

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

July 29, 1994

MEMORANDUM

SUBJECT: RCRIS Corrective Action Environmental Indicator Events Codes CA725 and CA750

FROM: Michael Shapiro, Director
Office of Solid Waste

TO: Regional Waste Management Division Directors

Attached are the final definitions and guidance for the two RCRIS corrective action Environmental Indicator event codes, Human Exposures Controlled Determination (CA725) and Groundwater Releases Controlled Determination (CA750). These Environmental Indicators are designed to measure the environmental status of facilities undergoing corrective action. The development of these Environmental Indicators represents an important transition in reporting successes for corrective action. Through the use of CA725 and CA750, the program can report on actual environmental accomplishments of cleanup activities, rather than focusing strictly on process events.

The definitions and guidance were distributed to the Regions for comment in May. Most commentors asked for clarification on issues rather than suggesting substantive changes. As a result, the definitions and guidance have been finalized with only a few changes. Because the definitions and guidance will be incorporated into the FY95 fall release of the RCRIS Data Element Dictionary (DED), the document was modified to include the third proposed status code. This status code will account for facilities where there is no need for human exposure control measures (CA725) or no release to groundwater (CA750).

The other change which should be noted involves entering the Environmental Indicator event codes under Areas as opposed to legitimate orphans in RCRIS. The Environmental Indicators are designed to be facility level indicators. Every Area at the facility must meet the definition before the event code can be entered. Use of a legitimate orphan is the most direct way of entering facility level data. However, some Regions are reluctant to create legitimate orphans. To address this concern, Environmental Indicator data can be entered under an Area labeled expressly "Entire Facility". This is a change from the draft where Environmental Indicator information could be entered under any Area. The select logic for reports will only include Environmental Indicator data entered as a legitimate orphan or under an Area labeled "Entire Facility."

The FY95 RIP encourages Regions to use tile Environmental Indicator event codes. These codes will be added to the standard reports in the spring of FY95 and were scheduled to become STARS measures for FY96. Although it is expected that STARS will be eliminated as of FY95, these Environmental Indicators will continue to play a prominent role in corrective action reporting.

The definitions and guidance provide several examples to follow when evaluating facilities. We hope these will be helpful. However, we expect that many of these determination will be subjective. If there are questions with using these Environmental Indicators, please contact Susan Parker at 703-308-8653.

Event Code Name: CA725 - Human Exposures Controlled Determination

Definition: This event indicates there are no current unacceptable risks to humans due to releases of contaminants at or from the facility that are subject to RCRA Corrective Action. This facility wide measure is based on current conditions at the facility, and covers all types of releases and media. Human exposure controls or other corrective action must have been implemented in every case where a release has posed a current unacceptable risk to human health before this event can be entered. (Environmental indicators are not a measure of activity at the facility, but a measure of the environmental status of the facility.) The event may be counted when one or more of the following are met:

1.) Remedial measures have been implemented with the result that all maximum contaminant concentrations detected or reasonably suspected are less than or equal to their respective action levels (e.g., MCLs for groundwater, a 10^{-6} risk level for other contaminants, or any other number designated as the action level) or do not exceed an Agency specified cleanup standard for the facility.

OR

2.) There is no unacceptable human exposure to any contaminant concentration above action levels that has been detected or is reasonably suspected based on current contaminant concentrations and current site conditions. Although contamination remains at the facility that may require further remediation, action has been taken or site conditions are otherwise such that unacceptable threats to human health from actual exposure to the contamination are not plausible based on current uses of the site. Such actions may include the use of physical barriers or institutional controls (e.g. deed restrictions or alternative water supply).

Status Codes:

- YE** Yes, applicable as of this date.
- NA** Previous determination no longer applicable as of this date.
- NC** No control measures necessary. (Available Fall FY95).

Initiating Sources: Documentation signed by the Branch Chief (or above, or his or her delegate) or the State equivalent (if the State is authorized for corrective action,) and entered into the Administrative file for the facility. Such documentation should state that (a) a human exposures controlled determination has been made or (b) a previous human exposures controlled determination is no longer applicable.

The documentation should also provide the basis for the determination made under (a) or (b).

Oversight: Yes, data for this event will be accessible by Headquarters.

Schedule Date: Date this event is anticipated.

Actual Date: Date that the EPA or State documents that the facility has achieved the event, or that the event determination is no longer applicable.

Responsible Agency: EPA or State

Guidance: This event code has been established to enable the corrective action program to identify as a "measure of success" facilities where measures have been implemented such that actual human exposures to contamination at or from the facility do not pose an unacceptable risk to human health, based on current site conditions. The event code applies to the entire facility including any off-site contamination emanating from the facility, rather than individual areas or releases. An entry should only be made after all relevant contaminated media pathways have been evaluated and documentation is available to show that human exposures have been controlled where necessary.

The assessment of whether human exposures are controlled can be accomplished in various ways. Each determination will require a different level of analysis based on the site conditions and the information available on the contaminated release. Logical deduction is the most direct mechanism towards making a human exposures determination. (As a simplified example: soil contamination + put up a fence = no current exposure). The most resource intensive analysis is a current scenario risk assessment. This option can be used if other types of analysis do not result in a concrete determination of human exposure. This type of assessment can be done using EPA guidance such as the Superfund Risk Assessment Guidance (RAGS) If a risk assessment is conducted, both off-site and on-site human exposures should be considered.

In making determinations of Human Exposures Controlled, it will be necessary to evaluate somewhat differently situations where contamination is entirely within the facility boundary, and situations where releases have migrated beyond a facility's boundary. In cases where contamination (e.g., contaminated ground water) is present only within the boundaries of a facility and there are no drinking water wells on-site, a positive (YE) determination could be entered on the basis that there are no human receptors present (e.g., there are no drinking water wells within the facility that could extract the contaminated ground water).

However, for contamination that has migrated beyond the facility boundary, this determination cannot be made unless control measures have been implemented (e.g., access controls, physical barriers, or institutional controls) that will prevent plausible human exposures from occurring.

The data entry has been set up to provide users with three Status code options. First, the YE code is entered into the system only after a positive Human Exposures Controlled Determination has been made for the entire facility. Use of the YE code is appropriate only for facilities where studies have shown that contamination is (or was) present at concentrations causing a plausible risk to human health and measures of been taken to control the risk of human exposure to the contaminated release.

The second code, NA, is entered only after the YE code has been entered. NA is used when conditions at the site subsequently change so that the human exposures controlled determination is no longer valid. In this context, assessments of human exposures are largely based on the current use of the facility and on surrounding land uses. As these factors change, this indicator may change. Determining whether human exposures to the release have been controlled at a given site is a dynamic measurement and should be reviewed and updated as site conditions change. If new information indicates that the previous human exposures controlled determination is no longer valid, a new status code of NA should be entered. If the situation which caused an NA is brought back under control, then YE may again be entered for the facility.

The third code, NC, is designed to address cases where there is no risk of human exposure to contaminant releases at the facility due to low/ nonexistent contaminant levels or lack of a human receptor. This status code has been included to refine the interpretation of data entered under CA725 by providing the ability to identify facilities where human exposure to contamination is not a plausible, current risk.

When entering a new status code or changing a previous determination (i.e. NA), a new record with the new date should be used instead of overwriting the old status code (YE) and the associated date. Entering a new record will ensure that the RCRIS system picks up the most up-to-date code on the facility.

The Environmental Indicator event codes are "legitimate orphans" under the RCRIS system. This means that the entry does not need to be attached to an instrument or an area. Therefore, the "legitimate orphan" is a good mechanism for tracking facility-wide activities such as CA725. Another option for entering Environmental Indicator data is to create an Area specifically entitled "Entire Facility" and enter the event and status code under this Area. National reports

will only pull Environmental Indicator data entered as a legitimate orphan or under an Area expressly named Entire Facility.

For data management purposes, the events are independent from corrective action process events (e.g. stabilization, CA600). If human exposures have been controlled either through a final remedy, stabilization measures, or some other remedial activity, the event should be entered.

Care should be taken when evaluating the information in this event code for the corrective action universe. Blank spaces or no entries should only be interpreted to mean that the human health risks resulting from a release have not yet been determined at the facility, not that the facility has uncontrolled risks. In addition, finding that direct exposure risks to humans are controlled does not suggest that all potential threats to humans, or threats to the environment, have been adequately addressed or that contamination has been removed or permanently contained.

The following series of examples has been developed to illustrate the use of this event code and the status codes. Many of these scenarios are simplified for clarity's sake. Each Environmental Indicator determination will depend on the particular conditions present at each site. These examples are intended to provide general guidance and increase familiarity with Environmental Indicator decision-making process:

1. A site has only soil contamination (with a temporary cover if wind-blown dust is a concern). A fence has been put up to keep people away and workers on-site wear protective gear appropriate to the level of contamination when exposure is plausible. Although it is possible, it is not plausible that a person would get by the fence and be exposed to the soil contamination. YE can be entered even though the contamination is above action levels or established clean-up goals for the site because human exposure has been controlled. If the fence (or temporary cover) is removed or damaged such that exposures are now plausible while the contamination is present, NA must be entered because the risk is no longer controlled.
2. Facility has off-site groundwater contamination (assume all other risks are controlled). Residential neighborhood uses wells that tap into the area contaminated by the release. The facility provides an alternate source of water to residents and insures that people will not use die tap water (e.g. seal the wells). YE can be entered. If the contamination is still present and the alternative source of water is discontinued, NA must be entered.

3. A facility has off-site groundwater contamination. however, in this case, there are no residents near the facility or wells that tap into tile contaminated aquifer. YE cannot be entered unless the owner/operator can effectively ensure control over human exposure to the contaminants. YE could be entered once the owner/operator has implemented measures to control human exposures such as preventing the installation of drinking water wells in the area overlying the groundwater contaminant plume, or some other effective exposure control measure.
4. In many cases more than one type of release will present a risk of human exposure. For example, a facility has both soil and groundwater contamination. Before YE can be entered, both types of exposures must be addressed. If the conditions surrounding any one of the control measures changes that would result in a plausible exposure to an unacceptable current risk, than NA must be entered. In addition, if new exposures are identified after making a YE determination, then NA must be entered.
5. There also may be situations where there is more than one type of release but only a fraction of the releases present an unacceptable risk of human exposure. As long as the entire facility has been evaluated and human exposure control measures have been established where necessary, YE can be entered (In order to enter a YE, some type of exposure control measure must be in place at the facility.)
6. A facility has ongoing releases to the air from units requiring corrective action and/or units required as a result of corrective action which are not subject to the 264/265 air emission rules (such as wastewater treatment units or other SWMUs) which are found to pose an unacceptable risk to receptors. YE could be entered once the owner/operator has implemented measures to reduce the emissions to an acceptable risk level, such as installation of carbon absorption units or other emission control technology.
7. A landfill facility surrounded by residential areas emits a landfill gas resulting in vinyl chloride concentrations (in air) in excess of health based levels. The facility implements a response action plan including air monitoring and interim remedial measures such as clay compaction of landfill benches and slopes, and improvements to the landfill gas collection system. YE can be entered once the air monitoring data show the vinyl chloride level has been reduced below the health based action levels.

8. Solvent Recycling Facility

A facility has high concentrations of contaminated ground water entering into an adjacent creek. The geology of the site consists of a shallow (20 feet thick) unconsolidated overburden which overlies fractured bedrock. The concentrations of observed contamination in the ground water and soil strongly suggest the presence of DNAPLS although no direct visual evidence of separate phase contamination has been found. The facility has implemented the following actions to avert human exposure to the contamination: (1) a shallow ground-water recovery system was installed to capture Contamination entering the adjacent creek; (2) a fence around the facility boundary erected; (3) no fishing or swimming/wading signs were posted along the creek which contamination has been detected in the surface water, creek sediments, and creek bank. The facility feels that these actions will prevent exposure to the creek itself and the drinking water wells which tap the bedrock aquifer on the other side of the creek.

Although the actions taken were warranted, upon careful evaluation, the regulator determined that YE cannot be entered for the following reasons:

- (1) The potential for DNAPL suggests that contamination could be present in the bedrock aquifer and could be migrating in directions not associated with the shallow ground-water flow. Contamination in the bedrock aquifer might not discharge into the shallow creek, and could, therefore, impact the nearby private wells. The facility has not characterized ground-water flow or contaminant occurrence in the bedrock aquifer.
- (2) The fence was installed at the top of the creek bank adjacent to the facility. This fence does not preclude exposure of humans to seeps of highly contaminated ground water flowing through the creek bank. Both sides of the creek would have to be fenced and perhaps guarded to ensure against human exposure.

9. Petroleum Refinery

A past release of a gasoline from a refinery has resulted in on-site soil, soil gas, and ground-water contamination. Nearby residents had complained of chemical smells in their basements. Air monitoring confirmed that homes had been impacted by a soil vapor plume that had

migrated beneath a parking lot and road. The facility installed and is operating a product removal, vapor extraction, and ground-water pump and treat system to prevent further off-site migration of the contamination. The facility contends that these measures were designed to prevent exposures to humans residing in die off-site homes, approximately 250 feet from the furthest extent of the ground-water contamination.

YE cannot be entered until the lack of exposure had been confined through performance monitoring. The residential air sampling conducted as part of the performance monitoring program revealed that concentrations of the volatile chemical were not significantly declining. Upon further investigation, it was discovered that the gasoline had migrated off-site along a the gravel bed of a sewer system. The on-site extraction system was found to be inadequate to prevent exposure to this existing off-site contamination. The facility purchased the five impacted homes and displaced the residents. An off-site remedial system was installed. Performance monitoring revealed that the human exposures were controlled, therefore, a entry of YE at this time would be appropriate.

10. Battery Recycling Facility

This facility has extensive lead contamination of on-site soils. The soils were contaminated both from the fallout of particular emissions from the past recycling operations as well as the disposal of crushed battery casings. Ground-water is not used for drinking water, nor was it found to be impacted from the lead contamination. The current discharges to air from the operations meet Clean Air Act standards. Interim measures including a facility fence, perimeter air monitoring, and a cap over contaminated soils have been implemented. The facility contends that these measures are adequate to prevent human exposure from the site.

While the measures were proven to be successful in preventing on-going off-site releases and human exposures, die impact from past releases had not been fully documented. Therefore, YE could not be entered. A requirement to perform off-site investigations at residences located off-site in the prevailing downwind direction revealed elevated levels of lead contamination in yards and inside homes. Samples of blood taken from the residents revealed elevated levels of lead. The facility took extensive actions at two impacted residences including: (1) removing

contaminated soils, bringing in new top soil and revegetating yards; (2) replacing carpeting, drapery, and furniture; and (3) extensively cleaning the inside and outside of the house. Subsequent sampling confirmed that absence of lead above levels of concern. YE could be entered at this point in time.

Event Code Name: CA750 - Groundwater Releases Controlled Determination

Definition: This event indicates that groundwater releases subject to RCRA Corrective Action at the facility are controlled. This event may be counted when one or more of the following conditions are fulfilled and documented by field measurements and/or observations including the direction of groundwater flow gradients over time.

For all known or reasonably suspected groundwater contamination at the facility in excess of action levels, or in excess of an Agency specified clean-up level:

1.) An engineered system has been installed that is designed and operating (including performance monitoring) to effectively control the further migration beyond a designated boundary such as the engineered system, the facility boundary, a line upgradient of receptors, or the leading edge of the plume as defined by levels above the Agency established action levels or cleanup standards.

OR

2.) The Agency has determined that the groundwater cleanup objectives can be met without the use of an engineered system through the remedial measures selected, including facilities where the contamination will naturally attenuate.

Status Codes:

YE Yes, applicable as of this date.

NA Previous determination no longer applicable as of this date.

NR No release to groundwater.

Initiating Sources: Documentation signed by the Branch Chief (or above or his or her delegate) or the State equivalent (if the State is authorized for corrective action), and entered into the Administrative file for the facility. Such documentation should state that (a) a groundwater releases controlled determination has been made or (b) a previous groundwater releases controlled determination is no longer applicable. The documentation should also provide the basis for the determination made under (a) or (b).

Oversight: Yes, data for this event will be accessible by Headquarters.

Schedule Date: Date this event is anticipated.

Actual Date: Date that the EPA or State documents that the facility has achieved the event, or that the event documentation is no longer applicable.

Responsible Agency: EPA or State

Guidance: This event is based on the physical movement of groundwater contaminants rather than the risk that groundwater contamination presents. The event is a facility wide measure. Therefore, all groundwater releases at the facility must be controlled before this event can be entered (Groundwater Releases Controlled Determination).

The Groundwater Releases Controlled Determination is based on field measurements and, to the extent necessary, other scientific analysis including modeling, capture zone determination, aquifer tests, groundwater flow meters, tracer tests, and isotope studies. These scientific tools help determine what remediation measures can achieve groundwater containment at a particular site and can monitor the contaminated plumes. Engineered treatment Systems used to control groundwater releases include, but are not limited to: extraction wells, slurry walls, sheet piles, and drain systems. Occasionally, the Agency will make the determination that a release will not require an engineered system for containment. This type of site includes facilities where the release will naturally attenuate.

The data entry has been set up to provide users with three status code options. First, the YE should be entered once a positive Groundwater Releases Controlled Determination has been made. After the YE status code has been entered, the Region or State implementor should continue to require and review performance monitoring data to ensure the positive determination is still valid. In many cases, long term groundwater monitoring will be necessary to confirm containment of groundwater contaminant plumes. If the groundwater release begins to further migrate beyond the designated boundary above the Agency established action levels or clean-up standards such that the previous code is invalid, the second status code of NA should be entered indicating that the groundwater release is no longer controlled. If the situation which caused an NA is brought back under control, then YE may again be entered for the facility. In some cases, seasonal fluctuations of the gradient prevent control of the release. If there is a history of seasonal fluctuation at a site, YE cannot be entered until the Agency is assured that the fluctuations will not cause the migration of contamination above the action levels or clean-up standards,

The third code, NR, is designed to address cases where there is no release of contaminants to groundwater at the facility. This status code has been included to refine the interpretation of data entered wider CA750 by

providing the ability to identify facilities where there is no groundwater contamination problems have been shown to exist.

When entering a new status code or changing a previous determination (i.e. NA), a new record with the new date should be used instead of overwriting the old status code (YE) and the associated date. Entering a new record will ensure that the RCRIS system picks up the most up-to-date code on the facility or area.

The Environmental Indicator event codes are "legitimate orphans" wider the RCRIS system. This means that the entry does not need to be attached to an instrument or an area. Therefore, the "legitimate orphan" is a good mechanism for tracking facility-wide activities such as CA750. Another option for entering Environmental Indicator data is to create an Area specifically entitled "Entire Facility" and enter the event and status code under this Area. National reports will only pull Environmental Indicator data entered as a legitimate orphan or under an Area expressly named Entire facility.

For data management purposes, the events are independent from corrective action process events (e.g. CA600). If a release has occurred and been controlled either through a final remedy, stabilization measures, or some other remedial activity, the event should be entered.

Care should be taken when evaluating the information in this event code for the corrective action universe. Blank spaces or no entries should only be interpreted to mean that the releases have not yet been determined at the facility, not that the facility has uncontrolled releases. In addition, finding that the groundwater releases are controlled does not suggest that the contamination has been adequately addressed or that the release has been removed or permanently contained. Further substantial cleanup measures of the controlled plume may be necessary.

The following series of examples have been developed to illustrate the use of this event code and the status codes:

1. If the plume is contained within the designated boundary, as verified by an adequate performance monitoring program, due to an engineered system, regardless of whether the plume is on or off-site, groundwater releases are controlled and YE can be entered. In this situation, the location of the plume with respect to the facility boundary may not matter. If the plume begins to further migrate beyond the designated boundary at concentrations above the Agency established action levels or clean-up standards, the status code should be changed to NA.

2. If groundwater contamination is contained through natural processes (i.e. degradation) and EPA/state has determined that natural attenuation of the contamination is a protective remedy that will meet the established clean-up goals for the facility (provided that the contaminated plume is predicted to remain within a designated boundary during the projected remedial time frame), then the groundwater releases are controlled and YE can be entered. This type of determination must be supported by data. If conditions change where natural conditions no longer prevent the plume from migrating beyond the designated boundary at concentrations above the Agency established action levels or cleanup goals, NA must be entered.
3. There may be cases where groundwater contamination is released to surface water, such as into a stream running alongside the facility. If the concentrations of contaminants in the groundwater flowing into the surface water exceed action levels or an Agency established clean-up standard, then the release is not controlled. Note that the concentration of contaminants is measured in the groundwater, not in the surface water. It does not matter if the surface water then dilutes the released contaminants below action or clean-up levels. Only in cases where an extraction well has pulled the plume back so that any groundwater contamination released to surface water is below action levels, could this code be entered.
4. If an additional groundwater release is discovered at the facility after other groundwater releases have been controlled and YE entered, then NA must be entered. Once the new release has been controlled, then YE can be entered again.
5. Pump and Treat Design Based on Capture Zone Modeling

Extensive ground-water modeling conducted by a facility's consultant predicted pumping 4 extraction wells at a combined rate of 350 gallons per minute (gpm) will effectively achieve hydraulic containment of the contaminant plume. The facility installed and began operating the system per the consultant's design. The facility submitted a performance report that indicated that the 350 gpm system was in operation; therefore, further migration of contaminated ground water was controlled.

The implementation of the 350 gpm ground water pump and treat system, in and of itself, does not provide evidence that groundwater releases are controlled,

even if the pumping rate was determined by modeling. While ground-water modeling can be helpful in designing remedial systems, the numerous assumptions made during the modeling exercise necessitates field measurements to confirm the model's predictions. YE should not be entered until the facility has submitted field measurements that provide evidence to support the "releases controlled determination." A clearly designed and implemented performance monitoring program is necessary to ensure the availability of adequate data to evaluate a YE determination. Plans for ongoing performance monitoring programs should be submitted, reviewed, and approved as an essential component of the remedial design.

6. Chemical Manufacturer

A facility has high concentrations of contaminated ground water in a highly heterogeneous coastal-plain aquifer. The extent of the plume was delineated and found to be migrating off-site under an adjacent farm. Although the concentrations of chlorinated solvents near the production area of the facility suggest the presence of DNAPL in the subsurface, no direct evidence of separate-phase contamination was observed during site investigations. Access to the farmer's property was granted, for a negotiated fee, and the facility implemented a pump and treat system designed to control die further migration of the contaminant plume. Several rounds of performance monitoring data collected from strategically placed monitoring wells and piezometers were submitted. The reports claimed that the system was effectively containing the plume, and provided field measurements to support the claim. Based on the available information, YE could be entered at this time.

Once the further migration of the plume was effectively controlled, the facility pursued other ground-water remedial actions designed to reduce contaminated mass in high concentration areas. During this time, a new EPA geologist was assigned to the case; this person had previous experience' in identifying lineaments (linear surface features that could be indicative of subsurface conditions). During the geologist's review of a proposal to pump hot spots, she recognized a narrow (< 50 ft wide) linear feature on an aerial photograph that passed through the production area of the facility.

She felt this feature might be an indication of a paleo-stream channel in the subsurface. The existence of such a feature was consistent with the conceptual model that had been formulated for the site. The EPA geologist required "direct-push" sampling of the shallow ground water in the middle of the feature and approximately 50 feet to either side. The facility was surprised to find ppm levels of chlorinated solvents in the sample collected from the center of feature, and no-detectable levels in the other two samples.

A subsequent boring and ground-water investigation of the area confirmed the presence of a paleo stream channel, as well as residual TCE DNAPL. The paleo channel had served as a preferential pathway for contaminant migration. The investigation also revealed the contaminated ground water within the channel flowed in a 45 degree angle from the previously delineated and "controlled" plume. The geologist recognized that all of the contaminated ground water at the facility was not longer being controlled; therefore, she entered NA.

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