provides highly accurate averages over the monitoring period, and is far less sensitive to variations in gas flow and quality in its accuracy. Further, this method eliminates expensive calibration requirements because all actual analysis is performed by a certified lab. We recommend methods similar to this be treated as equivalent to continuous analysis.

> **RESPONSE:** While this technology reliably calculates a time-weighted average methane density, it is not clear that it calculates a volume-weighted average methane density. Therefore we will not include it at this time.

G.6. Temperature and Pressure Monitoring Frequency (Ecosecurities)

Page 21 states that continuous LFG temperature and pressure must be directly metered, but according to equation 5-4, weekly T and P are sufficient. Page 24 also says continuously or weekly. This is inconsistent – recommend changing page 21 to be consistent with weekly allowance defined on pages 20 and 24.

> **RESPONSE:** Agree that the inconsistency should be fixed. We have changed the language on pages 20 and 24 to be consistent with the requirement for continuous measurement of temperature and pressure.

G.7. Measurement on a Wet or Dry Basis (Zeroemissions)

The comment about the parameter 'methane fraction in the landfill gas' states that the methane needs to be measured on a wet basis. Since most of the gas analyzers on the market use electric devices for the measurement, it is vastly more common to use filters to extract the humidity of the gas in order to ensure the precise measurement. For this reason, I would recommend that you prescribe the measure of the methane concentration on a dry basis. In order to consistently apply the concentration of the methane to the LFG flow, both would need to be monitored on the same basis. It is then possible to convert the LFG flow reading from wet to dry basis by applying Equations of State which correlate the humidity (water content) with the gas pressure. The Antoine Equation of State is based on very well-studied constants (Antoine Constants) and estimate the humidity content from pressure reading.

> **RESPONSE:** Agree. The language has been changed to allow for measurement on either a wet or dry basis. However, all measurements of flow, concentration, temperature and pressure must be measured on the same basis. This is consistent with the latest updates to CDM landfill methodology ACM0001.

G.8. Methane Composition Measurement Frequency (SWICS)

In the rare event that the methane concentration in LFG would be reduced by 20% due to network conditions, other continuously monitored parameters would identify the variance in methane concentration. The dates in which the GCCS experienced a loss of integrity would be documented as along with a corresponding corrective action in accordance with federal, state or local regulations. In the case of a documented integrity loss of the GCCS, a discount factor may be applied to the dates on which the event occurred. However, it should not be applied unilaterally to all projects without continuous monitoring systems. The CDM protocol allows for periodic monitoring of the gas quality; it does not require continuous monitoring of gas composition. The proposed LPRP requires continuous monitoring exclusively. There is no

adequate justification provided for this additional expense. SWICS recommends that the LPRP allow for both approaches.

> **RESPONSE:** The California Registry acknowledges that swings of 20% in methane concentration are rare, but also recognizes that smaller variation is common. Therefore, continuous monitoring is the best means of capturing this variation. The California Registry protocol allows for weekly or monthly (for historical data only) monitoring with the application of a 10% or 20% discount factor respectively to account for variation. These discount factors were included in version 1 of the protocol and we have received positive feedback on this policy from other stakeholders.

G.9. Operational Hours (Zeroemissions, Ecosecurities)

The parameter Operation of the landfill gas collection system is vaguely described since the passive collection system (wells, pipework, manifold,…) will always be operating. Since normally one main blower is used in the industry, I would recommend that the operation of each device be monitored (but not the main) by ensuring that the minimum operational parameters pre-set by the manufacturer are met to consider that the device is running.

> **RESPONSE:** Agree. This requirement has been removed as it is subsumed under the requirements to monitor the operation of the individual destruction devices. No emissions reduction credits are counted for periods in which the destruction device is not operational.

G.10. Monitoring Deviation Allowance (Ecosecurities)

Agree with change to allow monthly methane concentrations until 1/1/09, since existing projects did not have time to correct operations in 2008. What about other monitoring requirements that might not be met by existing projects, i.e. recording monitoring data continuously (every 15 minutes). Recommend allowing for deviation from exact monitoring definitions (for example, chart recorders that weren't recording data points every fifteen minutes, or equipment that was not calibrated quarterly) for historic monitoring, but require adherence to this protocol after 12/31/08 (following substitution guidelines). A discount factor, similar to those prescribed for methane monitoring frequency, could be used to conservatively estimate historic credits when monitoring system did not conform to these requirements exactly.

> **RESPONSE:** The California Registry cannot give a blanket allowance for less frequent metering and data recording for historical projects. As mentioned in the response to comment A.2, the California Registry has developed a request for variance procedure whereby a project developer can propose a suggested approach for minor deviations from the protocol. The proposed deviation would then be considered by the California Registry for allowance. Also, project verifiers have the discretion to apply their expert judgment to consider minor deviation allowances based on the evidence provided and data available to them. In both scenarios discount factors could be applied.

G.11. Totalizer and Monitoring Frequency (Ecosecurities)

If monitoring system is internally recording/sampling data and creating totalized values (i.e. LFG flow volume, methane volume) on some time scale (e.g. daily, monthly) but it is not possible to extract the raw data, this data should be sufficient as it is still continuous monitoring.

Additionally, supplying 15-minute data for verification if a totalized flow value is being used in ER calculations is redundant and excessive. One or the other should be required, but not both. If instantaneous flow rates are being used, 15-minute frequency is reasonable.

RESPONSE: Agree in principle. In order to ensure transparency and verifiability, it should be possible to access the raw monitoring data. Totalized values may be used as long as the supporting raw data is also available and can be checked for accuracy by the project verifier. For scenarios in which a continuous monitoring system with totalizer is being used, but the raw data is inaccessible, it is at the discretion of the project verifier to ensure that appropriate QA/QC procedures are in place to correctly account for periods of destruction device inoperability.

H. CALCULATIONS

H.1. Emission Factors (Ecosecurities)

Recommend using electricity emission factors from GRP v3.0 instead of v2.2.

RESPONSE: Agree. This has been corrected in the protocol.

H.2. Supplemental Gas (Ecosecurities)

The term $FFCH_4$ is not included in the equation for $CH_4Dest_{upgrade}$

RESPONSE: Thank you for pointing out this omission. This has been fixed in the final draft.

H.3. Gas State (Ecosecurities)

Need to define state (temperature and pressure) at which methane density is defined for (0.0423 lb CH4/ft3 CH4). Based on Ideal Gas Law, it appears to be given for 60°F, 1 atm.

RESPONSE: Agree. Language has been inserted specifying that, for the purposes of this protocol, SCF (standard cubic foot) is defined for 60°F at 1 atm.