DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99
Revised 11/8/00

RCRA Corrective Action
Environmental Indicator (EI) RCRIS Code (CA725)

Current Human Exposures Under Control

Facility Name: **Iowa State University (ISU) Chemical Waste Handling Facility (CWHF)**
Facility Address: **Ames, Iowa**
Facility EPA ID #: **IAT200010601**

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

   X If yes - check here and continue with #2 below.

   _____ If no - re-evaluate existing data, or

   _____ If data are not available skip to #6 and enter"IN" (more information needed) status code.

SWMUs IDENTIFIED AT THE ISU CWHF

SWMUs identified at the ISU CWHF are listed and described below. SWMU descriptions were obtained from documents referenced in this EI.

The 32 SWMUs for the ISU CWHF were designated in the ISU Resource Conservation and Recovery Act (RCRA) Permit for the CWHF. Permit conditions required that ISU conduct a RCRA Facility Investigation (RFI) to address 12 of the SWMUs. The remaining 20 SWMUs were eliminated from the RFI. The SWMU descriptions below are organized by exclusion or inclusion in the RFI.

In 19997, the U.S. Environmental Protection Agency (EPA) approved the RFI Report. EPA did not require the facility to perform corrective action at the CWHF (EPA 1997). Two figures from the RFI Report, a site location map and a map of SWMUs addressed by the RFI, are provided in Appendix A.

It should be noted that the two Fire Training Facility (FTF) SWMUs described below are not considered in this EI evaluation. The SWMUs originally were listed in ISU's RCRA Permit for the CWHF (EPA Identification No. IAT200010601). Later, the FTF was determined to be noncontiguous with the CWHF and was issued its own identification number (EPA Identification No. IAD984621383). Because the FTF is not contiguous with the CWHF and because the FTF is identified as a separate facility by the EPA, the FTF is not included in this EI evaluation. Only the CWHF and contiguous units under IAT200010601 are considered.

Units Excluded from the RFI

Under conditions of the RCRA Permit for the facility, the following SWMUs were not required to be part of the RFI. A SWMU was excluded from the RFI either because EPA and the facility determined that the likelihood of release from the SWMU was low, or because other agencies were investigating or had addressed the SWMU. Examples of other agencies investigating or having addressed SWMUs include the Department of the Environment (DOE), in the case of the Ames Research Laboratory (ARL) SWMUs, or the Iowa Department of Natural Resources (IDNR) in the case of the FTF SWMUs:

Waste Transfer Vehicle
Waste Unloading Dock
Waste Classification and Staging Area
Waste Chemical Shelves
Temporary Drum Storage Area
Filter Press and Tank
Chemical Treatment Area
Safety Cabinets
Empty Drum Collection Area
Building Drain and Sewer Line
Radioactive/Mixed Waste Storage
Hazardous Waste Storage Area
Polychlorinated Biphenol (PCB) Storage Area
Waste Drum Off-Loading Vehicle
Waste Loadout Dock
Non-Usable Drum Storage Area
Waste Detonation Area
ARL Underground Storage Tanks (UST)
DOE Landfill
ISU FTF
ISU FTF USTs

Waste Transfer Vehicle. The waste transfer vehicle is a cargo van used by ISU to transport hazardous wastes from generator locations on campus to the CWHF. Wastes in the vehicle are fully contained, and spills, should they occur, should be contained in the vehicle. No releases from this unit have been documented.

Waste Unloading Dock. Wastes transported to the CWHF are unloaded at this location. All wastes unloaded at the dock are contained, and the driveway outside of the dock is paved with concrete. No releases have been documented for this SWMU, and effective implementation of waste management practices specified in the permit should mitigate the potential for releases at this unit in the future. ISU evaluated design plans for a secondary containment system around the CWHF. The purpose of this system was to comply with building code requirements to provide containment of fire suppression water and to provide the added benefit of further mitigation of the potential for contaminant releases from the CWHF to surface waters in the area.

Waste Classification and Staging Area. This SWMU is located inside of the CWHF and within the internal containment system for the facility. No releases have been documented from this unit.

Waste Chemical Shelves. This SWMU is located inside the CWHF and within the internal containment system for the facility. No releases have been documented from this unit, and the potential for a future release is low. In addition, the RCRA Closure Plan for the CWHF includes decontamination procedures for the Waste Chemical Shelves. Recently, the original shelves were replaced as part of routine maintenance. The old shelves were cleaned thoroughly prior to disposal. No evidence of contamination existed on the original shelves. Most of the shelves were replaced with steel fire safety cabinets.

Temporary Drum Storage Area. The Temporary Drum Storage Area is located inside of the CWHF and within the internal containment system for the facility. The current location of the Temporary Drum Storage Area is in the new addition of the CWHF. The SWMU identified in the RCRA Facility Assessment report was located in the original portion of the CWHF, where safety cabinets are now located. No releases have been documented from this unit.

Filter Press and Tank. This SWMU is located inside of the CWHF and within the internal containment system for the facility. No documentation was provided about the materials pressed and filtered. No documented releases exist from this unit.

Chemical Treatment Area. This SWMU is located inside of the CWHF and within the internal containment system for the facility. No documented releases exist for this unit.

Safety Cabinets. The safety cabinets are located in the original portion of the CWHF and are used to store a wide range of wastes in small containers. The cabinets are located within the internal containment system for the facility. No documented releases exist for this unit.

Empty Drum Collection Area. This SWMU is located inside of the CWHF and within the internal containment system for the facility. No documented releases exist for this unit.

Radioactive/Mixed Waste Storage Area. This SWMU is located inside of the CWHF and within the internal containment system for the facility. The Radioactive/Mixed Waste Storage Area is further contained from other storage areas at the CWHF to prevent spreading or mixing of mixed waste from accidental spills or releases and to prevent escape of mixed waste to the floor drain system for the CWHF. No releases were documented for this unit.

Hazardous Waste Storage Area. The Hazardous Waste Storage Area is located inside of the CWHF and within the internal containment system for the facility. While occasional, accidental spills have occurred at the CWHF, none have ever exceeded the containment capacity for the facility. Operational procedures in the RCRA Permit for the CWHF include provisions for immediate response, containment, and cleanup of spills and releases. No documented releases have occurred to the environment from this SWMU.

PCB Storage Area. This SWMU is located inside of the CWHF and within the internal containment system for the facility. The PCB Storage Area is further contained from other storage areas at the CWHF to prevent spreading or mixing of PCB-contaminated waste from accidental spills or releases and to prevent escape of PCBs to the floor drain system for the CWHF. No documented releases exist for this unit.

Waste Drum Off-Loading Vehicle. This vehicle (forklift) is used to move closed drums containing wastes to and from loading areas within the CWHF. The vehicle is used inside of the CWHF within the internal containment system for the facility. No releases from this unit have been documented.

Waste Load-Out Dock. Wastes to be transported from the CWHF are removed from the facility at this location. All wastes handled at the dock are contained, and the driveway outside the dock is paved with concrete. No documented releases exist at this SWMU, and effective implementation of waste management practices specified in the permit should mitigate the potential for releases at this unit in the future. ISU evaluated design plans for a secondary containment system around the CWHF. The purpose of this system was to comply with building code requirements to provide containment of fire suppression water and to provide the added benefit of further mitigation of the potential for contaminant releases from the CWHF to surface waters in the area. It is not know whether any secondary containment actually was installed.

Non-Usable Drum Storage Area. This area, located outside of the CWHF, was used to store unusable 55-gallon drums. The drums were determined to be unusable, either because of damage or deterioration. In all cases, the unusable drums were decontaminated with a triple rinse prior to storage in the area. Use of the area for storage of unusable drums was discontinued in 1989. No history of release exists for this area, and the potential that a release occurred was determined to be extremely low, because no wastes were stored in the area and the drums were empty and decontaminated. Because the area is no longer used, little potential exists for future releases. ISU evaluated design plans for a secondary containment system around the CWHF. The purpose of this system was to comply with building code requirements to provide containment of fire suppression water and to provide the added benefit of further mitigation of the potential for contaminant releases from the CWHF to surface waters in the area. It is not known whether any secondary containment actually was installed.

Waste Detonation Area. This area, identified as SWMU No. 6 in the CWHF RCRA Permit, is located about 1,500 feet north of the CWHF. From 1983 to July 1987, the unit was used for the detonation of shock-sensitive and potentially explosive compounds (reactive wastes). In accordance with 40 Code of Federal Regulations (CFR) 265, Subpart G, ISU collected closure verification samples at this unit on March 28, 1995. Closure and associated sampling activities were conducted under a Closure Plan approved by EPA. Analytical results from the verification samples indicate that no contamination is present in soils at the former location of the SWMU. The unit was certified clean-closed by EPA in 1995.

ARL USTs. Four USTs associated with the ARL were included with the list of SWMUs in the CWHF RCRA Permit. Included were a 5,000-gallon diesel fuel tank, a 15,000-gallon tank containing sodium hydroxide, and two tanks (500- and 5,000-gallon) containing sulfuric acid. All four USTs were removed

under the review and approval of the UST Section of the IDNR. All four tanks were removed and cleaned between October 1989 and January 1990. None of the USTs showed signs of deterioration, and no indication of leakage or spillage existed in the excavations. Confirmatory samples were collected from each excavation to determine if any releases had occurred. None of the samples indicated the presence of contamination. Based on removal actions and confirmatory sampling done by ISU, it was determined by IDNR that no further action was required at the SWMU.

DOE Landfill. This landfill, also referred to as the Inactive Chemical Disposal Site, was located adjacent to the eastern side (across Scholl Road and north of the CWHF) of the ARL facility. The site was used for disposal of hazardous and radioactive materials generated at ARL between 1956 and 1966. Extensive soil and groundwater investigations have been conducted by DOE in the vicinity of the landfill. A removal action was conducted during 1995 at the site by OHM Corporation with DOE funding. ISU is involved in the project in an oversight and technical review capacity. Information pertaining to significant milestones associated with this project was to be forwarded to EPA Region 7. No documentation of DOE closure activities was found in the record for the CWHF, possibly because DOE was conducting the investigation, rather than ISU.

ISU FTF. The ISU FTF is located approximately 1 ½ miles east of the CWHF, near the intersection of Pammel Drive and Harber Road, north of the Chicago and Northwestern railroad tracks, in Ames, Iowa. The area consists of USTs for fuel storage, underground piping for fuel transfer, and a fire demonstration and training basin. Fire training activities have been conducted in this area since the mid-1960s and continue today. Current fire training exercises are conducted with propane and water instead of diesel and gasoline.

The FTF has undergone extensive investigation since the summer of 1993 as a result of hydrocarbon-impacted soil and groundwater discovered during the removal and investigation of the FTF USTs. A Site Cleanup Report (SCR) and SCR Addendum were prepared by ISU's consultant for the FTF site, ATC Blattert, Inc. (ATC), under direction of the IDNR Leaking Underground Storage Tank (LUST) program. ATC has installed 33 shallow monitoring wells in the vicinity. Analytical results of groundwater samples indicate the presence of a hydrocarbon plume beneath the former location of the FTF USTs and the Fire Demonstration and Training Basin (FDTB). Benzene appears to be the contaminant of most concern, with groundwater concentrations as high as 2,440 parts per billion (ppb). The IDNR action level is 5 ppb. The source of hydrocarbons in the soil and groundwater in the area appears to be leakage from the former USTs, leakage in the underground piping system from the USTs to the FDTB, and spills in the FDTB. The SCR states that the site is classified as a high-risk LUST site.

Prior to use as the FTF, the area appears to have been the location of a wastewater treatment facility. An Imhoff tank and dosing chamber were both present at the site. The FDTB was a sand filter bed for the treatment facility. The porous nature of the soils in the basin may have accelerated the migration of hydrocarbons released as a result of fire training exercises. Data presented in the SCR indicate that a hydrocarbon plume is present in the shallow, water-bearing unit beneath the basin.

Corrective action alternatives were evaluated in the SCR. Additional soil and groundwater sampling was conducted in 1999 and a Risk Based Corrective Action (RBCA) Tier II report was generated and

submitted to the IDNR and the Iowa Underground Storage Tank Board (IUSTB). IDNR assigned the FTF site a "No Action Required" classification in 2001 (IDNR 2001).

Although the FTF SWMUs are listed in ISU's RCRA permit for the CWHF (IAT200010601), the FTF was later determined to be noncontiguous with the CWHF, and the FTF was issued its own identification number (IAD984621383). Because the FTF is not contiguous with the CWHF and because the FTF is identified as a separate facility by EPA, the FTF is not included in this EI evaluation.

ISU FTF USTs. A total of seven USTs were located north of the FTF. The tanks were installed in 1980 and were used to store gasoline and diesel fuel used in fire training exercises. Underground piping was used to transfer the fuel to the FTF. Under review of the IDNR LUST Section, all seven USTs were removed by ISU in 1989. During removal of the USTs, hydrocarbon-impacted soils were observed. Subsequent investigation of the site was conducted under the IDNR LUST Program by ATC. ATC collected numerous soil and groundwater samples in the area. Analytical results from these soil and ground water samples indicate the presence of significant gasoline and diesel contamination in both media. The source of hydrocarbons in the area is attributed to leakage from the USTs and underground piping. An SCR was prepared by ATC and submitted to IDNR in March 1994. Subsequent sampling was conducted and an addendum to the original SCR was submitted in March 1995. Corrective action alternatives were included in the addendum. Additional groundwater and soil samples were collected in 1999 and a RBCA Tier II study was conducted. IDNR assigned the FTF site a "No Action Required" classification in 2001 (IDNR 2001).

Although the FTF SWMUs are listed in ISU's RCRA permit for the CWHF (IAT200010601), the FTF was later determined to be noncontiguous with the CWHF, and the FTF was issued its own identification number (IAD984621383). Because the FTF is not contiguous with the CWHF and because the FTF is identified as a separate facility by EPA, the FTF is not included in this EI evaluation.

Units Addressed by the RFI

The following SWMUs were included in the RFI, in accordance with the conditions of the RCRA Permit for the facility. SWMUs were included in the RFI because EPA and the facility determined that (1) a release had been documented, (2) some likelihood of release existed, or (3) insufficient information existed to make a determination.

Abandoned Sanitary Septic System
Applied Science Center (ASC) Acid Neutralization Tank
ASC Warehouse Septic System
Comfort Cooling Towers
Waste Handling Building
High Pressure Test Facility
Solar House
ASC Warehouse
Blockhouse

Former Evaporation Tray
Building Drain and Sewer Line
Wastewater Lift Station and Sump

Abandoned Sanitary Septic System. The Abandoned Sanitary Septic System was constructed in the 1960s and is located west of the ARL. The system was constructed of clay pipes, a concrete septic tank, and a sand filter. The tank is 24 feet 8 inches in diameter and 10 feet deep. It is buried 2 feet below the ground surface. The sand filter is 55 by 55 feet. The septic system discharged to Onion Gulch through a dedicated pipe system used for the Acid Neutralization Tank (ANT) (discussed below). The septic system received sanitary wastewater from toilets and bathroom sinks in the main ARL building and the Waste Disposal Building (discussed below). The system also received blowdown from the Comfort Cooling Towers (discussed below). In 1978, the septic system was abandoned in place when ARL began discharging to the Ames municipal sewer system. DOE completed decommissioning of the ARL in 1982. No documentation of DOE decommissioning or closure activities was found in the record for the CWHF, possibly because DOE was the responsible party, rather than ISU.

According to the RFI Work Plan, in 1993, RUST Environment & Infrastructure (E&I) collected samples for DOE in an area downgradient of the septic field. A surface gamma survey was conducted over the entire area west of the ARL. Subsurface soil samples were collected from an area downgradient of the septic system. In addition, sediment samples were collected from Onion Gulch, and a groundwater sample was collected from a monitoring well near the drain field. Samples were analyzed for radionuclides (Ac-228, Bi-214, Co-60, K-40, Pb-210, Pb-214, Ra-226, and T1-208) and chromium (a suspected contaminant from the Comfort Cooling Towers).

Based on the results of the chromium analysis, no evidence existed of chromium levels above action levels for soil and EPA maximum contaminant levels (MCL) for drinking water. The gamma survey indicated an anomalous area of slightly above background radioactivity downgradient of the septic system. Radionuclide results in soil and groundwater samples from the area were within naturally occurring ranges. Based on the results of the RUST E&I investigation, it was concluded that no public health threat exists from the Abandoned Sanitary Septic System under current land use.

ASC ANT. The ASC ANT accepted drainage from ARL sink drains. The drains were routed through a dedicated pipe system to an acid neutralizing tank on the western side of the facility. The ANT was constructed of poured concrete about 30 feet by 14 feet by 11 feet by 8 inches deep. The top is located 4 feet under the ground surface. The tank was constructed between 1961 and 1965 and was used until 1978, when the facility was connected to the sanitary sewers. The tank was used to neutralize wastewater (possibly containing acids, bases, metals, and organics) by flowing through a 5 foot-deep bed of pulverized limestone. The tank was abandoned in place, and the limestone was removed and used in an unpaved drive at the DOE landfill. Effluent from the ANT was drained into Onion Gulch through a dedicated pipe under a National Pollution Discharge Elimination System (NPDES) permit, which was held from 1975 to 1978.

ASC Warehouse Septic System. The ASC Warehouse Septic System received wastes from the sumps and sinks, lavatory, and other liquid collected in the warehouse/laboratories from 1965 until 1978, when the ASC was connected to the municipal sewer system. This dedicated septic system was located on the

northeastern side of the ASC. The septic system was abandoned in place. The septic system consisted of clay pipes, a 300-gallon steel septic tank, and a drain field. The drain field, which was allowed to percolate into the ground, consisted of 5-inch, perforated, agricultural tile in a 1-foot-thick gravel bed. The maximum depth of the bed was 30 inches. Presently, a gravel roadway and a maintained lawn overlie the system.

Comfort Cooling Towers. Comfort Cooling Towers for the ASC reactor building were located north of, and near, the reactor cooling towers. Chromates, at a concentration of 30 milligrams per liter, were used in the towers for corrosion inhibition. The chromates were used from the early-1960s until September 1987.

An area suspected of surface soil contamination, caused by drift of chromates from the Comfort Cooling Towers, was investigated during the 1993 RUST E&I investigation. In addition, the Abandoned Septic System, its outfall, and the sediment of Onion Gulch were also sampled, because both areas received blowdown from the Comfort Cooling Towers. Based on the results of chromium analyses, no indication existed of chromium levels above action levels for soil and MCLs for water in Onion Gulch. The RUST E&I investigation concluded that available data indicate that no public threat exists from residual contamination associated with the Comfort Cooling Towers under current land use.

Waste Handling Building. The Waste Handling Building (also known as the Waste Disposal Building) was used to store radioactive waste generated by ARL when the reactor was in operation. The Waste Handling Building was not decommissioned with other units and structures at ARL, because it was to be used for handling and temporary storage of radioactive waste in the future. Mixed wastes, composed of volatile organic liquids contaminated with depleted thorium and uranium generated in an attached, alpha, glove box facility, are stored in the building. Furthermore, holding tanks are used at the building to hold water from washing machines used to wash clothing suspected of radioactive contamination.

Soil and groundwater sampling west of the ARL, sediment and surface water sampling at Onion Gulch, and aerial gamma surveys at the ASC indicated that some contaminant were present at slightly elevated levels. Isolated anomolies were visible in the gamma surveys. The impact was mitigated with decontamination and decommissioning, as well as subsequent removal actions.

High Pressure Test Facility. The High Pressure Test Facility was built in the early 1970s and was used initially for hydrogen gas reactions. The facility was later used for thermite reduction of metals and for hydroxide activities. Use of the facility was discontinued in 1990, but the structure remains on the northern side of the Waste Handling Building.

Soil and groundwater sampling west of the ARL, sediment and surface water sampling at Onion Gulch, and aerial gamma surveys at the ASC indicated that some contaminant were present at slightly elevated levels. Isolated anomolies were visible in the gamma surveys. The impact was mitigated with decontamination and decommissioning, as well as subsequent removal actions.

Solar House. The Solar House was located at the ASC and used for research of solar energy technology during the mid- to late-1970s. Solar panels, energy-absorbing paints, and other energy-efficient materials were tested at the facility. The facility was permanently closed during ARL decontamination and

decommissioning activities. The building was demolished and removed from the ASC in 1987, when an addition to the ASC was constructed.

Because the former location of the Solar House is now under the ASC addition, no recent activities have investigated this area directly; however, the RUST E&I investigation included sampling activities at the entire ASC. Therefore, residual contamination associated with the Solar House would most likely have been discovered in the RUST E&I, and the investigation report concluded that no public health threat exists at the ASC under current land use.

ASC Warehouse. The ASC Warehouse was a combined reactor warehouse and laboratories. The laboratories were used by the radiochemistry group for 2 years during the mid-1960s. The warehouse did not undergo decontamination and decommissioning with the rest of the ASC complex sites, because it was anticipated that studies using radioactive materials would continue. Neutron diffraction equipment, which was removed from the face of the reactor, was also stored at the facility after the reactor was decommissioned. The neutron diffraction equipment was eventually shipped to Oak Ridge National Laboratory. The warehouse is currently used as a storage building and as graduate student offices.

Soil and groundwater sampling west of the ARL, sediment and surface water sampling at Onion Gulch, and aerial gamma surveys at the ASC indicated that some contaminant were present at slightly elevated levels. Isolated anomolies were visible in the gamma surveys. The impact was mitigated with decontamination and decommissioning, as well as subsequent removal actions.

Blockhouse. The Blockhouse site is located immediately east of the current ASC eastern boundary. The Blockhouse was a 240-square-foot, concrete block building. The building was constructed in the early- to mid-1960s and was used for the handling of radioactive wastes until the early 1980s. The building was demolished in June 1988; however, the concrete floor slab is still present at the site. Portions of the floor were contaminated radioactively at levels up to 3,000 disintegrations per minute per one hundred square centimeters. The isotopes present in these areas were Cobalt-60 and Cesium-137. ARL coordinated subsequent removal of residual radioactive material from the pad following destruction of the building. Contaminated block, floor, and soils were removed and disposed of at the DOE disposal site in Hanford, Washington.

In the fall of 1981, ARL collected samples form the ASC, including one sample from the Blockhouse. In addition, five samples were collected from control sites to determine whether radioactive contamination resulted from operation. The sample collected from the Blockhouse had a concentration of 8.6 picoCurie/gram (pCi/g) Cesium-137, which is elevated in comparison to the control samples.

No documentation of DOE closure activities was found in the record for the CWHF, possibly because DOE was the responsible party, rather than ISU.

During the RUST E&I 1993 investigation, a gamma survey was conducted at the site. The Blockhouse Site was included with this survey. Gamma radiation measurements at the Blockhouse Site were generally at background levels. Two anomalous readings were noted during the gamma survey. A cinder block, which was believed to have been from the old structure at the site, had a reading of approximately 15,000 counts per minute (cpm). This block was removed by ARL for off-site disposal. Another area at

the Blockhouse Site had gamma survey readings ranging from 9,000 to 13,000 cpm. A soil sample was collected from this area; however, the results of the radioactivity analyses of this sample indicated that levels are not elevated above naturally occurring levels. Based on the results of the RUST E&I investigation, it was concluded that no public health threat exists from the Blockhouse Site under current land use.

Former Evaporation Tray. The evaporation tray was located outside of the CWHF to the north. Until 1984, the tray was used to evaporate volatile liquids. The unit consisted of a metal tray on a stand, which sat outside of the facility. The ground beneath the tray was not covered or lined. After the unit was taken out of service, the associated equipment was decontaminated and disposed of. Although no remnants of the unit exist, documented releases occurred of small volumes of liquid from the tray. Because releases from the unit were small, and the nature of the liquid spilled would indicate that volatilization would have occurred before spills could have migrated any significant distance, it was determined to be unlikely that any residual hydrocarbons are still present in soils in the area.

Building Drain and Sewer Line. The Building Drain and Sewer Line convey treated wastewater and floor wash water from the CWHF to the Wastewater Lift Station and Sump and then to the City of Ames sewer system. ISU has a Pretreatment Agreement with the City of Ames for these discharges. The Pretreatment Agreement is maintained in the RCRA Permit. The drain is located in the Chemical Treatment Area, at the low point of the sloped concrete floor slab. The Building Drain and Sewer Line have been in service since 1979. The unit has accepted regulated discharges only, and no history of contamination exists for the drain or sewer line; however, the integrity of the system has never been tested. It is not known if a release from the sewer line has occurred previously.

Wastewater Lift Station and Sump. The Wastewater Lift Station and Sump is a covered, below-ground sump located about 70 feet west of the CWHF. It is used to collect wastewater and sanitary waste from the CWHF before it is pumped into the sanitary sewer. The Wastewater Lift Station and Sump was put into service in 1979. No history of contaminant release exists for the unit into soil or groundwater in the area; however, the integrity of the system has never been tested. It is not known if a release from the unit has occurred previously.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in

concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility [i.e., site-wide]).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria [e.g., Maximum Contaminant Levels (MCLs), the maximum permissible level of a contaminant in water delivered to any user of a public water system under the Safe Drinking Water Act] from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale / Key Contaminants
Groundwater	___	X	___	_____
Air (indoors)[2]	___	X	___	_____
Surface Soil (<2 feet)	___	X	___	**Please See**
Surface Water	___	X	___	**Description Below**
Sediment	___	X	___	_____
Subsurface Soil (>2 feet)	___	X	___	_____
Air (outdoors)	___	X	___	_____

__X__ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

_____ If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

_____ If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

According to a SWMU summary prepared by the facility's consultant (Black & Veatch [B&V] 1996), 32 SWMUs were designated in ISU's RCRA Permit for the CWHF. Permit conditions required that the RFI address 12 of the SWMUs and exclude the remaining 20 SWMUs from investigation (see response to Question 1). EPA approved the RFI Report in 1997, and the facility has not been required to perform corrective action at the CWHF (EPA 1997). The FTF SWMUs, FTF FDTB and FTF UST, were not included in the RFI but were investigated separately under the IDNR LUST program. Although the FTF SWMUs are listed in ISU's RCRA permit for the CWHF (IAT200010601), the FTF later was determined to be noncontiguous with the CWHF and was issued its own identification number (IAD984621383). Because the FTF is not contiguous with the CWHF and because the FTF is identified as a separate facility by EPA, the FTF is not included in this EI evaluation. Only the CWHF and contiguous units under IAT200010601 are considered.

For each media at the CWHF, the following rationale and contaminants were considered.

Surface Soil (<2 feet). During the 1993 RUST E&I investigation, potential surface soil contamination due to chromate drift from the Comfort Cooling Towers was investigated. Chromium levels in surface soil were found to be below action levels (RUST E&I 1995). During the CWHF RFI, surface soil samples from the southeast and northwest corners of the Former Evaporation Tray SWMU were collected and analyzed for volatile organic compounds (VOCs). Trace amounts of naphthalene (15 micrograms per kilogram [µg/kg]) and trimethylbenzene (49 µg/kg) were detected in one sample. These concentrations were below the Region III Risk Based Concentration Levels for naphthalene (3,100,000 µg/kg) and trimethylbenzene (3,900,000 µg/kg). No VOCs were detected in the second surface soil sample.

Subsurface Soil (>2 feet). During the CWHF RFI, soil samples were collected from 20 SWMUs (B&V 1997). Soil samples from three of the SWMUs revealed trace levels of hydrocarbon contamination at several orders of magnitude below EPA Region 9 Preliminary Remediation Goals (PRG). Arsenic was detected in soil sampling at a maximum concentration of 10.9 mg/kg, above the Region 9 Industrial PRG of 2.7 mg/kg. However, this elevated arsenic detection was potentially related to background concentrations of the element in soil (B&V 1997). The Abandoned Sanitary Septic Field was a SWMU of particular concern in the RFI. Subsurface soil samples were collected as part of the 1993 RUST E&I investigation in an area downgradient of the sanitary system (RUST E&I 1995, B&V 1996). Samples were analyzed for radionuclides (Ac-228, Bi-214, Co-60, K-40, Pb-210, Pb-214, Ra-226, and T1-208) and chromium (a suspected contaminant from the Comfort Cooling Towers). Radionuclide results in these soil samples were within naturally occurring ranges, and chromium levels did not exceed action levels for soil.

Sediment. As part of the B&V 1996 RFI and the RUST E&I 1993 investigation, samples were collected from Onion Gulch, near the Abandoned Sanitary Septic Field. Samples were analyzed for radionuclides (Ac-228, Bi-214, Co-60, K-40, Pb-210, Pb-214, Ra-226, and T1-208) and chromium (a suspected contaminant from the Comfort Cooling Towers). Radionuclide results in these samples were within naturally occurring ranges, and chromium levels did not exceed action levels for soil.

Surface Water. Surface water sampling at the facility was not conducted under the CWHF RFI; however, as part of the 1993 RUST E&I investigation, a surface water sample was collected from an ASC outfall to Onion Gulch. The sample was analyzed for chromium and gross radioactivity. Total and hexavalent chromium were less than the detection limit for the sample, while the gross alpha level was 6 pCi/g and the gross beta level was 17 pCi/g. RUST E&I determined that no public health threat was present (RUST E&I 1995). The CWHF is located about 2,000 feet west to southwest of Squaw Creek, and about 1,200 feet east to southeast of Onion Creek, a tributary to Squaw Creek. The CWHF is above the Onion Creek 100-year floodplain (EPA 1985).

Groundwater. No groundwater samples were collected during the RFI for the CWHF. In 1993, however, RUST E&I collected samples from ASC sites at the request of the DOE. In support of this investigation, a groundwater sample was collected from a drain field monitoring well located west of the Radioactive Waste Disposal Building. The sample was analyzed for chromates and gross radioactivity. The chromium analysis revealed a total chromium concentration of 0.02 mg/l and a hexavalent chromium concentration below the detection limit. The radioactivity analysis revealed a gross alpha level of 34

pCi/g and a gross beta level of 163 pCi/g. Chromium concentrations did not exceed EPA MCLs for drinking water; however, radioactivity was elevated in comparison to EPA MCLs and in comparison to non-impacted groundwater samples collected adjacent to the site (RUST E&I 1995).

In December 1993 and February 1994, Ames Laboratory contracted Fox Engineering to conduct follow-up groundwater sampling from the drain field monitoring well. Gross alpha levels for the December 1993 and February 1994 sampling events were 2.1 pCi/L and 0.9 pCi/L, respectively, while gross beta levels were 8.0 pCi/L and 6.5 pCi/L, respectively. Both follow-up sampling events showed gross alpha levels within naturally occurring ranges and gross beta levels below EPA MCLs (RUST E&I 1995).

In addition to groundwater analytical data, soil and sediment analytical data may be used to show that contamination at the CWHF is not likely to leach from soil to groundwater. Contaminants detected in CWHF soil and sediment samples are below appropriate action levels or are within naturally occurring ranges. Thus, these trace levels of contamination are unlikely to leach to groundwater at or above levels of concern.

Air (indoors). Air sampling has not been reported by the facility. Contaminants which are metals do not pose a volatilization hazard to human receptors. Because volatile compounds detected in soil samples in the area of these units are below appropriate action levels, it is safe to assume that these compounds are not volatilizing into indoor atmospheres at levels of concern.

Air (outdoors). Air sampling has not been reported by the facility. Contaminants which are metals do not pose a volatilization hazard to human receptors. Because volatile compounds detected in soil and groundwater samples in the area of these units are below appropriate action levels, it is safe to assume that these compounds are not volatilizing into outdoor atmospheres at levels of concern.

Footnotes:

[1]"Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

[2] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

	Potential Human Receptors (Under Current Conditions)						
"Contaminated" Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food[3]
Groundwater	___	___	___	___	___	___	___
Air (indoors)	___	___	___	___	___	___	___
Soil (surface, e.g.,<2 ft)	___	___	___	___	___	___	___
Surface Water	___	___	___	___	___	___	___
Sediment	___	___	___	___	___	___	___
Soil (subsurface e.g.,>2 ft)	___	___	___	___	___	___	___
Air (outdoors)	___	___	___	___	___	___	___

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated") as identified in #2 above.

2. Enter "yes" or "no" for potential "completeness" under each "Contaminated" Media – Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("___"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

_____ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

_____ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

_____ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and Reference(s):

[3] Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[4] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

   _____ If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

   _____ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

   _____ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

   Rationale and Reference(s):

[4] If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

5. Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

_____ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

_____ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

_____ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and Reference(s):

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

__X__ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the ISU CWHF facility, EPA ID #IAT200010601, located in Ames, Iowa, under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO - "Current Human Exposures" are NOT "Under Control."

____ IN - More information is needed to make a determination.

Completed by Original signed by Date 4/24/02
(signature)
Gayle Hubert
Project Manager, RCRA Corrective Action & Permits Branch
EPA Region 7

Supervisor Original signed by Date 4/25/02
(signature)
John Smith
Branch Chief, RCRA Corrective Action & Permits Branch
EPA Region 7

Locations where References may be found:

EPA Region 7 Headquarters
RCRA Files
901 North 5th Street
Kansas City, Kansas 66101

Contact telephone and e-mail numbers

Gayle Hubert
(913) 551-7439
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FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.

REFERENCES

ATC Blattert, Inc. (ATC). 1995. "Site Cleanup Report Addendum, Iowa State University (ISU) Fire Service." March.

Barker, Lemar & Associates (Barker-Lemar). 1999. "Tier 2 Site Cleanup Report (SCR), ISU Fire Training Service, Harbor Road, Ames, Iowa." November 2.

Black & Veatch Special Projects Group (B&V). 1996. "RCRA Facility Investigation (RFI) Work Plan, 12 Solid Waste Management Units (SWMU), ISU." August.

B&V. 1997. "RFI, 12 SWMUs, ISU." June.

Iowa Department of Natural Resources (IDNR). 2001. Tier 2 Completeness Review – ISU Fire Training Service at Harber Road in Ames, Iowa, Registration No. 8607311, Leaking Underground Storage Tank (LUST) No. 7LTE67. From Elaine R. Douskey, Environmental Specialist Underground Storage Tank (UST) Section, IDNR. To William Diesslin, Environmental Programs Manager, Department of Environmental Health and Safety (EHS), ISU. February 6.

ISU. 1995. "Status of the SWMUs at ISU, Chemical Waste Handling Facility." August 24.

ISU. 2000. Cover letter for the Risk Based Corrective Action (RBCA) Tier II Report for the Iowa State University Fire Service. From Dr. A. David Inyang, Director, ISU. To Elaine Douskey, Environmental Specialist, UST Section, IDNR. January 7.

U.S. Environmental Protection Agency (EPA). 1985. Transmittal of Inspection Report from Robert B. Dona of EPA, Field Investigations, to Michael Sanderson of EPA, RCRA Branch. May 29.

EPA. 1995. Closure Certification for ISU, Ames Iowa, EPA Resource Conservation and Recovery Act (RCRA) ID No. IAT200010601. From Don Lininger, Project Manager. To Emery Sobottka, Director, EHS, ISU.

EPA. 1997. Letter approving the RFI Report and Waiving Further Corrective Action. From Don Lininger, Project Manager. To Emery Sobottka, Director, EHS, ISU.

RUST Environmental & Infrastructure (RUST E&I). 1995. Investigation Summary Report, Ames Laboratory Inactive Waste Site, Ames, Iowa. February.