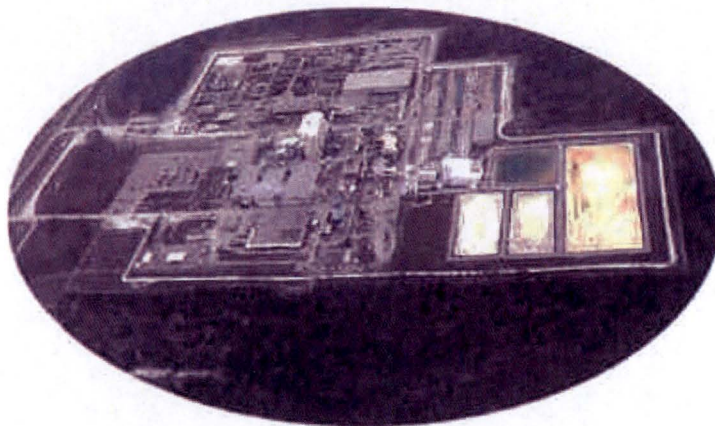




## Decommissioning Cost Estimate



### Prepared for:

Honeywell Metropolis Works  
2768 North US State Route 45  
Metropolis, IL 62960

**Honeywell**

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Rev. 1  
April 20, 2016

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### **ATTACHMENT**

Attachment No. 1 – EnergySolutions letter dated November 11, 2015 (Subject: Decommissioning Cost Estimate)

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## EXECUTIVE SUMMARY

Enercon Services, Inc. (ENERCON) prepared this Decommissioning Cost Estimate (DCE) to meet the requirements in 10 Code of Federal Regulations (CFR) 40.36(a) that each applicant for a specific license authorizing the possession or use of more than 100 mCi of source material in a readily dispersible form to submit a decommissioning funding plan (DFP) comprised of the following sections:

- (i) A detailed cost estimate for decommissioning (hereafter referred to as the DCE);
- (ii) Identification of and justification for using the key assumptions in the DCE;
- (iii) A description of the method of assuring funds for decommissioning;
- (iv) A certification by the licensee that financial assurance for decommissioning has been provided in the amount of the cost estimate for decommissioning; and
- (v) A signed original, or if permitted, a copy, of the financial instrument obtained to cover the costs associated with decommissioning.

As required by 10 CFR 40.36(d)(2) and License Condition 25, Honeywell must update the DCE at intervals not to exceed three years. The triennial update to the DCE accounts for changes in costs and for the events identified in 10 CFR 40.36(d)(2). The DCE identifies and provides the justification for the key assumptions used to prepare the DCE.

The following is a chronological history of the previous DCEs prepared for the Honeywell MTW:

- *Site Reclamation Cost Estimate for Plant Located in Metropolis, Illinois, Revision 0* dated May 2006 (2006 Report);
- *Decommissioning Cost Estimate for Honeywell Metropolis Works, Revision 1* dated July 27, 2010 (2009 Report); and
- *Decommissioning Cost Estimate for Honeywell Metropolis Works, Revision 0* dated August 15, 2012 (2012 Report).

The 2006 Report was prepared by Duratek (now EnergySolutions) and the 2009 and 2012 Reports were prepared by ENERCON. This DCE is an update to the 2012 Report. Data and information were obtained from Honeywell (plant radiation protection department) for this update to evaluate the events identified in 10 CFR 40.36(d)(2) that might affect the level of contamination.

Key facility changes that have occurred between 2012 and 2015 are as follows:

- 26 molyflush cylinders were disposed of at a licensed disposal facility;
- 400 thin walled UF6 cylinders were disposed of at a licensed disposal facility;
- Remediated impacted portion of the roof above the Laundry Area;

- Installed the liquid hydrogen tanks/units to replace the ammonia (NH<sub>3</sub>) dissociators which required relocation of the Fuel Depot;
- Numerous seismic upgrades to various systems;
- The ammonia (NH<sub>3</sub>) dissociators were replaced with a liquid hydrogen unit;
- The Fuel Depot was relocated so that the liquid hydrogen unit could be installed;
- Aggregate (crushed concrete) (from the rehabilitation of UF<sub>6</sub> cylinder storage pad) has been placed in the Waste Storage Area for reuse on future projects;
- Aggregate (crushed concrete) from north pad of the Feed Materials Building (FMB) and northern edge of waste storage area (south of HF rail line) will require disposal; and
- A Sanitary Wastewater Treatment Plant (WWTP) has been constructed to replace the IMHOFF (aboveground storage) tank (existing subgrade structures for the IMHOFF tank were characterized and found to be free of contamination and were abandoned in place).

In addition, there have been no known releases of radioactive material to the surface or subsurface soil since the 2012 update to the DCE. This information on facility changes and releases does not support revising the amount of surface and subsurface soil material considered impacted in the 2012 Report. Based on a review of plant records, inadvertent releases from plant operations were also deemed to have no impact that justifies updating of the surface and subsurface soil material considered impacted in the 2012 Report. Therefore, this update accounts for cost escalation and addresses the facility changes noted.

ENERCON evaluated the waste management practices. Improved waste management practices (which were instituted beginning in 2009) continued through 2015 and support the continued use of the 5 percent failure rate for Bulk Survey for Release (BSFR). This has resulted in no additional waste accumulating on-site. Therefore, the waste inventory has not been revised for this update.

A significant portion of the overall decommissioning costs is attributed to the processing, transportation, and disposal/burial of radioactive waste. The disposal rate used for most of the material in this estimate was based on shipping a large volume of low-level radioactive waste (LLRW) to *EnergySolutions* of Utah. The waste disposal rate is calculated based on the initial rate provided in 2006 Report which has been adjusted (increased) for inflation. The disposal rates for the off-site Bulk Survey for Release (BSFR) disposition option were provided by *EnergySolutions* for their Bear Creek Processing facility located near Oak Ridge, Tennessee. The BSFR disposal rates are provided in Attachment No. 1 for ease of reference.

This DCE includes itemized costs for manpower and equipment resources, radioactive waste volume reduction, packaging, shipping and burial activities, and the performance of final status surveys for buildings and structures. The estimated decommissioning cost is approximately \$254,238,000 in 2015 dollars.

## 1.0 INTRODUCTION

### 1.1 Purpose

Enercon Services, Inc. (ENERCON) prepared this Decommissioning Cost Estimate (DCE) to meet the requirements in 10 Code of Federal Regulations (CFR) 40.36(a) that each applicant for a specific license authorizing the possession or use of more than 100 mCi of source material in a readily dispersible form to submit a decommissioning funding plan (DFP). The DFP is required to be comprised of the following sections:

- (i) A detailed cost estimate for decommissioning (hereafter referred to as the DCE);
- (ii) Identification of and justification for using the key assumptions in the DCE;
- (iii) A description of the method of assuring funds for decommissioning;
- (iv) A certification by the licensee that financial assurance for decommissioning has been provided in the amount of the cost estimate for decommissioning; and
- (v) A signed original, or if permitted, a copy, of the financial instrument obtained to cover the costs associated with decommissioning.

As required by 10 CFR 40.36(d)(2) and License Condition 25, Honeywell must update the DCE at intervals not to exceed three years. The DFP contains the independent decommissioning cost estimate (DCE) required for financial assurance purposes for the Honeywell Metropolis Works Plant (MTW) located in Metropolis, Illinois. Honeywell MTW is planning on using the self-guarantee financial test to demonstrate financial assurance.

The triennial update to the DCE accounts for changes in costs and for the events identified in 10 CFR 40.36(d)(2). The DCE identifies and provides the justification for the key assumptions used to prepare the DCE.

The DCE is a triennial update to the *Decommissioning Cost Estimate for Honeywell Metropolis Works, Revision 0* dated August 15, 2012 (2012 Report). Data and information were obtained from Honeywell (plant radiation protection department) for this update to evaluate the events identified in 10 CFR 40.36(d)(2) that might affect the level of contamination. This data and information are summarized in this DCE.

This update to the DCE accounts for cost escalation and facility changes that have occurred between 2012 and 2015. As required by License Condition 25 and 10 CFR 40.36(d)(2), Honeywell will update the decommissioning cost estimate at intervals not to exceed 3 years. The update will take into account the effect on decommissioning costs for the events identified in 10 CFR 40.36(d)(2). Honeywell also will take into account surveys or information obtained by the plant radiation protection department. If those surveys or other information indicate residual radioactivity in the facility and environment, including the subsurface, at levels that would, if left uncorrected, prevent the site from meeting the criteria for unrestricted use, Honeywell will update the decommissioning funding plan within one year.

## **1.2 Background**

The 2012 Report used as its basis the *Decommissioning Cost Estimate for Honeywell Metropolis Works, Revision 1* dated July 27, 2010 (2009 Report). The 2009 Report used as its basis the *Site Reclamation Cost Estimate for Plant Located in Metropolis, Illinois, Revision 0* dated May 2006 (2006 Report). The 2006 Report was issued to Honeywell by Duratek (now EnergySolutions) and the 2009 and 2012 Reports were prepared by ENERCON.

In order to update the DCE in 2009, a radiological characterization survey of surface and subsurface soils was performed as documented in the *Radiological Characterization Report for Site Soil, Revision 0* dated January 11, 2010, to determine the horizontal and vertical extent of radionuclide concentrations in soil. In the 2009 Report, the DCE was revised based on the site soil characterization data documented in the *Radiological Characterization Report* which identified previously unknown impacts. These costs were accounted for as additional soil impacts for Plant Areas P-1 through P-25, Non-Plant Areas NP-1 through NP-5, and areas adjacent to subsurface piping. No additional data regarding subsurface piping has been identified since the 2012 update that would warrant a change in estimated volume of subsurface piping.

In addition, based on a review of plant records there have been no known releases of radioactive material to the surface or subsurface soil since the 2012 update to the DCE. This information (on facility changes) did not support revising the amount of surface and subsurface soil material considered impacted in the 2012 Report and this update to the DCE. No characterization of equipment and structures was performed as part of the 2009 radiological site characterization. Therefore, the 2009 Report, the 2012 Report, and this update to the DCE use the 2006 Report as the basis for estimating the decommissioning costs for equipment and structures. Some equipment and structures have been decommissioned and the revisions made to the DCE are discussed in detail later in this report.

For the update to the DCE in 2012, the volume of impacted material on-site (waste inventory) was reduced by approximately 20 million pounds of waste due to improved waste management practices.

Improved waste management practices (which were instituted beginning in 2009) continued between 2012 and 2015. This has resulted in no additional waste accumulating on-site. For this update to the DCE, the waste inventory was revised based on the various equipment and structures that have been decommissioned.

### **1.2.1 Changes Since the 2012 Update**

In order to maintain a record of the various changes that have impacted the DCE, the following is a record of the changes to the MTW facility that were considered for potential impacts. Facility changes that have occurred which impact this update to the decommissioning costs are as follows:

- 26 molybdenum cylinders were disposed of at a licensed disposal facility;
- 400 thin walled UF<sub>6</sub> cylinders were disposed of at a licensed disposal facility;
- Remediated impacted portion of the roof above the Laundry Area;
- Installed the liquid hydrogen tanks/units to replace the ammonia (NH<sub>3</sub>) dissociators which required relocation of the Fuel Depot;
- Numerous seismic upgrades to various systems;
- The ammonia (NH<sub>3</sub>) dissociators were retired in place and replaced with a liquid hydrogen unit;
- The Fuel Depot was relocated so that the liquid hydrogen unit could be installed;
- Aggregate (crushed concrete) (from the rehabilitation of UF<sub>6</sub> cylinder storage pad) has been placed in the Waste Storage Area for reuse on future projects;
- Aggregate (crushed concrete) from north pad of the Feed Materials Building (FMB) and northern edge of waste storage area (south of HF rail line) will require disposal; and
- A Sanitary Wastewater Treatment Plant (WWTP) has been constructed to replace the IMHOFF (aboveground storage) tank (existing subgrade structures for the IMHOFF tank were characterized and found to be free of contamination and were abandoned in place).

### **1.2.2 Historical Changes**

The following is a record of the various historical changes to the MTW facility that were considered in previous revisions to the DCE. The significant changes to the 2009 Report were primarily due to the 2009 site characterization (which are documented throughout Section 3.0 of this report).

The following is a summary of the activities or actions that occurred between 2009 and 2012 (Drawing No. MTW-2800) which were addressed in the 2012 Report:

- Honeywell removed approximately six inches of roadway material and repaved a majority of the roads in the restricted area.
- A radiological survey was performed on Aisle No. 5 of the uranium hexafluoride (UF<sub>6</sub>) pad to prepare for removal of existing concrete and repaving.

- A 12-foot-wide trailer (BD-69) and an additional engineering trailer (BD-56) were installed in the old LPG Area (northwest corner of the restricted area).
- A Resource Conservation and Recovery Act (RCRA) potassium hydroxide (KOH) Mud Drums Storage Building (BD-26) was constructed in the northwest corner of the Ore Storage Pad area.
- Two sheet metal buildings (BD-92 and BD-93) were constructed to support waste processing and capital fabrications.
- Improved waste management reduced the volume of impacted material requiring off-site disposal and the anticipated failure rates for Bulk Survey for Release (BSFR) waste.

The changes noted above have been previously incorporated into the DCE.

### **1.3 Scope**

The scope of this report is to present the triennial update for site decommissioning costs of the Honeywell MTW. The specific areas covered by this estimate include:

- Feed Materials (FM) Building
- Fluorine Plant
- Ion Exchange Building
- Liquid Fluorine and Nitrogen Facilities
- Sodium Removal Building
- KOH Muds Building
- Calcium Fluoride Building
- Uranium Recovery Building
- Surface Treatment Facility
- FM Building Pads
- Administrative Areas
- Sampling Plant
- Sanitary WWTP
- Ore Storage Pads
- Ore Storage Building
- Drum Storage Pad
- Bed Materials and Filter Fines Building
- Waste Storage Pad
- Uranium Settling Ponds
- Pond Muds Filter Calciner Building
- Drains and Sewers

- Cylinder Wash Building
- Outdoor Areas
- Drum Crusher Building
- Discharge Ditch to River

Decommissioning costs are directly related to the degree of remediation required and the amount of radioactive waste generated. The extent of remediation is based on radiological data, proven decontamination processes, and data from similar projects.

#### **1.4 Assumptions and Bases**

The following assumptions and bases were utilized to update the DCE (and are consistent with previous DCEs unless otherwise noted).

- The estimate includes activities and cost factors necessary to reduce residual radioactivity to levels that will permit unrestricted release of the associated structures, buildings, and grounds.
- Costs associated with the demolition and removal of non-contaminated equipment or structures are not included in this cost estimate unless such activities are required to support decommissioning. Consistent with the prior DCEs, an actual date to perform the site decommissioning has not been selected. Therefore, the cost estimate provided herein is in 2015 dollars.
- Some of the older more contaminated structures will be removed completely. Structures with minimal or no contamination will remain in place after decommissioning. These structures will be decontaminated as required and free released. No building refurbishment is included.
- Uncontaminated processing equipment may have intrinsic value. No credit was taken for any salvage value. Contaminated equipment will be decontaminated on-site, processed at a volume reduction facility prior to disposal, or sent directly to a licensed radioactive material disposal site. The waste processing facility is assumed to be the EnergySolutions facility located in Memphis, Tennessee.
- Labor rates used to update the costs were obtained from 2015 RSMeans Site Work & Landscape Cost Data (34<sup>th</sup> Annual Edition). By using these rates, the decommissioning cost estimate meets the requirement that costs be based on an independent third-party estimate.
- Waste planned for processing includes scrap metal, used equipment, concrete, and soil that are generally expected to be uncontaminated.
- Molyflush cylinders have been disposed of and are no longer considered in the DCE.
- Improved waste management resulted in reduced waste inventory (this volume reduction in the waste inventory is documented in the 2012 Report). Improved waste management practices continued between 2012 and 2015. This has resulted in no additional waste accumulating on-site. Therefore, the waste inventory on-site has not been revised.
- The improved waste management practices resulted in a reduction in the BSFR failure rate (which was first documented in the 2012 Report). This update uses the reduced BSFR failure rate from the 2012 Report. The disposal rates for the off-site BSFR disposition option were provided

by EnergySolutions for the Bear Creek Processing facility located near Oak Ridge, Tennessee. These rates are provided in Attachment No. 1.

- Radioactive waste with low specific activity will be sent to EnergySolutions in Clive, Utah. It was assumed that partially decontaminated equipment, protective clothing wastes, removed concrete, miscellaneous dry activated waste (DAW), and soil would qualify for disposal at the EnergySolutions facility. Wastes qualify for disposal at EnergySolutions under their current license and waste acceptance criteria. Generation of Class B and C radiological waste is not anticipated during decommissioning.
- The independent third-party site remediation contractor will provide the demolition equipment and survey instrumentation at prevailing rates.
- During decommissioning, local decontamination technicians and supervisors will be utilized so no travel and living expenses are included.
- Supervisors and project management personnel will not be local hires; therefore, travel and living expenses were included.
- To account for inflation between 2012 and 2015, an escalation factor of 1.153 was applied based on the methodology in NUREG-1307.
- The site-specific release criterion used as the basis in this report is 110 picocuries per gram (pCi/g) which would support achieving the unrestricted release criterion of 25 millirem per year (mrem/yr). This value is consistent with the site-specific release criteria approved by the U.S. Nuclear Regulatory Commission (NRC) at the closed Sequoyah Fuels UF<sub>6</sub> conversion plant.

### **1.5 Method and Frequency of Assuring Funds for Decommissioning**

As required by License Condition 25 and 10 CFR 40.36(d)(2), Honeywell must update the decommissioning cost estimate at intervals not to exceed 3 years. The update must take into account the effect of the events identified in 10 CFR 40.36(d)(2) on decommissioning costs. Honeywell also must take into account surveys or information obtained by the plant radiation protection department. If those surveys or other information indicate residual radioactivity in the facility and environment, including the subsurface, at levels that would, if left uncorrected, prevent the site from meeting the criteria for unrestricted use, Honeywell will update the decommissioning funding plan within one year.

Prior to September 24, 2014, Honeywell's decommissioning funding plan utilized a surety bond as the mechanism to provide decommissioning financial assurance. Earlier that year, in the letters dated February 27 and 28, 2014, Honeywell demonstrated that its self-guarantee provided the necessary financial assurance to address the DCE. By letter dated September 24, 2014, the NRC verified and accepted Honeywell's change in the financial assurance arrangement which included a self-guarantee and supporting documentation as decommissioning financial assurance for its MTW facility.

According to 10 CFR 30 Appendix C II.B.(3), in order to continue to utilize the self-guarantee, Honeywell must annually pass the self-guarantee financial assurance test and provide documentation of



its continued eligibility to use the self-guarantee to the NRC within 90 days after the close of each fiscal year. As a result of reviewing the latest correspondence in support of Honeywell's use of the self-guarantee financial test dated March 27, 2015, NRC concluded that Honeywell meets the regulatory requirements to provide financial assurance for decommissioning.

Honeywell intends to continue to use the self-guarantee as the financial assurance mechanism. Honeywell will confirm its ability to continue to use the self-guarantee by annually passing the test and providing documentation of eligibility to use the self-guarantee within 90 days after the close of each fiscal year. If Honeywell no longer meets the requirements to use a self-guarantee, Honeywell will send immediate notice to the NRC of its intent to establish alternate financial assurance as specified in the Commission's regulations within 120 days of such notice.

## **2.0 MTW LOCATION, HISTORY, AND CURRENT STATUS**

### **2.1 MTW Location and Description**

MTW is the holder of NRC License No. SUB-526. The plant address listed on the license is as follows:

Honeywell  
2768 N US Route 45  
Metropolis, IL 62960-6700

The plant is located on U.S. Highway 45, approximately 1.8 miles northwest of downtown Metropolis, Illinois. The MTW site is located on approximately 950 acres of land in Massac County at the southern tip of Illinois (Figure 1). The primary site perimeter is formed by U.S. Highway 45 to the north, the Ohio River to the south, an industrial coal blending plant to the west, and privately-owned, developed land to the east. Plant operations are conducted in a fenced, restricted area covering approximately 59 acres in the north-central portion of the site. MTW also owns approximately 100 acres of land directly across U.S. Highway 45, north/northeast of the plant.

### **2.2 MTW History**

Initial construction of the facility was completed in 1958, and the first UF<sub>6</sub> was produced in 1959 as part of a five-year contract for conversion services with the former Atomic Energy Commission (AEC). In 1961, a UF<sub>6</sub> pilot plant was installed. The AEC conversion contract expired in 1964 and the conversion process was mothballed. Continued increase in demand for conversion services resulted in rehabilitation of the UF<sub>6</sub> facility in 1967, and commercial conversion started in 1968. In 1968-1969, capacity for the facility was expanded to 9,000 metric tons. Capacity was increased to 11,500 metric tons and 12,700 metric tons in 1975 and 1995, respectively. Re-engineering in 2001 increased capacity to approximately 14,000 metric tons. Additional re-engineering in 2007 further increased the capacity to approximately 15,000 metric tons. To date, the highest production has been approximately 13,000 metric tons.

### **2.3 MTW Physical Description**

Drawing No. MTW-2800 shows the approximate location of the following areas on the MTW site.

#### **2.3.1 Main Production and Plant Operations Buildings**

Main production buildings include the following: FM Building (BD-29), Ion Exchange Building (BD-37), Sodium Removal Building (BD-17), KOH Muds Building (BD-20), Uranium Recovery Building (BD-19), Sampling Plant (BD-23), Fluoride Production Facility (BD-3, BD-4, and BD-5), Waste

Treatment Plant, and UF<sub>6</sub> Cylinder Storage Area. The plant operations buildings include the Administration Building (BD-1), Laboratory and Office Building (BD-2), Maintenance Shop/Store/Office Building (BD-6), and Powerhouse (BD-7).

### **2.3.2 Miscellaneous Production Buildings**

The miscellaneous production buildings include the Ore Storage Building (BD-18), Bed Materials and Filter Fines Building (BD-33), Pond Muds Filter Calciner Building (BD-16), Cylinder Wash Building (BD-15), Drum Crusher Building (BD-41), non-uranium Fluorination (SF<sub>6</sub>/IF<sub>5</sub>/SbF<sub>5</sub>) Buildings (BD-12 and BD-13), Liquid Fluorine Facility, Liquid Nitrogen Facility, and Calcium Fluoride Building.

### **2.3.3 Drum Storage Pads and Uranium Settling Ponds**

The Drum Storage Pads and Uranium Settling Ponds are located in the (plant) eastern portion of the restricted area and include the five Ore Storage Pads, the Drum Storage Pads, the Waste Storage Area, and Uranium Settling Pond Nos. 3 and 4.

### **2.3.4 Outdoor Areas, Drains, and Sewers**

The outdoor areas, drains, and sewers include the employee parking lot, paved roads on-site, railroad spur Nos. 1 through 5, the land between two parallel property exclusion fences, site drains/sewers/underground process lines, and the MTW land outside the fenced operations area.

### **2.3.5 Calcium Fluoride Ponds**

There are currently four calcium fluoride ponds located at the site designated Ponds B, C, D, and E. Pond A (which was located north of Pond B) was removed and the Surface Treatment Facility was constructed in the area once occupied by Pond A. Historically, calcium hydroxide was used to precipitate fluorides as insoluble calcium fluoride into these ponds. The Surface Treatment Facility is currently used to treat fluoride materials prior to a permitted discharge; therefore, fluoride materials are no longer added to the calcium fluoride ponds. The decommissioning costs associated with the remediation of the calcium fluoride ponds are included in the RCRA estimate and not the NRC estimate.

## **2.4 MTW Process Operations**

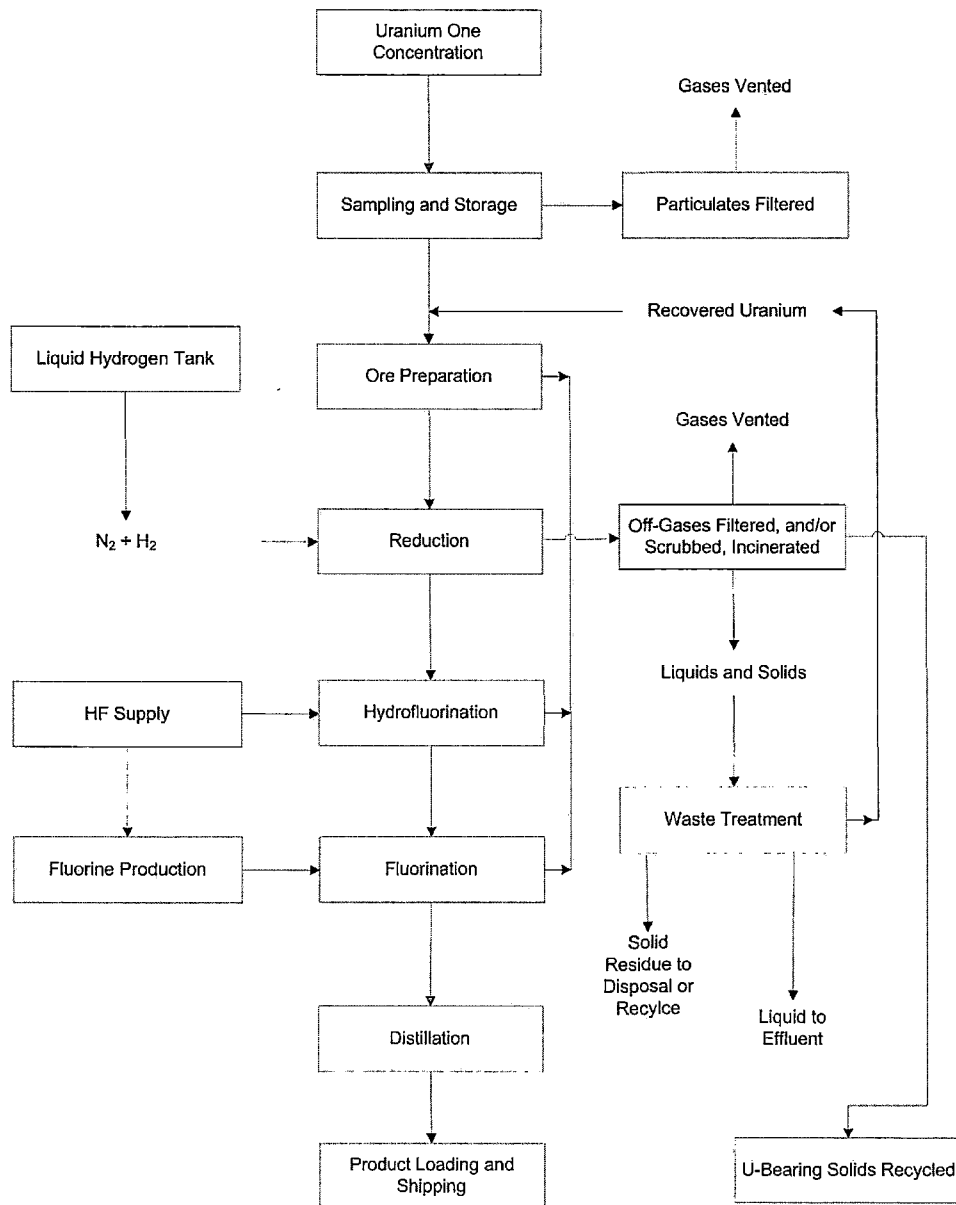
The MTW Plant was designed to convert uranium ore concentrates into UF<sub>6</sub>, which is then shipped to U.S. and foreign plants for enrichment of the <sup>235</sup>U isotope. The facility, which uses the fluoride volatility process, has the capacity to convert approximately 15,000 metric tons of uranium per year from ore concentrates into UF<sub>6</sub>. Assays of the uranium ore concentrates show approximately 75 percent uranium. The distilled UF<sub>6</sub> product contains less than 300 parts per million (ppm) impurities. A process flow

diagram of the conversion process is provided, and each significant step of the conversion process is described in the following sections of this report.

#### 2.4.1 Uranium Hexafluoride Conversion Process Flow Diagram

The  $UF_6$  conversion process flow diagram for the plant operations is as follows.

#### 2.4.2 Ore Preparation



The plant receives uranium ore concentrates in 55-gallon drums. Each drum of ore concentrate is weighed and then stored on storage pads until accountability procedures and the uranium and impurity analyses are completed.

Some ore concentrates and all uranium compounds from the uranium recovery process contain undesirable amounts of contaminants (principally sodium) that must be removed. The pretreatment process consists of a four-stage countercurrent decantation treatment with ammonium sulfate solution. The uranium solids discharge into the ore calciner in the ore preparation area.

Incoming ore concentrates are charged into the system through a drum dumping station. The concentrates either go directly to the calciner or through the pretreatment area to the calciner. Following the calciner, the ore concentrates are blended, agglomerated, dried, crushed, and sized to a uniform particle size. Dusts and fumes from this process are controlled by a series of dust collectors.

#### **2.4.3 Uranium Reduction**

The uranium is reduced utilizing a mixture of hydrogen and nitrogen; hydrogen is supplied from a liquid hydrogen tank located on site. Since the last update to the DCE, the liquid nitrogen tanks were installed to replace the ammonia (NH<sub>3</sub>) dissociators. The reductor off-gas (principally hydrogen, nitrogen, water vapor, and hydrogen sulfide) is passed through filters to remove particulate uranium, and the residual gas is incinerated to convert the hydrogen sulfide to sulfur dioxide.

#### **2.4.4 Uranium Hydrofluorination**

The uranium dioxide from the reductor is fed into two fluid-bed hydrofluorinators operated in series. A countercurrent flow of anhydrous hydrogen fluoride (HF) fluidizing gas converts the uranium dioxide into uranium tetrafluoride (UF<sub>4</sub>). The off-gas is filtered to remove particulate uranium and scrubbed with water and KOH solution to remove HF before being vented to the atmosphere. The HF scrubber liquors are neutralized with KOH, and the fluoride is removed with calcium before being discharged with the main plant effluent.

The UF<sub>4</sub> is then fed into a fluid-bed fluorinator that contain inert bed material. Elemental fluorine, used as the fluidizing gas, converts the UF<sub>4</sub> to UF<sub>6</sub> that is volatilized from the fluorinators. Residual uranium and nonvolatile uranium daughter products remain in the bed material, which is recycled and reused until the buildup of contaminant levels prohibits further use. The bed material is then retired for radioactive decay and recovery of the uranium content. The volatilized gas containing UF<sub>6</sub>, excess fluorine, and HF is passed through a series of filters for particulate removal and through a series of cold traps for UF<sub>6</sub> collection.

#### **2.4.5 Uranium Hexafluoride Distillation**

The bulk of the  $\text{UF}_6$  is condensed in a series of primary cold traps that are operated at approximately  $-20^\circ\text{F}$ . The secondary and tertiary traps operate at lower temperatures and remove the residual  $\text{UF}_6$ . Following liquefaction, crude  $\text{UF}_6$  is removed intermittently from the cold traps by heating and is then transferred to still feed tanks to await purification by fractional distillation.

Uncondensed gas from the cold traps, consisting of fluorine, HF, air, and traces of  $\text{UF}_6$ , is passed through scrubbers, where contact with aqueous KOH solution removes fluorides and traces of uranium prior to release to the atmosphere. The potassium diuranate precipitated in the off-gas scrubbers is settled from the KOH that is subsequently reused in the process scrubbers.

Crude  $\text{UF}_6$  from the still feed tanks is fed into a low boiler distillation column. The  $\text{UF}_6$  that has been stripped of low boiling impurities is then fed into a high boiler distillation column where high boiling impurities are eliminated. The product is condensed and packaged into 10-ton or 14-ton cylinders. There are no off-gases from this process.

Potassium diuranate from the cold trap off-gas cleanup system, fluorinator filter fines, contaminated fluorinator bed material, miscellaneous recovered dust, and scrap ore are finely ground and leached with a sodium carbonate ( $\text{Na}_2\text{CO}_3$ ) solution to solubilize the uranium as a tricarbonat complex. The leached material is filtered and the insoluble material (principally inorganic fluoride containing residual uranium and uranium daughter products) is dried and drummed for disposal at a licensed radioactive waste disposal facility. The uranium in the filtrate is precipitated with sodium hydroxide (NaOH). The recovered uranium is then charged to the head end of the process via the pretreatment facility. The uranium recovery leach liquors are recycled/reused. Less than 10 percent of these liquors are withdrawn, treated, and then discharged into the plant effluent.

#### **2.4.6 Uranium Hexafluoride Cylinder Cleaning**

Periodically,  $\text{UF}_6$  product cylinders must be washed and pressure tested to assure integrity. The cylinders are washed with  $\text{Na}_2\text{CO}_3$  solution to leach the uranium from the residual solids. The leach liquors are then filtered to remove the unleached solids and transferred to the remaining recovery facility. The remaining solids containing daughter products of uranium (principally  $^{234}\text{Th}$  and  $^{234}\text{Pa}$ ) are stored on-site in drums and are eventually disposed of at a licensed waste disposal facility.

##### **2.4.6.1 Fluorine Production**

Fluorine, which is one of the raw materials required for the  $\text{UF}_6$  process, is produced on-site by electrolysis using HF as the source.

#### 2.4.7 Plant and Non-Plant Area Delineation

In 2009, ENERCON assessed the plant and non-plant areas at the MTW site as part of the *Historical Site Assessment, Rev. 0* dated April 2009. The results of the radiological characterization are presented in the *Radiological Characterization Report*. The plant area was divided into 29 separate areas or systems of interest (Figure 2). Non-plant areas were divided into 5 separate areas or systems (Figure 3). Table 2-1 provides a list of the 34 areas of interest.

**Table 2-1: Listing of Plant and Non-Plant Areas**

<b>Area Designation</b>	<b>Description</b>
P-1	Administration Building and Parking Lot
P-2	Laboratory Building and Adjacent Storage Area
P-3	Former Cold Trash Storage Area
P-4	Fluorination Preparation
P-5	Ore Staging Area/Drum Dumping Area/Sodium Removal Building/KOH Muds Building/Wet Process Building/Calciner
P-6	FM Building and South Pad
P-7	Powerhouse, Nitrogen Generation, Laundry, Flammable Storage Building, and Storage Area
P-8	Liquid Fluorine Plant, Sulfur Hexafluoride Plant, Antimony Pentafluoride, Iodine Pentafluoride Plant, and the Loading Docks
P-9	Ore Sampling Area
P-10	Ore Storage Building
P-11	Ore Storage Pads
P-12	Tank Farm, Pond Muds Calciner, and Fuel Oil Storage
P-13	Cylinder Wash Area
P-14	Uranium Settling Ponds
P-15	Bed Materials and Filter Fines Building
P-16	Drum Storage Pad
P-17	Waste Storage Area
P-18	UF <sub>6</sub> Cylinder Storage Area
P-19	Drum Crushing Facility
P-20	Environmental Protection Facility (EPF)
P-21	Calcium Fluoride Ponds
P-22	Maintenance Storage Area/Trash Compactor/Switchyard/Fuel Depot
P-23	Maintenance Shop/Stores/Loading Dock
P-24	Liquid Propane Gas Area
P-25	Roadways and Ground Surface
P-26	Plant Exclusion Area
P-27	Sanitary Drain Lines
P-28	Process Drain Lines
P-29	Storm Water Drain Lines
NP-1	Non-Plant Area 1 - NPDES Outfalls
NP-2	Non-Plant Area 2 - Surface Drainage Pathways to the Ohio River
NP-3	Non-Plant Area 3 - On-site Landfill and Kickback Area
NP-4	Non-Plant Area 4 - River Road
NP-5	Non-Plant Area 5 - Remainder of the Property

The 2009 site characterization activities evaluated the site soils in 26 (P-1 through P-26) of the 29 designated plant areas and the 5 (NP-1 through NP-5) designated non-plant areas. Plant Areas P-27, P-28, and P-29 were not characterized due to inability to access the various subsurface lines due to ongoing plant operations. Details are provided in the *Historical Site Assessment* and the *Radiological Characterization Report*. This approach is allowed under the exception stated in 10CFR20.1501(a)(2) “Are reasonable under the circumstances to evaluate...”. Based on the characterization data gathered (in 2009), engineering judgment was used to estimate the quantity of impacted subsurface piping.



### **3.0 ASSESSMENT OF PLANT RADIOLOGICAL CONDITIONS**

#### **3.1 Radiological Criteria for License Termination**

The overall objective of the MTW decommissioning is to remediate the site to an unrestricted use condition that corresponds to a calculated dose to the public that is less than 25 mrem/yr from applicable pathways. The site can then be used without any restrictions. The 25 mrem/yr dose limit is codified at 10 CFR 20.1402, Radiological Criteria for Unrestricted Use.

The DCGL is defined in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) as the radionuclide-specific concentration within a survey unit corresponding to the release criterion. The DCGL is dependent upon several factors, including the radionuclides of concern (ROCs), applicable dose pathways, area occupancy, and the future use of the facility. DCGLs assume a uniform level of residual radioactivity across the survey unit. For the Honeywell MTW facility, it was assumed that site-specific release criteria would be developed. The 2009 Report cited as an example the release criterion of 110 pCi/g for the Sequoyah Fuels facility. The Sequoyah Fuels facility was a uranium conversion plant similar to MTW that closed in the 1990s. The 2009 Report and DCE used as a basis a release criterion of 110 pCi/g. ENERCON believes that 110 pCi/g is a reasonable and technically defensible DCGL for planning purposes and can be defended to the NRC. Since 2009, ENERCON has developed modified DCGLs for the ROCs for the MTW site. These DCGLs are preliminary and have not been submitted to or approved by the NRC. Therefore, the release criterion of 110 pCi/g remains the basis for the DCE.

The NRC criterion for acceptable surface contamination levels historically was 5,000 disintegrations per minute per 100 square centimeters (dpm/100 cm<sup>2</sup>) average for natural uranium (U-nat) and 1,000 dpm/100 cm<sup>2</sup> removable for U-nat as stated in Policy and Guidance Directive FC 83-23, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Byproduct, Source, or Special Nuclear Materials Licenses." These acceptable levels are presented in Table 3-1. The current NRC guidance for acceptable activity levels for specific radionuclides is presented in NUREG-1757, Volume 1, Appendix B, Table B.1. The NRC declined to provide specific guidance for alpha emitting radionuclides, including U-nat. ENERCON expects that the MTW site will apply for site-specific release criteria using the guidance in NUREG-1757, Volume 2, Appendix I and the As Low As Reasonably Achievable (ALARA) analysis guidance in NUREG-1757, Volume 2, Appendix N.

**Table 3-1: Acceptable Surface Contamination Levels**

NUCLIDES <sup>a</sup>	AVERAGE <sup>b,c,f</sup> (dpm/100 cm <sup>2</sup> )	MAXIMUM <sup>b,d,f</sup> (dpm/100 cm <sup>2</sup> )	REMOVABLE <sup>b,e,f</sup> (dpm/100 cm <sup>2</sup> )
<b>U-nat</b> , U-235, <b>U-238</b> , and associated decay products	5,000 ( $\alpha$ )	15,000 ( $\alpha$ )	1,000 ( $\alpha$ )
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100	300	20
<b>Th-nat</b> , <b>Th-232</b> , Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1,000	3,000	200
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	5,000 ( $\beta\gamma$ )	15,000 ( $\beta\gamma$ )	1,000 ( $\beta\gamma$ )

- <sup>a</sup> Where surface contamination by both alpha- and beta-gamma emitting nuclides exists, the limits established for alpha- and beta-gamma emitting nuclides should apply independently.
- <sup>b</sup> As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.
- <sup>c</sup> Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such subject.
- <sup>d</sup> The maximum contamination level applies to an area not more than 100 cm<sup>2</sup>.
- <sup>e</sup> The amount of removable radioactive material per 100 cm<sup>2</sup> of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.
- <sup>f</sup> The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per cm<sup>2</sup> of total absorber.

### 3.2 Prior Assessment of Plant Radiological Conditions

Based on a review of NRC criteria, the following conclusions regarding potential release criteria for the MTW are provided:

- NRC criterion for residual depleted uranium (DU) in soil was formerly 35 pCi/g.
- NRC guidance for acceptable license termination screening values for specific radionuclides was available in NUREG-1757, Volume 1, Appendix B, Table B.2.
- Honeywell would apply for site-specific release criteria using the guidance in NUREG-1757, Volume 2, Appendix I and the ALARA analysis guidance in NUREG1757, Volume 2,

Appendix N. The outcome of this effort would be a release criterion for residual DU in soil in excess of 35 pCi/g.

Other sites have performed evaluations and obtained site-specific release criteria using a DCGL for soil in excess of 35 pCi/g. For example, the Sequoyah Fuels Corporation site's DCGL for uranium was 110 pCi/g for a release criterion of 25 mrem/yr. A corresponding ALARA evaluation indicated an ALARA action level of 4,780 pCi/g uranium, thus demonstrating that the 110 pCi/g value was ALARA. Therefore, it is assumed that a site-specific release level of 110 pCi/g or greater for soils could be established using the release criteria for surface contamination levels discussed in the following sections.

### **3.3 Identification of Potential Radionuclides of Concern**

A list of potential ROCs has been developed.

The ROCs in incoming ore concentrate and the plant-specific waste streams were assessed. Evaluating the various forms of uranium found in the incoming ore concentrate and the plant waste streams, the following was concluded:

- Dose from the incoming ore concentrate is primarily (more than 90 percent) driven by the presence of radionuclides U-234, U-235, and U-238.
- Dose based on on-site and off-site environmental air monitoring data is primarily driven (more than 90 percent) by the presence of radionuclides U-234, U-235, and U-238.
- Dose based on uranium recovery solid wastes is primarily driven by the presence of radionuclides Ra-226, Th-230, and Th-232.
- Dose based on water effluent monitoring data is primarily driven by the presence of radionuclides Ra-226, U-234, and U-238.

Radionuclides U-234, U-235, and U-238 were identified as the base ROC group. Radionuclides Ra-226, Th-230, and Th-232 were designated as modified ROC Group 1. Radionuclides Ra-226, U-234, and U-238 were designated as modified ROC Group 2.

Within the plant operational processes, the uranium recovery process occurs in the following locations:

- FM Building (P-6),
- Cylinder Wash Area (P-13),
- Bed Materials and Filter Fines Building (P-15), and
- Waste Storage Area (P-17).

Thus, 4 of the 29 plant areas were assessed using the base ROC and modified ROC Group 1. The remaining plant operational areas (25 of the 29 plant areas) were assessed using the base ROC group.

The water effluent location is the National Pollutant Discharge Elimination System (NPDES) outfall (NP-1), and this area was assessed using the modified ROC Group 2. All remaining non-plant areas (NP-2 through NP-5) were assessed using the base ROC group.

### **3.4 Characterization Data for Prior Assessments of Radiological Conditions**

Available data and previous experience were used to estimate the extent of remediation that will be required during decommissioning. The characterization data used to estimate the decommissioning costs in the 2006 Report included removable activity survey data and environmental sampling data.

The removable activity survey data were utilized to help determine which buildings and indoor areas required remediation. Fixed activity data were not available. The average and maximum activity levels measured for each building were provided in the 2006 Report. The limit used for removable activity for U-nat was 1,000 dpm/100 cm<sup>2</sup>. No additional data from buildings and indoor areas were collected during the 2009 site characterization. Therefore, no changes were made to the equipment or building quantities estimated in previous reports or this update to the DCE unless a building area or piece of equipment was remediated.

The 2006 Report used site environmental sample survey data to help determine which outdoor areas potentially required remediation assuming a site-specific soil release level of 35 pCi/g. However, this report uses data collected during the 2009 site characterization assuming a site-specific soil release level of 110 pCi/g.

#### **3.4.1 Main Production Buildings**

Survey data included in the 2006 Report for the Main Production Buildings indicated that in general these buildings were contaminated and would require remediation. Specifically, the FM Building, Uranium Recovery Building, KOH Building, and Sampling Plant exceeded the release level assumed for the 2006 Report. This update to the DCE assumes no change in the radiological status of these buildings.

#### **3.4.2 Miscellaneous Production Buildings**

Survey data included in the 2006 Report for the Miscellaneous Production Buildings indicated (that in general) these buildings were not contaminated and would not require extensive remediation. Based on prior history, the Pond Muds Filter Calciner Building was assumed to require remediation in the 2006 Report. This update to the DCE assumes no change in the radiological status of these buildings.

#### **3.4.3 Drum Storage Pads and Ponds**

The Drum Storage Pad, the former KOH Muds Storage Pad (which now serves as a Drum Storage Pad), the Waste Storage Pad, and the Ore Storage Pads were assumed in the 2006 Report to require

remediation. Uranium Settling Pond Nos. 3 and 4 were assumed in the 2006 Report to require remediation based upon data from Uranium Settling Pond Nos. 1 and 2 that required remediation at closure. This update to the DCE assumes no change in the radiological status of these areas.

#### **3.4.4 Outdoor Areas, Drains, and Sewers**

Prior to the 2009 site characterization, there were limited data available for surface and subsurface soils in the plant and non-plant areas. The site characterization completed in 2009 focused on plant and non-plant surface and subsurface soils. Subsurface characterization was not completed (in 2009) immediately adjacent to subsurface piping due to the potential to impact on-going operations. This approach is allowed under the exception stated in 10 CFR 20.1501(a)(2) "Are reasonable under the circumstances to evaluate...". Based on the characterization data gathered (in 2009), engineering judgment was used to estimate the quantity of impacted subsurface piping. Costs are included in this estimate to decommission subsurface piping. A significant volume of impacted soil was identified beyond the volume estimated in the 2006 Report.

The volume of impacted soil in Plant Areas P-1 through P-25 estimated during the 2009 characterization is as follows:

- Plant area soil impacted to a depth of approximately 1 foot below grade was identified in an estimated footprint area of 489,435 square feet (ft<sup>2</sup>). Therefore, an additional 489,435 cubic feet (ft<sup>3</sup>) of impacted soil was added to the 2009 DCE.
- Plant area soil impacted to a depth of approximately 3 feet below grade was identified in an estimated footprint area of 69,609 ft<sup>2</sup>. Therefore, an additional 139,218 ft<sup>3</sup> (69,609 ft<sup>2</sup> by 2 feet) of impacted subsurface soil was added to the 2009 DCE.
- Plant area soil impacted to a depth of approximately 6 feet below grade was identified in an estimated footprint area of 30,013 ft<sup>2</sup>. Therefore, an additional 90,039 ft<sup>3</sup> (30,013 ft<sup>2</sup> by 3 feet) of impacted subsurface soil was added to the 2009 DCE.

The volume of impacted soil in the non-plant areas (NP-1 through NP-5 and P-26) estimated during the 2009 characterization is as follows:

- NP-1 – Impact of 7,649 ft<sup>3</sup> of soil was estimated based on the 2009 characterization.
- NP-2 – No additional impacts were discovered based on the 2009 characterization.
- NP-3 – Impact of 16,020 ft<sup>3</sup> of soil was estimated based on the 2009 characterization.
- NP-4 – Impact of 37,500 ft<sup>3</sup> of soil was estimated based on the 2009 characterization.
- P-26 and NP-5 – Impact of 49,025 ft<sup>3</sup> of soil was estimated based on the based on the 2009 characterization.

In summary, the volume of impacted soil adjacent in the non-plant areas (NP-1 through NP-5 and P-26) was estimated during the 2009 characterization to be approximately 110,194 ft<sup>3</sup>.

The volume of impacted soil adjacent to subsurface piping was estimated during the 2009 characterization to be approximately 129,622 ft<sup>3</sup>. The volume of impacted soil associated with the non-plant areas and adjacent to subsurface piping is 239,816 ft<sup>3</sup> (110,194 ft<sup>3</sup> of soil from the non-plant areas and 129,622 ft<sup>3</sup> of soil adjacent to subsurface piping). This is an increase from the 2012 Report. The larger volume should have been used in the 2012 DCE.

The volumes noted above are in-place cubic feet and do not account for bulking. A bulking factor of 1.42 was used to convert the in situ volume to the disposal volumes provided in Table A-12.

In summary, the additional impacted soil volume for plant areas (P-1 through P-25), non-plant areas (P-26 and NP-1 through NP-5), and impacted soil adjacent to subsurface piping identified in the 2009 DCE was estimated to be 718,692 ft<sup>3</sup>, 110,194 ft<sup>3</sup>, and 129,622 ft<sup>3</sup>, respectively. Routine characterization surveys performed since 2009 and the last update to the DCE do not indicate that the amount of impacted surface and subsurface soil material needs to be revised.

#### **3.4.5 Administrative Areas**

The Administration Building, the Laboratory and Office Building, the Maintenance Shop/Store/Office Building, and the Powerhouse were previously identified as not contaminated. The 2006 Report stated that radioactive materials were used in the laboratory area and some remediation in this area will be required. This update to the DCE assumes no change in the radiological status of these areas. Small portion of the roof over the Laundry Area was remediated and the impacted materials were disposed of at a licensed disposal facility. The DCE has been adjusted to account for this remediation.

#### **3.4.6 Calcium Fluoride Ponds B, C, D, and E**

Ponds B, C, D, and E are RCRA-regulated surface impoundments. Characterization of the ponds was completed by Honeywell in 2009. RCRA financial assurance for the calcium fluoride pond closures is accounted for separately and is not part of this DCE.

#### **3.4.7 Roads**

Based on the 2009 characterization data, the subgrade material under the roads (P-25) inside the restricted area was characterized as having little or no radiological impact. Therefore, no adjustment to the impacted volume of soil was made.

In 2012, Honeywell replaced a majority of the asphalt roads inside the restricted area with concrete. The project required removal of approximately six inches of asphalt and subgrade material so that the concrete roadway could be constructed.

Prior to the removal of the asphalt paving material, a walkover survey was performed. The walkover survey results showed little to no radiological impact to the asphalt paving material. Therefore, the material which was removed was managed as non-impacted material. Subsequently, Honeywell used the asphalt and subgrade material as fill within the plant.

#### **3.4.8 Aisle No. 5 of the Uranium Hexafluoride Pad**

In August 2011, ENERCON performed a radiological survey of Aisle No. 5 of the UF<sub>6</sub> pad. The details of this survey are provided in *Radiological Characterization Report of the UF<sub>6</sub> Pad* (prepared by ENERCON). This survey was performed because the existing concrete in Aisle No. 5 was scheduled to be removed so that the areas could be repaved. The results of the survey showed some elevated activity in the concrete and no impacts to the aggregate beneath the existing concrete pad. The clean concrete in Aisle No. 5 was removed, crushed, and utilized as fill in the Waste Storage Area.

#### **3.4.9 Support Trailers**

In 2011, Honeywell installed a 144-foot by 56-foot trailer (BD-69) and an additional engineering trailer (BD-56) in the old LPG Area (northwest corner of the restricted area) to provide office space to support ongoing site operations. The administrative activities being conducted in the trailers are not expected to result in any impacts to building surfaces or soil. Therefore, no adjustments were made to the DCE due to the installation of these trailers.

#### **3.4.10 RCRA KOH Mud Drums Storage Building**

In 2009, Honeywell installed the RCRA KOH Muds Storage Building (BD-26) (an opened wall structure) in the southern portion of the Ore Storage Pad area. The location of BD-26 is depicted in Drawing No. MTW-2800 (Rev AF). The original concrete pad is still in place and was only cut at the footer/foundation locations for the building column installation. The Ore Storage Pads are considered impacted, and the volume of impacted concrete was not adjusted for this update. The building is comprised of steel columns, trusses, and a sheet metal roof. It is assumed the building will not be contaminated from site operations; therefore, costs were not allotted in the DCE to decommission this building.

#### **3.4.11 Sheet Metal Buildings**

In 2012, Honeywell installed two sheet metal buildings. The Waste Sorting Building (BD-92) was installed west of the Surface Treatment Facility. The Capital Fabrication Building (BD-93) was installed south of the Sampling Plant. The Waste Sorting Building is used to reduce the volume of contaminated equipment and materials. It has a poured concrete floor with industrial coating to prevent migration of contamination into the concrete. Given the activities that occur in these buildings and contamination

control measures, it is assumed that there will be no radiological impacts. Therefore, no changes were made to the cost estimate due to the installation of these buildings.

#### **3.4.12 Waste Management**

Starting in 2008, Honeywell instituted improved waste management practices at MTW, which resulted in a reduction in the volume of impacted waste on the site and lessened failure rates for BSFR. Based on information provided by Honeywell, improved waste management practices resulted in approximately 4,000 ft<sup>3</sup> of material typically on-site that requires processing and disposal at any time (typical waste inventory). Based on waste management experience, it is estimated that 2,750 ft<sup>3</sup> will be processed at EnergySolutions Bear Creek Processing facility located near Oak Ridge, Tennessee and the balance of 1,250 ft<sup>3</sup> will be disposed of as LLRW at the EnergySolutions disposal facility in Clive, Utah.

#### **3.4.13 BSFR Failure Rate**

Consistent with the 2012 estimate, a BSFR failure rate of 5 percent is assumed. This is due to continued waste management practices.

### **3.5 Changes Since 2012 Report**

The following is a summary of the changes that have occurred since the 2012 Report was prepared (Drawing No. MTW-2800):

- 26 molyflush cylinders were disposed of at a licensed disposal facility;
- 400 thin walled UF6 cylinders were disposed of at a licensed disposal facility;
- Remediated impacted portion of the roof above the Laundry Area;
- Installed the liquid hydrogen tanks/units to replace the ammonia (NH<sub>3</sub>) dissociators which required relocation of the Fuel Depot;
- Numerous seismic upgrades to various systems;
- The ammonia (NH<sub>3</sub>) dissociators were replaced with a liquid hydrogen unit;
- The Fuel Depot was relocated so that the liquid hydrogen unit could be installed;
- Aggregate (crushed concrete) (from the rehabilitation of UF6 cylinder storage pad) has been placed in the Waste Storage Area for reuse on future projects;
- Aggregate (crushed concrete) from north pad of the Feed Materials Building (FMB) and northern edge of waste storage area (south of HF rail line) will require disposal
- A Sanitary Wastewater Treatment Plant (WWTP) has been constructed to replace the IMHOFF (aboveground storage) tank (existing subgrade structures for the IMHOFF tank were characterized and found to be free of contamination and were abandoned in place).



#### 4.0 2015 DECOMMISSIONING COST ESTIMATION METHODS

This section of the DCE report documents the considerations and factors used to prepare this update to the DCE. Factors from the previous reports (2006 Report, 2009 Report, and 2012 Report) that remain unchanged are identified and described. This update did not modify the volumes associated with buildings and structures (Table A-1) from the 2012 Report except for the roof above the Laundry Area. There has been no additional information collected that would result in a net change in the volumes of impacted surface and subsurface soil material since 2012. As noted in Section 3.4.4, there was an error in the 2012 Report that, when corrected, resulted in a net increase in the impacted soil associated with the non-plant areas and adjacent to subsurface piping in the 2015 Report.

The estimated cost to decommission the Honeywell MTW facility is approximately \$254,238,000. Table 4-1 provides a summary of the costs for each area of the facility.

**Table 4-1: Decommissioning Cost Summary – Honeywell MTW Facility**

Operation	Man-hours	Labor Plus Travel & Living	Waste Process & Transport	Equipment, Contracts & Supplies	Radwaste Ship & Disposal	Total Cost
Main Production Buildings	211,041	\$14,944,148	\$1,304,249	\$1,329,110	\$73,400,877	\$90,978,384
Miscellaneous Production Buildings	103,738	\$7,561,016	\$279,254	\$417,599	\$8,403,715	\$16,661,584
Drum Storage Pads and Ponds	349,504	\$25,642,631	\$787,199	\$1,328,261	\$6,608,460	\$34,366,551
Outdoor Areas, Drains, & Sewers	6,723	\$464,898	\$7,929,580	\$122,074	\$373,055	\$8,889,606
Administrative Areas	196	\$13,519	\$0	\$1,040	\$9,023	\$23,582
Additional soil plant areas P1-P25	1,664	\$0	\$36,412,961	\$0	\$3,795,774	\$40,208,735
Additional soil non-plant areas NP1-NP5 plus additional soil adjacent to subsurface piping	10,400	\$0	\$4,220,842	\$0	\$1,067,701	\$5,288,542
Decommissioning Planning	480	\$67,549	\$0	\$0	\$0	\$67,549
Characterization Surveys	2,275	\$291,404	\$0	\$27,304	\$0	\$318,708
Final Surveys	9,100	\$1,165,615	\$0	\$109,213	\$0	\$1,274,828
Planning Training & Mobilization	2,068	\$158,718	\$0	\$0	\$0	\$158,718
Honeywell Oversight & Licensing	21,684	\$1,198,548	\$0	\$0	\$0	\$1,198,548
General Plant Area Waste	-	\$0	\$76,043	\$0	\$267,160	\$343,203
Savings from A-10	-	-	-	-	-	-\$7,350,024
Sanitary Wastewater Treatment Plant	-	-	-	-	-	\$150,000
Aggregate in Waste Storage Area	-	-	-	-	-	\$3,088,000
Aggregate (LLRW) from FMB/HF rail	-	-	-	-	-	\$347,000
Seismic Upgrades	-	-	-	-	-	\$2,818,000
Totals	718,873	\$51,508,045	\$51,010,128	\$3,334,601	\$93,925,764	\$198,831,514
					25% CONTINGENCY	\$49,707,878
					ILLINOIS RAD WASTE FEE (\$3/ft <sup>3</sup> )	\$5,697,690
					GRAND TOTAL	\$254,238,000

Specific modifications and/or adjustments to the DCE in this current report compared to the 2012 Report are highlighted below:

- No adjustments were made in the estimated level of man-hours for tasks scoped in the 2012 Report.
- Labor and travel and living costs were escalated using a cost escalation factor of 1.153 (Appendix A-14) to account for inflation between 2012 and 2015 based on the methodology in NUREG-1307.
- Radwaste transportation and disposal costs in the 2012 Report were escalated by a factor of 1.153 to account for inflation between 2012 and 2015 based on the methodology in NUREG-1307. BSFR disposition option rates are based on quoted rates provided by EnergySolutions for the Bear Creek Processing facility located near Oak Ridge, Tennessee.
- Waste process and transport costs in the 2012 Report were escalated by a factor of 1.153 to account for inflation based on the methodology in NUREG-1307.
- Improved waste management practices continue. This has resulted in no net increase in the general volume of waste on-site that would require disposal.
- Decommissioning costs for aggregate (crushed concrete) on-site in the Waste Storage Area are included.
- Decommissioning costs for a Sanitary WWTP that has been constructed to replace the IMHOFF (aboveground storage) tank are included.

Honeywell Oversight & Licensing line item includes the administrative fees required by NUREG-1757, Volume 3, Appendix A, Section A.3.6. This line item includes the following administrative fees:

- Procurement fees for third party contractor (\$192,600);
- Legal fees (\$287,600);
- Local permit fees (\$118,500);
- Utilities (\$229,600); and
- NRC staff review (\$370,400).

The costs associated with decommissioning the Sanitary WWTP, disposal of the aggregate in the Waste Storage Area, seismic upgrades, and aggregate from the FMB and HF rail line are documented in Appendix A-15. For this update, it has been assumed that the Sanitary WWTP is impacted primarily due to wastewater from the on-site laundry. The aggregate in the Waste Storage Area has been assumed to be impacted and will require disposal as BSFR. For the seismic upgrades, 11,000 cubic feet of material is assumed impacted and will require disposal as LLRW. The aggregate (crushed concrete) assumed to be generated is estimated to be approximately 5,000 cubic feet and it has been assumed the aggregate can be dispositioned as BSFR. Approximately 1,550 cubic feet of concrete is assumed to require disposal as LLRW for the projects performed on the northwest side of the north pad of the FMB and northern edge of

the Waste Storage Area (south of the HF line). The decommissioning costs associated with these items are summarized in separate lines in Table 4-1, Decommissioning Cost Summary.

#### 4.1 Cost Escalation Factor

A methodology for computing the cost escalation due to inflation is provided in Appendix A-14. Labor, energy, and burial costs escalation factors were calculated. The cost escalation methodology specified in NUREG-1307, Revision 15, was utilized to calculate a cost escalation factor of 1.153, accounting for inflation between 2012 and 2015. This is slightly higher than the 2012 cost escalation factor of 1.141, which accounted for inflation between 2009 and 2012.

#### 4.2 Cost Modifying Factors

In the 2006 Report, site and work conditions were assumed by Duratek to significantly affect the overall cost of remediation. A productivity adjustment factor was incorporated based on site and work conditions expected to be encountered during decommissioning tasks. The productivity adjustment factor was related to personal protection requirements and working temperatures. The degree of protection required depended on the extent of contamination and specific activities to be performed in a given area. As the level of personal protection increased, so did the impact on individual productivity and task duration. Adjustments were made to account for the implementation of personal protective measures where applicable. This estimate utilized standardized levels of personal protection and their associated impacts as shown in Table 4-2. The productivity factors related to these levels of personal protection were provided in Table 4-3 and Table 4-4 for light and heavy work, respectively. These factors have not been adjusted for this update to the DCE.

**Table 4-2: Personal Protective Equipment Protection Summary**

Level A:	The highest available level of respiratory, skin, and eye protection
Level B:	The highest level of respiratory protection, but less skin protection than Level A. Level B is the minimum level recommended for initial site entries, or for other entry conditions dealing with unknown hazards.
Level C:	The same level of skin protection as Level B, but a lower level of respiratory protection.
Level D Modified:	Skin protection similar to or the same as Level C, without respiratory protection.
Level D:	Standard work uniform suitable for construction work: no respiratory protection and minimal skin protection.

**Table 4-3: Hazardous and Toxic Waste Productivity Factors: Light Work**

Variables	U/M	Level A			Level B			Level C			Level D Modified			Level D		
		T<70	70<T	T>85	T<70	70<T	T>85	T<70	70<T	T>85	T<70	70<T	T>85	T<70	70<T	T>85
A. Standard losses	Min.	160	160	160	140	140	140	128	128	128	76	76	76	32	32	32
B. Scheduled/heat stress breaks	Min.	60	90	120	43	65	86	35	63	101	30	47	63	30	33	44
C. Dexterity losses	Min.	78	69	60	74	69	64	55	51	44	4	4	3	5	5	5
D. Total time lost per 8-hr. WD	Min.	298	319	340	257	274	290	218	242	273	110	127	142	67	70	81
E. Productivity time per 8-hr. WD	Min.	182	161	140	223	206	191	262	238	207	370	353	338	413	410	399
F. Productivity time on clean site	Min.	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430
<b>G. HTW Productivity Factor</b>		<b>0.42</b>	<b>0.37</b>	<b>0.33</b>	<b>0.52</b>	<b>0.48</b>	<b>0.44</b>	<b>0.61</b>	<b>0.55</b>	<b>0.48</b>	<b>0.86</b>	<b>0.82</b>	<b>0.79</b>	<b>0.96</b>	<b>0.95</b>	<b>0.93</b>

**Notes:**

- Standard delays account for all time losses independent of temperature variations. They include safety meetings, instructions, putting on and taking off of PPE, decontamination, switching air supply/filters, monitoring delays, and cleanup.
- Scheduled/heat stress breaks account for all paid rest periods per workday.
- Dexterity losses are based on subjective opinions of the percentage that PPE slows down a normal worker because of factors such as discomfort, clumsiness, weight, and restricted breathing and communication. The number of minutes actually worked is reduced by the percentage representing the average response for that particular PPE level.
- Values for A, B, and C were derived by averaging the survey responses for each PPE level. Responses that varied greatly from the average were subject to omission at the author's discretion.
- Total paid time = 480 minutes.
- 50-minute delay on clean site = 10-minute safety meeting and instructions + 10-minute cleanup + 30-minute breaks.
- Calculations:  $D = A + B + C$      $E = 480 - D$      $F = 480 - 50$      $G = E/F$     U/M = unit of measure    WD = workday    Min. = minutes  
T = temperature (°Fahrenheit)
- Level A-protection is used in extreme emergency situations only. Productivity factors for Level A should be used with caution because they were extrapolated from 2 data points.



**Table 4-4: Hazardous and Toxic Waste Productivity Factors: Heavy Work**

Variables	U/M	Level A			Level B			Level C			Level D Modified			Level D		
		T<70	70<T	T>85	T<70	70<T	T>85	T<70	70<T	T>85	T<70	70<T	T>85	T<70	70<T	T>85
A. Standard losses	Min.	220	220	220	204	204	204	135	135	135	76	76	76	28	28	28
B. Scheduled/heat stress breaks	Min.	60	105	150	50	75	123	64	131	178	30	90	165	30	45	60
C. Dexterity losses	Min.	80	62	44	52	46	35	44	34	26	28	24	18	11	10	10
D. Total time lost per 8-hr. WD	Min.	360	387	414	306	325	362	243	300	339	134	190	259	69	83	98
E. Productivity time per 8-hr. WD	Min.	120	93	66	174	155	118	237	180	141	346	290	221	411	397	382
F. Productivity time on clean site	Min.	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430
<b>G. HTW Productivity Factor</b>		<b>0.28</b>	<b>0.22</b>	<b>0.15</b>	<b>0.40</b>	<b>0.36</b>	<b>0.27</b>	<b>0.55</b>	<b>0.42</b>	<b>0.33</b>	<b>0.80</b>	<b>0.68</b>	<b>0.51</b>	<b>0.96</b>	<b>0.92</b>	<b>0.89</b>

**Notes:**

- Standard delays account for all time losses independent of temperature variations. They include safety meetings, instructions, putting on and taking off of PPE, decontamination, switching air supply/filters, monitoring delays, and cleanup.
- Scheduled/heat stress breaks account for all paid rest periods per workday.
- Dexterity losses are based on subjective opinions of the percentage that PPE slows down a normal worker because of factors such as discomfort, clumsiness, weight, and restricted breathing and communication. The number of minutes actually worked is reduced by the percentage representing the average response for that particular PPE level.
- Values for A, B, and C were derived by averaging the survey responses for each PPE level. Responses that varied greatly from the average were subject to omission at the author's discretion.
- Total paid time = 480 minutes.
- 50-minute delay on clean site = 10-minute safety meeting and instructions + 10-minute cleanup + 30-minute breaks.
- Calculations:  $D = A + B + C$      $E = 480 - D$      $F = 480 - 50$      $G = E/F$     U/M = unit of measure    WD = workday    Min. = minutes
- T = temperature (°Fahrenheit)
- Level A-protection is used in extreme emergency situations only. Productivity factors for Level A should be used with caution because they were extrapolated from 2 data points.

### 4.3 Radiological Waste Volume Estimates

The unprocessed radiological waste volumes are shown in Table 4-5. This update to the DCE did not modify the volumes associated with buildings and structures in Table A-1 from the 2012 Report except for the roof above the Laundry Area. The roof above the Laundry Area was remediated so the 500 cubic feet of waste has been removed from Tables 4-5 and A-1 accordingly. Waste volume increases due to the decommissioning of the Sanitary WWTP and aggregate in the Waste Storage Area are documented in Appendix A-15. No Class B and C waste is expected to be generated during decommissioning activities.

**Table 4-5: 2006 Honeywell Unprocessed Radioactive Waste Summary**

<b>Area Description</b>	<b>Generated EnergySolutions Disposal Volume (ft<sup>3</sup>)</b>	<b>Decon EnergySolutions Disposal Volume (ft<sup>3</sup>)</b>	<b>Direct EnergySolutions Disposal Volume (ft<sup>3</sup>)</b>	<b>Total Disposal Volume (ft<sup>3</sup>)</b>
Main Production Buildings	2,434	10,860	330,849	344,144
Miscellaneous Production Buildings	1,246	1,373	36,783	39,401
Drum Storage Pads & Ponds	4,184	0	26,800	30,984
Outdoor Areas, Drains & Sewers	105	0	1,644	1,749
Administrative Areas	18	0	0	18
<b>TOTALS</b>	<b>7,987</b>	<b>12,233</b>	<b>396,076</b>	<b>416,296</b>

#### 4.3.1 Radiological Waste Disposal Cost

The 2006 Report assumed a portion of the waste would be processed at the EnergySolutions (former Duratek) facility in Oak Ridge, Tennessee followed by disposal at EnergySolutions of Utah. Other wastes were assumed to be directly disposed at EnergySolutions. The 2009 Report addressed changes made to the 2006 Report. The following sections describe the adjustments made in the 2009 Report, 2012 Report, and this update to the DCE.

##### 4.3.1.1 EnergySolutions of Utah Disposal Costs

The 2006 Report estimated the cost to transport waste to the EnergySolutions disposal site in Clive, Utah based on a transportation distance of 1,985 miles at a rate of \$2.90 per mile. This assumes the waste will be shipped to a processing facility in the Oak Ridge, Tennessee area and subsequently transported to the EnergySolutions disposal site in Clive, Utah. The cost to dispose of the waste at the EnergySolutions of Utah site was based on a disposal charge of \$123 per ft<sup>3</sup>. In 2009, ENERCON assumed these unit costs

remained the same. Therefore, in the 2009 Report, a cost escalation factor of 1.126 was used to account for inflation between 2006 and 2009. In the 2012 Report, a cost escalation factor of 1.141 was used to account for inflation between 2009 and 2012. In this update to the DCE, a cost escalation factor of 1.153 was used to account for inflation between 2012 and 2015, which results in a disposal rate of \$182.20 per ft<sup>3</sup> and a transportation rate of \$4.30 per mile. Table A-2 provides a summary of the *EnergySolutions* disposal costs and Table A-3 provides a summary of the unit cost information.

#### **4.3.2 Waste Processing/Burial Costs**

In the 2006 Report, the cost to transport waste to the *EnergySolutions* (former Duratek) central volume reduction facility in Oak Ridge, Tennessee was based on a transport distance of 295 miles at a rate of \$2.90 per mile. This rate was adjusted for inflation by 1.126 and 1.141 in the 2009 Report and 2012 Report, respectively. For this update to the DCE, this rate was increased by 1.153 to account for inflation, which results in a transportation rate of \$4.30 per mile.

Waste processing at the *EnergySolutions* facility in Memphis, Tennessee was included in the 2009 Report for additional soils identified during the 2009 site characterization. The unit cost was variable depending upon the volume reduction process. These unit costs were incorporated into the costs presented in Table A-12 of the 2009 Report. These costs were increased by 1.141 to account for inflation between 2009 and 2012. In this update to the DCE, these costs were increased by 1.153 to account for inflation between 2012 and 2015 as shown in Table A-12 of this report.

In the 2012 Report, improved waste management practices resulted in the removal of the following items from Table A-12: (1) scrap metal on metals pad (4,830 tons); (2) new scrap metal on metals pad (73 tons); (3) 16-inch by 16-inch by 8-inch cubes on metals pad (22 tons); (4) thin-walled UF<sub>6</sub> cylinders (660 tons); and (5) soil from I-HF mitigation and fire water line rupture (450 tons). The items were removed during the 2012 update to the DCE because they were shipped off-site for disposal. Improved waste management practices continued between 2012 and 2015. Therefore, the 2,750 ft<sup>3</sup> of material typically on-site (which was first documented in the 2012 Report) that will require processing at the *EnergySolutions* Bear Creek Processing facility located near Oak Ridge, Tennessee remained unchanged. In this update to the DCE, the costs associated with the disposal of the 2,750 ft<sup>3</sup> of material were increased by 1.153 to account for inflation between 2012 and 2015 as shown in Table A-12 of this report (Miscellaneous Debris).

In the 2012 Report, costs were added to Table A-2 to account for the 1,250 ft<sup>3</sup> of waste typically on-site that requires disposal as LLRW at the *EnergySolutions* disposal facility in Clive, Utah. This volume has remained unchanged in this update to the DCE as Honeywell has continued to implement improved waste

practices. In this update to the DCE, the costs associated with the disposal of the 1,250 ft<sup>3</sup> of material were increased by 1.153 to account for inflation between 2012 and 2015 as shown in Table A-2 of this report (General Plant Area).

#### 4.4 Remediation Methods

Remediation methods considered contamination levels, degree of penetration of contamination into substrate material, equipment cost, support equipment costs, material and chemical costs, the generation of secondary waste volumes (waste in addition to the removed contaminated material), processing rates, labor requirements, and applicability to various tasks. Typical decontamination processes are summarized in Table 4-6. This table shows the decontamination methodology, application, the process cost in dollars per ft<sup>2</sup> of area decontaminated, and the volume of secondary waste generated. A summary of the unit rates associated with these costs for this update is shown in Table 4-7.

**Table 4-6: Decontamination Methodology Comparison**

Methodology	Application	Penetration Depth (inch)	Crew Size	Secondary Waste Volume (ft <sup>3</sup> /1000 ft <sup>2</sup> )
McDonald U-5 Scabbler	Floor concrete	0.25	2.0	0
McDonald U-5 Scabbler	Floor concrete	0.50	2.0	0
McDonald 3WCD Scabbler	Wall concrete	0.125	2.0	0
Blastrac 10D Shot Scabbler	Floor concrete	0.063	1.1	0.53
Blastrac 10D Shot Scabbler	Floor concrete	0.125	1.1	0.53
LTC 10-60Pn Special Vacuum Blaster	All surfaces	0.310	1.3	0.53
LTC 10-60Pn Special Vacuum Blaster	All surfaces	0.063	1.3	0.53
EDCO CPU-10C Floor Plane	Floor concrete	0.50	2.0	0
CO2 Blasting	All surfaces	0.00	2.0	0
Hydrolaser (5-10,000 psi)	All surfaces	0.00	2.0	9.07
Hands-On-Decon	Non-porous surfaces	0.00	1.0	8.33



**Table 4-7: Decontamination Methodology Cost Summary**

<b>Methodology</b>	<b>2015 Process Cost (\$/ft<sup>2</sup>)</b>
McDonald U-5 Scabbler	1.584
McDonald U-5 Scabbler	3.025
McDonald 3WCD Scabbler	7.282
Blastrac 10D Shot Scabbler	0.825
Blastrac 10D Shot Scabbler	0.647
LTC 10-60Pn Special Vacuum Blaster	2.721
LTC 10-60Pn Special Vacuum Blaster	4.942
EDCO CPU-10C Floor Plane	2.619
CO2 Blasting	6.777
Hydrolaser (5-10,000 psi)	1.410
Hands-On-Decon	3.254

#### 4.5 Radiological Waste Volume Reduction Costs

The volume reduction processes are summarized in Table 4-8. This table shows the volume reduction methodology, applicability, transportation container type, and total process cost per unit weight. Unit factors were applied to specific items of equipment requiring volume reduction. The waste materials expected to be generated during the decommissioning of the Honeywell MTW facility include ventilation systems, process equipment, concrete, steel, soil, and secondary waste (generated during the decontamination work such as protective clothing and materials used during manual decontamination work). ENERCON assumed the volume reduction process would remain as presented in the 2006 Report. The only exception is that, in the 2009 Report, the cost to survey and release high-density boxes was modified based on a vendor-supplied rate (see below for details). For this update to the DCE, a cost escalation factor of 1.153 was applied to account for inflation between 2012 and 2015. Table 4-9 provides a summary of the volume reduction costs used in the DCEs.

The volume reduction cost to survey and release high-density waste was modified to \$0.20 per pound based on vendor quotes in the 2009 Report. In the 2012 Report, this rate was inflated by a factor of 1.141 to account for inflation between 2009 and 2012. For this update to the DCE, this rate was inflated by a factor of 1.153 to account for inflation between 2012 and 2015. In the 2009 Report, a 5 percent BSFR failure rate was assumed for contaminated concrete and soil, and all other contaminated items were

assumed to have a 10 percent BSFR failure rate. In the 2012 Report, the failure rates were reduced based on the improved waste management practices which have resulted in lower failure rates. Similar to the 2012 update, contaminated waste was assumed to have a 5 percent BSFR failure rate for this update to the DCE.

**Table 4-8: 2006 Volume Reduction Methodology Cost Information**

<b>Volume Reduction (VR) Methodology</b>	<b>Applicability</b>	<b>Transportation Container Type</b>	<b>Total VR Cost (\$/lb)</b>
Super Compaction	Dry activated waste, 20 lb/ft <sup>3</sup>	B-25 for EnergySolutions Disposal	4.08
Survey & Release Low-Density Drums	Clean Low-Density Waste	55-Gallon Drum	1.31
Survey & Release Low-Density Boxes	Clean Low-Density Waste	B-25 for EnergySolutions Disposal	1.68
Survey & Release High-Density Boxes	Clean Waste at >60 lb/ft <sup>3</sup>	B-25 for EnergySolutions Disposal	0.50
Survey & Release Asbestos Material	Potentially Clean Asbestos	B-25 for EnergySolutions Disposal	2.53

**Table 4-9: Volume Reduction Cost Summary**

<b>Volume Reduction (VR) Methodology</b>	<b>2006 Total VR Cost (\$/ft<sup>2</sup>)</b>	<b>2009 Total VR Cost (\$/ft<sup>2</sup>)</b>	<b>2012 Total VR Cost (\$/ft<sup>2</sup>)</b>	<b>2015 Total VR Cost (\$/ft<sup>2</sup>)</b>
Super Compaction	4.08	4.59	5.24	6.04
Survey & Release Low-Density Drums	1.31	1.48	1.68	1.94
Survey & Release Low-Density Boxes	1.68	1.89	2.16	2.49
Survey & Release High-Density Boxes	0.50	0.20	0.23	0.27
Survey & Release Asbestos Material	2.53	2.85	3.25	3.74

#### 4.6 Unit Costs

Select 2015 unit cost rates are shown in Table 4-10 and Table A-3. Rates listed in Table 4-10 and Table A-3 are non-prevailing wage rates.

**Table 4-10: 2015 Decommissioning Estimate Selected Unit Cost Factors**

Unit Cost Factor	2015 Unit Cost Rate	Units
Radioactive Soil and Rubble Disposal at EnergySolutions of Utah	\$182.20	cubic foot
Waste Transportation to EnergySolutions of Utah	\$4.30	mile
Transportation Distance to EnergySolutions of Utah	1,985	miles
20-ft Sea/Land Container Cost	\$488.84	month
Management and Supervision	\$193.82	hour
Engineer	\$129.62	hour
Radiation Protection Supervisor	\$182.84	hour
Laborer Foreman	\$66.72	hour
Administrative Assistant	\$48.93	hour
Instrument Technician	\$88.55	hour
Radiation Protection Technician	\$88.55	hour
Laborer	\$42.74	hour
Illinois sales tax	6.25%	
Fee	20%	

#### **4.7 Final Surveys**

The 2006 Report estimated final survey costs based on the methodology presented in NUREG-1757, Volume 3. The estimate utilized the number of sample points for the various areas being surveyed, the type of survey being performed, and the time to perform each of these surveys. Equipment and material costs to perform the surveys were added along with staff support costs to determine a total cost. The survey requirements were based on NUREG-1575, MARSSIM. The 2006 Report summarized the facility survey labor estimates. For this update to the DCE, a cost escalation factor of 1.153 was applied to account for inflation between 2012 and 2015.

## 5.0 DESCRIPTION OF THE DECOMMISSIONING PROCESS

Decommissioning of the Honeywell facility will require that residual radioactive materials be removed or remediated to meet the unrestricted release criteria to allow removal of the decommissioned facilities from the site's radioactive materials license. The unrestricted release means no restrictions are imposed upon the site after license termination. Numerous structures will remain after license termination. These structures will not have had their structural soundness compromised by decommissioning activities.

### 5.1 Characterization Surveys

Characterization surveys will be conducted in areas of the facility that have a history of radioactive materials use or storage. Survey results will determine the extent of remediation required to achieve release of these areas for unrestricted use. Characterization surveys are normally performed in such a manner that if no contamination is found, the results may be used as final survey data or to augment final survey data.

### 5.2 Remediation

The general remediation approach assumes that source material and waste will be removed from process areas and that no remediation is required in administrative areas. Table 5-1 summarizes the planned remediation activities including the following updates:

- Administrative Areas were removed as the 20' x 50' area of the Laundry Area roof has been removed and replaced;
- 26 molyflush cylinders were removed from the site and therefore were removed from the Miscellaneous Waste listing;
- Sanitary WWTP; and
- Aggregate (crushed concrete) in the Waste Storage Area.

**Table 5-1: 2015 Decommissioning Basis for Planned Remediation Activities**

Building or Area	Remediation Activities
<b>Main Production Buildings</b>	
FM Building	All equipment and structure will be removed from the site. Basement 8" concrete walls and 6" concrete floor slab will be removed. Soil 12" deep below floor slab will be removed.
KOH Muds Bldg, Sodium Removal Bldg, Uranium Recovery Bldg, & Sample Plant Bldg	All equipment and structure will be removed from the site. 1/2" of concrete will be removed from the floor slabs and they will be left in place.
FM Building South Pad East & FM Building South Pad West	All equipment will be removed from the site. 6" concrete floor slabs will be removed, 18"x24" footings will be removed, and 2'x3' equipment footings will be removed. Soil 12" deep below floor slabs will be removed.

Building or Area	Remediation Activities
<b>Miscellaneous Production Buildings</b>	
Calcliner Building	All equipment and structure will be removed from the site. 1/2" of concrete will be removed from the floor slab and it will be left in place.
Ore Storage Bldg., Bed Materials and Filter Fines Bldg., Cylinder Wash Bldg., Hazardous Waste Storage Bldg., & Drum Crusher Bldg.	Buildings will be decontaminated and remain in place. 1/2" of concrete will be removed from the floor slabs and the slabs will remain in place.
Drum Washing Bldg., & Drum Crusher Bldg.	All equipment will be removed from the site. Buildings will be decontaminated and remain in place. 1/2" of concrete will be removed from the floor slabs and the slabs will remain in place.
Miscellaneous Waste	Cold Concrete (Construction Rubble) - 158 tons, Hot Concrete (Construction Rubble) - 340 tons, Hot Asbestos in Drum Crusher Building - 9 tons, Large Rad. Scrap Metal (Fluorinator shell & Cold Trap Shell) - 12.5 tons, Crushed Unwashed Ore Drums - 155 tons, DAW on storage pad - 60 tons, Cold Special / Chemical Waste - 68 tons.
<b>Drum Storage Pads &amp; Ponds</b>	
Ore Storage Pads, Drum Storage Pad, Waste Storage Pad	1/2" of concrete will be removed from the concrete pads and the pads will remain in place.
Uranium Settling Pond Nos. 3 and 4	Excavate 3' from pond bottoms, backfill ponds with 9' thick clay.
<b>Outdoor Areas, Drains &amp; Sewers</b>	
Non-plant areas	Excavate a trapezoidal area 3' wide at the bottom, 2 feet deep, with side sloped two horizontal to 1 vertical along the 2,770 foot length of the drainage ditch. Excavate impacted soils along the surface drainage pathway east of the plant. Excavate impacted soils along the road to the inactive landfill. Excavate impacted soils along old River Road.
Process Drain & Storm Water Pipe	Excavate and remove all process drain lines in an area 3' x 5' x 2,567'. Excavate and remove all storm water drain lines in an area 3' x 5' x 6,175'. Portions of the storm water piping were not considered impacted.
Site Soil Areas	Excavate a total of 748,500 ft <sup>2</sup> to a depth of 1'. Excavate additional soils to a depth of 3' in limited areas and in additional areas up to 6. Total volume of soils to be excavated is estimated to be 883,140 ft <sup>3</sup> . Backfill the excavated areas.
Waste Storage Area	Aggregate (crushed concrete) (originally from Aisle No. 5 of UF <sub>6</sub> cylinder area, Ore Storage (north) Pad, and Waste Railcar Loading Area) will be disposed of as BSFR; there is approximately 17,000 ft <sup>3</sup> of aggregate that will require disposal.
Sanitary WWTP	Existing IMHOFF tank was remediated and subgrade structures were found to be free of contamination and buried in place; Assumed Sanitary WWTP that replaced the IMHOFF tank will be impacted and will require disposal as BSFR; WWTP weighs approximately 87,000 pounds.

Further discussion of the individual remediation tasks follows.

### 5.2.1 Main Production Buildings

The entire FM Building, structure, concrete slab, building pads, and all of the equipment are considered to be contaminated. The building and associated encased equipment will need to be demolished and removed from the site for processing or disposal at a licensed radioactive waste disposal facility.

The Ion Exchange Building, Sodium Removal Building, KOH Muds Building, Uranium Recovery Building, and Sample Plant will be treated in a similar manner. The structures and all of the equipment are considered to be contaminated and will need to be demolished and removed from the site for processing or disposal at a licensed radioactive waste disposal facility. The building concrete slabs will be left in place after being decontaminated using surface removal methods.

#### **5.2.2 Miscellaneous Production Buildings**

The Ore Storage Building, Bed Materials and Filter Fines Building, Pond Muds Filter Calciner Building, Cylinder Wash Building, and Drum Crusher Building are considered to be contaminated. The Pond Muds Filter Calciner Building and associated equipment will need to be demolished and removed from the site for processing or disposal at a licensed radioactive waste disposal facility. The Ore Storage Building, Bed Materials and Filter Fines Building, the old and new Cylinder Wash Buildings, and the old and new Drum Crusher Buildings will be decontaminated and left in place. Building concrete slabs will be left in place after being decontaminated using surface removal methods.

The  $\text{GF}_2$  Plant Building, South  $\text{GF}_2$  Plant,  $\text{SF}_6/\text{IF}_5/\text{SbF}_5$  Buildings, Liquid Fluorine Facility, Liquid Nitrogen Facility, Surface Treatment Facility, and Calcium Fluoride Building will not require remediation.

#### **5.2.3 Drum Storage Pads and Uranium Settling Ponds**

The Ore Storage Pads, the former KOH Muds Storage Pad (which now serves as a Drum Storage Pad), Drum Storage Pad, and Waste Storage Pad are considered to be contaminated. The concrete slabs will be left in place after surface contamination is mechanically removed.

Uranium Settling Pond Nos. 3 and 4 are contaminated and will be remediated by removing the pond sediments, pond liner, and contaminated soil under the ponds for disposal at a licensed radioactive waste disposal facility.

#### **5.2.4 Outdoor Areas, Drains, and Sewers**

Subsurface characterization was not completed (in 2009) immediately adjacent to subsurface piping due to the potential to impact on-going operations. This approach is allowed under the exception stated in 10CFR20.1501(a)(2) "Are reasonable under the circumstances to evaluate...". Based on the characterization data gathered (in 2009), engineering judgment was used to estimate the quantity of impacted subsurface piping. Costs are included in this estimate to decommission subsurface piping based on the following discussion.

The sanitary system was not assumed to be impacted; therefore, it will not require remediation. This assumption is further supported by the fact that the IMHOFF tank characterization showed it was not impacted above the release criteria.

The entire process system was assumed to be impacted, and portions of the storm water system were assumed to be impacted.

No characterization was performed near subsurface piping systems during the 2009 site characterization due to ongoing production at the site. The determining factor for the storm water system was based on whether or not the piping was located downgradient of an area that had impacts to surface and subsurface soils. If a subsurface piping system was assumed to be impacted, remediation was assumed to consist of removing the piping and associated backfill. A typical cross section (three feet wide by five feet deep) was used to estimate the removal volume. The disposition of the impacted piping and backfill was assumed to be disposal at a licensed radioactive waste disposal facility.

The drainage swale from Outfall 002 (formerly referred to as “The Discharge Ditch to River” in the 2006 Report) is contaminated and will be remediated by removing the ditch sediments and surrounding impacted soil for disposal at a licensed radioactive waste disposal facility. The typical cross section assumed was a two-foot-deep trapezoidal-shaped channel with a three-foot bottom and two horizontal to one vertical side slopes. The total length was estimated to be approximately 2,770 feet. No changes were made to these assumptions in this update of the DCE.

The other three notable impacts to areas outside the restricted area include impacts east of the Ore Storage Pads, impacts detected along River Road, and the road to the inactive landfill. The impacts along River Road were detected approximately 25 feet on either side of the center of River Road over approximately 750 feet. The impacts east of the Ore Storage Pad were in a drainage swale located east of the Ore Storage Pads. The typical cross section assumed a one-foot-deep rectangular-shaped channel with a three-foot-wide bottom. Approximately 675 feet of drainage swale was assumed to be impacted. The impacts along the road to the inactive landfill were isolated. Due to limited sampling, which did not allow for extensive delineation, an assumed to be impacted area was used.

Aggregate (crushed concrete) in the Waste Storage Area was originally from the following areas:

- Aisle No. 5 of the UF<sub>6</sub> Cylinder Storage Area (approximately 15,000 ft<sup>3</sup>);
- Ore Storage (north) Pad (approximately 1,000 ft<sup>3</sup>); and
- Waste Railcar Loading Area (approximately 1,000 ft<sup>3</sup>).

The approximate 17,000 ft<sup>3</sup> of aggregate will be assumed to be disposed of as BSFR for this update to the DCE. Appendix A-15 contains details of the cost estimate for the disposal of the aggregate.

#### **5.2.5 Administrative Areas**

The Administration Building, Laboratory and Office Building, Maintenance Shop/Store/Office Building, and Powerhouse do not require remediation

#### **5.2.6 Sanitary Wastewater Treatment Plant**

The WWTP was constructed to replace the IMHOFF tank. Sanitary wastewater from the site is treated in the Sanitary WWTP. The Sanitary WWTP has been assumed to be impacted primarily due to wastewater from the on-site laundry facility. Thus, it will be volume reduced and disposed as BSFR. Appendix A-15 contains details of the cost estimate for the Sanitary WWTP.

#### **5.2.7 Calcium Fluoride Ponds**

Calcium Fluoride Ponds B, C, D, and E contain calcium fluoride materials impacted with minor amounts of uranium. These ponds are permitted RCRA impoundments and will be remediated as RCRA-regulated units. These surface impoundments are included in the RCRA decontamination and decommissioning estimate for the required RCRA financial security. Closure costs for these ponds are not included in this update to the DCE.

### **5.3 License Termination Surveys**

License termination surveys, or final release surveys, will be performed using the guidance provided in NUREG-1575, MARSSIM. The surveys will be performed in accordance with specifically developed plans and procedures.

#### **5.3.1 Survey Instrumentation**

Selection and use of instrumentation will ensure sensitivities are sufficient to detect the identified nuclides at the minimum detection requirements. A list of typical final survey instrumentation, radiation detected, and calibration sources is provided in Table 5-2.



**Table 5-2: Typical Final Survey Instrumentation**

<b>Instrument/Detector</b>	<b>Detector Type</b>	<b>Radiation Detected</b>	<b>Calibration Source</b>	<b>Use</b>
Ludlum Model 2350 with 4368, 43-98, 43-94 or 43-106 detector	Gas-flow proportional (126 cm <sup>2</sup> )	Alpha or beta	99Tc ( $\beta$ ) 230Th ( $\alpha$ )	Direct alpha and direct beta surveys; Beta scans on solid surfaces
Ludlum Model 2350/ SP-1133m or SP-175-3m	GM Pipe Detector	Alpha or beta	99Tc ( $\beta$ ) 230Th ( $\alpha$ )	Direct beta pipe survey
Ludlum Model 2350 with 44-40 detector	Shielded GM (15.5 cm <sup>2</sup> )	Beta	99Tc ( $\beta$ )	Direct beta surveys; Beta scans on solid surfaces
Ludlum Model 2350 with 44-2 or 44-10 detector	NaI (Tl) Scintillator	Gamma	137Cs	Gamma exposure rate and gamma scans
Eberline Teletector Model 6112B	Ion Chamber	Gamma	60Co ( $\gamma$ )	Gamma exposure rate
Eberline SAC-4 Scaler Counter	ZnS scintillator	Alpha	230Th ( $\alpha$ )	Smear counting
Eberline BC-4 Scaler Counter	Shielded GM	Beta	99Tc ( $\beta$ )	Smear counting
Tennelec Planchette Counter or Equal	Shielded Gas-flow proportional	Alpha and Beta	99Tc ( $\beta$ ), 230Th ( $\alpha$ )	Smear counting
EG&G NOMAD Gamma Spectrometer or Equal	HPGe	Gamma energy and intensity	Mixed gamma	Nuclide identification and quantification of soil and sand samples

## 6.0 REFERENCES

Code of Federal Regulations, 10 CFR 61, Licensing Requirements for Land Disposal of Radioactive Waste.

*Means Building Construction Cost Data*, 64th Annual Edition, 2006, R.S. Means Company, Inc.

*Site Work & Landscape Cost Data*, 34th Annual Edition, 2015, R.S. Means Company, Inc.

Code of Federal Regulations, 10 CFR 20.1402, Radiological Criteria for Unrestricted Use.

NUREG-1575, Rev. 1, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), (August 2000).

NRC Policy and Guidance Directive FC 83-23, Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Byproduct, Source, or Special Nuclear Material Licenses.

NUREG-1757, Vol. 1, Rev. 1, Consolidated Decommissioning Guidance Decommissioning Process for Materials Licensees, Table B.1, Acceptable License Termination Screening Values of Common Radionuclides for Building-Surface Contamination.

NUREG-1757, Vol. 2, Rev. 1, Consolidated Decommissioning Guidance Characterization, Survey, and Determination of Radiological Criteria, September 2006.

NUREG/CR-5512, Volume 2, Residual Radioactive Contamination From Decommissioning: User's Manual DandD Version 2.1," Decontamination and Decommissioning (DandD).

Federal Register / Vol. 46, No. 205 / Pages 52061-3 / October 23, 1981 Nuclear Regulatory Commission, "Disposal or Onsite Storage of Thorium or Uranium Wastes From Past Operations".

NUREG-1757, Vol. 1, Rev. 1, Consolidated NMSS Decommissioning Guidance Decommissioning Process for Materials Licensees, Table B.2, Screening Values (pCi/g) of Common Radionuclides for Soil Surface Contamination Levels.

NUREG-1307, *Report on Waste Burial Charges*, Revision 15, January 2013.

NUREG-1757, Vol. 3, Rev. 1, Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness, PART II: Financial Assurance.

Code of Federal Regulations, 10 CFR 30, Rules of General Applicability to Domestic Licensing of Byproduct Material.

*Site Reclamation Cost Estimate for Plant Located in Metropolis, Illinois*, May 2006, Duratek Inc.

Decommissioning Cost Estimate, Revision 1, July 27, 2010, ENERCON Services, Inc.

Historical Site Assessment, April 2009, ENERCON Services, Inc.

Modified DCGLs for the Honeywell Metropolis Works (draft), April 29, 2010, ENERCON Services, Inc.

*Radiological Characterization Report for Site Soil, Revision 0*, January 11, 2010, ENERCON Services, Inc.

*Radiological Characterization Report of the UF<sub>6</sub> Pad for the Honeywell Metropolis Works (UF6PAD-RPT-001)*, Revision 0, October 31, 2011, ENERCON Services, Inc.

**ATTACHMENT NO. 1**



November 11, 2015

Lidia Litinski  
Environmental Engineer  
Honeywell Metropolis Works Facility  
2768 US Hwy 45N  
Metropolis, IL 62960

Delivered via e-mail: [Lidia.Litinski@Honeywell.com](mailto:Lidia.Litinski@Honeywell.com)

**Subject: Decommissioning Cost Estimate**

Dear Ms. Litinski,

EnergySolutions is pleased to provide this proposal, and given Honeywell's need for disclosure of pricing for off-site Bulk Survey for Release (BSFR) disposition option; we have reconsidered our confidentiality requirements and would like to make our offer available to you and to anyone requesting the information. For the services related to Honeywell's Decommissioning Cost Estimate in Metropolis, Illinois. Said services include waste disposition via BSFR Waste Material at EnergySolutions Bear Creek Processing facility (BCO) near Oak Ridge, Tennessee. The following below rates are applicable to the above mentioned services.

Category-Disposal	Pricing
BSFR via BCO	<i>\$0.30 per pound</i>
Does not meet BSFR Criteria	<b>\$2.50 per pound</b>

The following assumptions apply to the above pricing tables:

1. The waste meets the EnergySolutions Waste Acceptance Guidelines (WAG) for BSFR.
2. Assumes 30/lbs./ft3 density on all material.
3. Transportation is not included in the pricing above.
4. Pricing offered is for a period of ninety (90) calendar days from the date of this offer date.
5. BSFR pricing does not include the \$0.02 per pound tax levied by the State of Tennessee.

We would like to thank Honeywell for its consideration for this project. Should you have additional questions, please do not hesitate to contact myself or Scott Baskett.

Sincerely,

**Submitted via e-mail-RDK**

Bob Koss  
Director of Sales

Cc: Scott Baskett

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**APPENDIX A-1**

**Table A-1**  
**CONTAMINATED WASTE VOLUME SUMMARY**  
**Honeywell - Metropolis Works (MTW) Metropolis, Illinois**

CODE	Area Description	Generated EnergySolutions Waste Volume (ft <sup>3</sup> )	Decon EnergySolutions Waste Volume (ft <sup>3</sup> )	EnergySolutions Direct Bury Waste Volume (ft <sup>3</sup> )	Total Waste Volume (ft <sup>3</sup> )
1	Main Production Buildings	2,434	10,860	330,849	344,144
2	Miscellaneous Production Buildings	1,246	1,373	36,783	39,401
3	Drum Storage Pads and Ponds	4,184	0	26,800	30,984
4	Outdoor Areas, Drains, and Sewers	105	0	1,644	1,749
5	Administrative Areas	18	0	0	18
6	Calcium Fluoride Ponds	0	0	0	0
7	General Plant Area	0	0	1,250	1,250
	<b>TOTALS:</b>	<b>7,987</b>	<b>12,233</b>	<b>397,326</b>	<b>417,546</b>

**Notes:**

- (1) Decon Waste Volume: This is the volume of waste generated directly by a decontamination process (this includes such items as blasting grit, treated chemicals, etc.).
- (2) Generated Waste Volume: This is the volume of protective clothing waste generated by all operations on site and is a function of labor hours for each activity.
- (3) Due to rounding of values, the calculated values may not be exact.

**APPENDIX A-2**

Table A-2

**CONTAMINATED WASTE DISPOSAL COST**

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

CODE	Area Description	Generated EnergySolutions Disposal Cost	Decon EnergySolutions Disposal Cost	EnergySolutions Direct Bury Disposal Cost	Total Waste Disposal Cost
1	Main Production Buildings	\$494,052	\$2,204,049	\$67,143,432	\$69,841,533
2	Miscellaneous Production Buildings	\$252,778	\$278,612	\$7,464,815	\$7,996,206
3	Drum Storage Pads and Ponds	\$849,035	\$0	\$5,438,967	\$6,288,001
4	Outdoor Areas, Drains, and Sewers	\$21,276	\$0	\$333,684	\$354,961
5	Administrative Areas	\$3,665	\$0	\$0	\$3,665
6	Calcium Fluoride Ponds	\$0	\$0	\$0	\$0
7	General Plant Area	\$26,090	\$0	\$227,755	\$253,846
	<b>TOTALS:</b>	<b>\$1,646,896</b>	<b>\$2,482,662</b>	<b>\$80,608,653</b>	<b>\$84,738,211</b>

**WASTE DISPOSAL PACKAGING AND SHIPPING COST**

CODE	Area Description	Generated EnergySolutions Pack and Shipping Cost	Decon EnergySolutions Pack and Shipping Cost	EnergySolutions Direct Bury Pack and Shipping Cost	Total Waste Pack and Shipping Cost
1	Main Production Buildings	\$19,238	\$85,824	\$2,614,520	\$2,719,582
2	Miscellaneous Production Buildings	\$9,843	\$10,849	\$290,675	\$311,368
3	Drum Storage Pads and Ponds	\$33,060	\$0	\$211,789	\$244,850
4	Outdoor Areas, Drains, and Sewers	\$828	\$0	\$12,993	\$13,821
5	Administrative Areas	\$142	\$0	\$3,951	\$4,093
6	Calcium Fluoride Ponds	\$0	\$0	\$0	\$0
7	General Plant Area	\$534	\$0	\$9,319	\$9,853
	<b>TOTALS:</b>	<b>\$63,646</b>	<b>\$96,673</b>	<b>\$3,143,246</b>	<b>\$3,303,566</b>

Notes:

(1) Due to rounding of values, the calculated values may not be exact.

(2) The costs shown for the General Plant Area are for the 1,250 cubic feet of waste typically on site that requires disposal at EnergySolutions' disposal facility in Clive, Utah.



**APPENDIX A-3**

**Table A-3**  
**CONTAINER COST**  
**Honeywell - Metropolis Works (MTW) Metropolis, Illinois**

CODE	Area Description	Total Waste Volume (ft <sup>3</sup> )	Waste Containers <sup>(1)</sup> (each)	Waste Container Cost
1	Main Production Buildings	344,144	486	\$237,577
2	Miscellaneous Production Buildings	39,401	56	\$27,375
3	Drum Storage Pads and Ponds	30,984	44	\$21,509
4	Outdoor Areas, Drains & Sewers	1,749	3	\$1,467
5	Administrative Areas	18	1	\$489
6	Calcium Fluoride Ponds	0	0	\$0
7	General Plant Area	1,250	2	\$978
	<b>TOTALS</b>	<b>417,546</b>	<b>592</b>	<b>\$289,394</b>

Note:

(1) The number of waste containers is rounded up to the next full container.

**UNIT COST FACTORS FOR DISPOSAL**

Decon waste disposal rate for Barnwell:	\$3,325.55 per ft <sup>3</sup>
DAW waste disposal rate for Barnwell:	\$3,325.55 per ft <sup>3</sup>
DAW waste disposal rate for EnergySolutions :	\$182.20 per ft <sup>3</sup>
Estimated mileage rate to Barnwell:	\$4.30 per mile
Estimated transport distance to Barnwell:	1,192 miles
Estimated mileage rate to EnergySolutions :	\$4.30 per mile
Estimated transport distance to EnergySolutions :	1,985 miles
Average direct bury waste density:	56.4 pound per ft <sup>3</sup>
Average generated waste density (EnergySolutions waste):	25 pound per ft <sup>3</sup>
Truck transport waste weight limit:	44,000 pounds
20-ft shipping container internal volume:	709 ft <sup>3</sup>
Estimated cost for 20-ft shipping container use (4 months):	\$488.84 each
Local industrial waste landfill shipping & disposal rate:	\$47.40 per yd <sup>3</sup>
Labor rate for shipping:	\$108.18 per hour

**APPENDIX A-4**

**Table A-4**
**WASTE DISPOSAL SUPPORT LABOR ESTIMATE**

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

CODE	Area Description	Waste Containers (each)	Radioactive Waste Shipments <sup>(1)</sup> (each)	Waste Shipment Labor <sup>(2)</sup> (man-hour)
1	Main Production Buildings	485.2	486	7762.5
2	Miscellaneous Production Buildings	55.5	56	888.7
3	Drum Storage Pads and Ponds	43.7	44	698.9
4	Outdoor Areas, Drains & Sewers	2.5	3	39.5
5	Administrative Areas	0.2	1	11.7
6	Calcium Fluoride Ponds	0.0	0	0.0
7	General Plant Area	1.8	2	28.8
	<b>TOTALS</b>	<b>589</b>	<b>592</b>	<b>9,430</b>

## Notes:

(1) The number of waste shipments is rounded up to the next full shipment.

(2) Estimated waste loading operator time:

Estimated HP technician time per rad or mixed waste load:

Estimated HP shipper time per rad or mixed waste load:

(3) Due to rounding of values, the calculated values may not be exact.

4 hours per load

4 hours per load

8 hours per load

**APPENDIX A-5**

Table A-5

**CONTAMINATED WASTE DISPOSAL SUMMARY**

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

			CONTAINER COST		SHIP LABOR	SHIP LABOR COST
CODE	Total Waste Volume (ft <sup>3</sup> )	B-25 Waste Containers (each)	Waste Container Cost <sup>(1)</sup>	Radioactive Waste Shipments <sup>(2)</sup> (each)	Waste Shipment Labor (man-hour)	Waste Shipment Labor Cost
1	344,144	485.2	\$237,577	486	7762.5	\$839,762
2	39,401	55.5	\$27,375	56	888.7	\$96,141
3	30,984	43.7	\$21,509	44	698.9	\$75,608
4	1,749	2.5	\$1,467	3	39.5	\$4,273
5	18	0.2	\$489	1	11.7	\$1,266
6	0	0	\$0	0	0	\$0
7	1,250	1.8	\$978	2	32	\$3,462
<b>Total</b>	<b>417,546</b>	<b>587</b>	<b>\$288,416</b>	<b>590</b>	<b>9,401.3</b>	<b>\$1,020,512</b>

Notes:

(1) The number of waste containers is rounded up to the next full container.

(2) The number of waste shipments is rounded up to the next full shipment.

**APPENDIX A-6**

Table A-6

**CLASS 1 (IMPACTED) BUILDING AREA SURVEY**

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

**CLASS 1 (IMPACTED) BUILDING AREA SURVEY**

								Surface Area											
				Survey Package Reqrd ? (Y/N)	Area Width (feet)	Area Length (feet)	Area Height (feet)	Floor (m <sup>2</sup> )	Lower Walls (m <sup>2</sup> )	Upper Walls (m <sup>2</sup> )	Ceiling (m <sup>2</sup> )	Roof (m <sup>2</sup> )	Total (m <sup>2</sup> )	Survey Package (each)	Floor + L. Wall Survey Code	U. Wall + Ceiling Survey Code	Survey Sketches (each)	Survey Package Prep (hours)	Direct Survey Labor (hours)
Loc Code	Building Name	Room Number	Area Description																
5	Lab/Office	Exterior	Exterior	Y	28	77	15		128	165		200	493		1	5	3	8	23
5	Lab/Office	Exterior	Exterior	Y	42	56	15		119	154		219	492		1	5	3	8	23
		Exterior	Exterior																
		Exterior	Exterior																
		Exterior	Exterior																
		Exterior	Exterior																
		Exterior	Exterior																
		Exterior	Exterior																

**Class 1 Structure Survey Area Limit: 100 m<sup>2</sup>**

5	Lab/Office	1	Typical office	Y	14.0	16.5	12.0	21	37	31	21		111	1	1	5	1	8	19
5	Lab/Office	2	Typical office	N	14.0	16.5	12.0	21	37	31	21		111	1	1	5	1		11
5	Lab/Office	3	Typical office	N	14.0	16.5	12.0	21	37	31	21		111	1	1	5	1		11
5	Lab/Office	4	Typical office	N	14.0	16.5	12.0	21	37	31	21		111	1	1	5	1		11
5	Lab/Office	1	Typical lab	Y	16.5	28.0	12.0	43	54	45	43		185	1	1	5	1	8	19
5	Lab/Office	1	Typical lab	N	16.5	28.0	12.0	43	54	45	43		185	1	1	5	1		11
5	Lab/Office	1	Typical office	Y	9.5	19.25	12.0	17	35	29	17		98	5	1	5	1	40	51
<b>TOTALS</b>								<b>187</b>	<b>538</b>	<b>562</b>	<b>187</b>		<b>1,897</b>					<b>72</b>	<b>182</b>

\*Note:

Direct survey labor hours sums to 179 but due to rounding actual total is 182 (see Table A-6 in the 2006 Report prepared by Duratek).



Table A-6

**CLASS 2 (IMPACTED) BUILDING AREA SURVEY**

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

**CLASS 2 (IMPACTED) BUILDING AREA SURVEY**

Loc Code	Building Name	Room Number	Area Description	Survey Package Required ? (Y/N)	Area Width (feet)	Area Length (feet)	Area Height (feet)	Floor + L. Wall Survey Code	U. Wall + Ceiling Survey Code	Survey Sketches	Survey Package Prep (hours)	Direct Survey Labor (hours)
5	Administration	Exterior	Exterior	Y	44.5	150.0	25	1	5	3	8	23
5	Shop/Stores	Exterior	Exterior	Y	50.0	128.0	15	1	5	3	8	23
5	Engr Offices	Exterior	Exterior	Y	64.0	128.0	15	1	5	3	8	23
5	Power House	Exterior	Exterior	Y	35.0	84.0	25	1	5	3	8	23
2	CaF <sub>2</sub>	Exterior	Exterior	Y	50.0	64.0	25	1	5	3	8	23
2	SF <sub>6</sub> /SbF <sub>5</sub>	Exterior	Exterior	Y	54.0	78.0	15	1	5	3	8	23
2	Liquid Fluorine	Exterior	Exterior	Y	28.0	28.0	15	1	5	3	8	23
2	Liquid Nitrogen	Exterior	Exterior	Y	32.0	52.0	15	1	5	3	8	23
2	CF <sub>x</sub>	Exterior	Exterior	Y	32.0	35.0	15	1	5	3	8	23
2	N <sub>2</sub> Gas Facility	Exterior	Exterior	Y	29.0	47.0	15	1	5	3	8	23
2	GF <sub>2</sub>	Exterior	Exterior	Y	145.0	210.0	20	1	5	3	8	24
2	Hazardous Waste	Exterior	Exterior	Y	42.0	42.0	20	1	5	3	8	23

**Class 2 Structure Survey Area Limit: 1,000 m<sup>2</sup>**

5	Admin. Office	1	Typical 1st Floor Office	Y	11.0	16.5	8	1	5	1	8	19
5	Admin. Office	2	Typical 1st Floor Office	N	9.5	9.5	8	1	5	1		11
5	Admin. Office	3	Typical 1st Floor Office	N	10.0	13.0	8	1	5	1		11
5	Admin. Office	4	Typical 1st Floor Office	N	16.5	22.5	8	1	5	1		11
5	Admin. Office	5	Typical 1st Floor Office	N	9.0	10.5	8	1	5	1		11
5	Admin. Office	6	Typical 1st Floor Office	N	11.0	16.5	8	1	5	1		11
5	Admin. Office	7	Typical 1st Floor Office	N	11.0	22.5	8	1	5	1		11
5	Admin. Office	8	Typical 1st Floor Office	N	11.0	16.5	8	1	5	1		11
5	Admin. Office	9	Typical 1st Floor Office	N	11.0	22.5	8	1	5	1		11
5	Admin. Office	10	Typical 1st Floor Office	N	11.0	14.5	8	1	5	1		11

Table A-6

**CLASS 2 (IMPACTED) BUILDING AREA SURVEY**

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

**CLASS 2 (IMPACTED) BUILDING AREA SURVEY**

Loc Code	Building Name	Room Number	Area Description	Survey Package Required ? (Y/N)	Area Width (feet)	Area Length (feet)	Area Height (feet)	Floor + L. Wall Survey Code	U. Wall + Ceiling Survey Code	Survey Sketches	Survey Package Prep (hours)	Direct Survey Labor (hours)
5	Admin. Office	11	Typical 1st Floor Office	N	11.0	22.5	8	1	5	1		11
5	Admin. Office	12	Typical 1st Floor Office	N	1.5	8.0	8	1	5	1		11
5	Admin. Office	13	Typical 1st Floor Office	Y	11.0	22.5	8	1	5	1	8	19
5	Admin. Office	14	Typical 1st Floor Office	Y	11.0	14.5	8	1	5	1	8	19
5	Admin. Office	15	Typical 1st Floor Office	N	11.0	22.5	8	1	5	1		11
5	Admin. Office	1	Typical 2nd Floor Office	Y	11.0	16.5	8	1	5	1	8	19
5	Admin. Office	2	Typical 2nd Floor Office	N	11.0	22.5	8	1	5	1		11
5	Admin. Office	3	Typical 2nd Floor Office	N	11.0	16.5	8	1	5	1		11
5	Admin. Office	4	Typical 2nd Floor Office	N	11.0	22.5	8	1	5	1		11
5	Admin. Office	5	Typical 2nd Floor Office	N	11.0	16.5	8	1	5	1		11
5	Admin. Office	6	Typical 2nd Floor Office	N	11.0	22.5	8	1	5	1		11
5	Admin. Office	7	Typical 2nd Floor Office	Y	11.0	16.5	8	1	5	1	8	19
5	Admin. Office	8	Typical 2nd Floor Office	N	11.0	22.5	8	1	5	1		11
5	Admin. Office	9	Typical 2nd Floor Office	N	11.0	16.5	8	1	5	1		11
5	Admin. Office	10	Typical 2nd Floor Office	N	11.0	22.5	8	1	5	1		11
5	Admin. Office	11	Typical 2nd Floor Office	N	11.0	16.5	8	1	5	1		11
5	Admin. Office	12	Typical 2nd Floor Office	N	11.0	22.5	8	1	5	1		11
5	Admin. Office	13	Typical 2nd Floor Office	N	11.0	16.5	8	1	5	1		11
5	Admin. Office	14	Typical 2nd Floor Office	N	7.0	14.0	8	1	5	1		11
5	Admin. Office	15	Typical 2nd Floor Office	N	15.5	19.5	8	1	5	1		11
5	Shop/Stores	1	Large Space	N	5.0	7.0	8	1	5	1		11
5	Shop/Stores	1	Smaller Space	N	16.5	30.0	8	1	5	1		11
5	Shop/Stores	2	Smaller Space	Y	22.0	31.5	8	1	5	1	8	19

Table A-6

**CLASS 2 (IMPACTED) BUILDING AREA SURVEY**

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

**CLASS 2 (IMPACTED) BUILDING AREA SURVEY**

Loc Code	Building Name	Room Number	Area Description	Survey Package Required ? (Y/N)	Area Width (feet)	Area Length (feet)	Area Height (feet)	Floor + L. Wall Survey Code	U. Wall + Ceiling Survey Code	Survey Sketches	Survey Package Prep (hours)	Direct Survey Labor (hours)
5	Shop/Stores	3	Smaller Space	N	11.0	12.5	8	1	5	1		11
5	Shop/Stores	4	Smaller Space	N	11.0	16.5	8	1	5	1		11
5	Shop/Stores	5	Smaller Space	N	11.0	22.5	8	1	5	1		11
5	Shop/Stores	6	Smaller Space	N	11.0	16.5	8	1	5	1		11
5	Engr Offices	1	Lunch Area	N	11.0	22.5	8	1	5	1		11
5	Engr Offices	1	Engineering Area	N	11.0	16.5	8	1	5	1		11
5	Engr Offices	1	Drafting Area	N	11.0	22.5	8	1	5	1		11
5	Engr Offices	1	Drawing Room	N	11.0	14.5	8	1	5	1		11
5	Power House	1	Large Space	N	1.5	8.0	8	1	5	1		11
2	Power House	1	Small Space	N	11.0	22.5	8	1	5	1		11
2	Power House	2	Small Space	Y	11.0	14.5	8	1	5	1	8	19
2	Power House	1	Offices	N	11.0	22.5	8	1	5	1		11
2	Power House	2	Offices	N	11.0	16.5	8	1	5	1		11
2	Power House	3	Offices	N	11.0	22.5	8	1	5	1		11
2	Power House	4	Offices	N	11.0	16.5	8	1	5	1		11
2	CaF <sub>2</sub>	1	Offices	N	11.0	22.5	8	1	5	1		11
2	CaF <sub>2</sub>	2	Offices	N	11.0	16.5	8	1	5	1		11
2	CaF <sub>2</sub>	3	Offices	N	11.0	22.5	8	1	5	1		11
2	CaF <sub>2</sub>	4	Offices	N	11.0	16.5	8	1	5	1		11
2	CaF <sub>2</sub>	1	Large Bay	N	11.0	22.5	8	1	5	1		11
2	CaF <sub>2</sub>	2	Large Bay	N	11.0	16.5	8	1	5	1		11
2	CaF <sub>2</sub>	3	Large Bay	Y	11.0	22.5	8	1	5	1	8	19
2	SF <sub>6</sub> /SbF <sub>5</sub>	1	Offices	N	11.0	16.5	8	1	5	1		11

Table A-6

**CLASS 2 (IMPACTED) BUILDING AREA SURVEY**

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

**CLASS 2 (IMPACTED) BUILDING AREA SURVEY**

Loc Code	Building Name	Room Number	Area Description	Survey Package Required ? (Y/N)	Area Width (feet)	Area Length (feet)	Area Height (feet)	Floor + L. Wall Survey Code	U. Wall + Ceiling Survey Code	Survey Sketches	Survey Package Prep (hours)	Direct Survey Labor (hours)
2	SF <sub>6</sub> /SbF <sub>5</sub>	2	Offices	N	11.0	22.5	8	1	5	1		11
2	SF <sub>6</sub> /SbF <sub>5</sub>	3	Offices	N	11.0	16.5	8	1	5	1		11
2	SF <sub>6</sub> /SbF <sub>5</sub>	4	Offices	N	7.0	160.0	8	1	5	1		11
2	SF <sub>6</sub> /SbF <sub>5</sub>	1	Large Bay	N	7.0	50.0	8	1	5	1		11
2	SF <sub>6</sub> /SbF <sub>5</sub>	2	Large Bay	Y	7.0	160.0	8	1	5	1	8	19
2	SF <sub>6</sub> /SbF <sub>5</sub>	3	Large Bay	N	4.5	146.0	8	1	5	1		11
2	Liquid Fluorine	1	Interior	Y	102.0	159.0	4	1	5	1	8	19
2	Liquid Nitrogen	1	Interior	N	21.5	36.0	8	1	5	1		11
2	CF <sub>x</sub>	1	Offices	N	5.5	6.0	8	1	5	1		11
2	CF <sub>x</sub>	2	Offices	N	7.0	7.5	8	1	5	1		11
2	CF <sub>x</sub>	1	Large Bay	N	5.5	14.0	8	1	5	1		11
2	N <sub>2</sub> Gas Facility	1	Interior	N	11.0	16.5	8	1	5	1		11
2	GF <sub>2</sub>	1	Offices	N	11.0	16.5	8	1	5	1		11
2	GF <sub>2</sub>	2	Offices	N	11.0	16.5	8	1	5	1		11
2	GF <sub>2</sub>	3	Offices	N	11.0	16.5	8	1	5	1		11
2	GF <sub>2</sub>	4	Offices	N	11.0	16.5	8	1	5	1		11
2	GF <sub>2</sub>	5	Offices	N	11.0	16.5	8	1	5	1		11
2	GF <sub>2</sub>	6	Offices	N	11.0	16.5	8	1	5	1		11
2	GF <sub>2</sub>	7	Offices	N	2.0	8.0	8	1	5	1		11
2	GF <sub>2</sub>	8	Offices	N	11.0	16.5	8	1	5	1		11
2	GF <sub>2</sub>	9	Offices	Y	11.0	16.5	8	1	5	1	8	19
2	GF <sub>2</sub>	10	Offices	N	11.0	16.5	8	1	5	1		11
2	GF <sub>2</sub>	11	Offices	N	11.0	16.5	8	1	5	1		11

Table A-6

**CLASS 2 (IMPACTED) BUILDING AREA SURVEY**

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

**CLASS 2 (IMPACTED) BUILDING AREA SURVEY**

Loc Code	Building Name	Room Number	Area Description	Survey Package Required ? (Y/N)	Area Width (feet)	Area Length (feet)	Area Height (feet)	Floor + L. Wall Survey Code	U. Wall + Ceiling Survey Code	Survey Sketches	Survey Package Prep (hours)	Direct Survey Labor (hours)
2	GF <sub>2</sub>	12	Offices	N	11.0	16.5	8	1	5	1		11
2	GF <sub>2</sub>	1	Large Bay	N	11.0	16.5	8	1	5	1		11
2	GF <sub>2</sub>	2	Large Bay	N	11.0	16.5	8	1	5	1		11
2	GF <sub>2</sub>	3	Large Bay	N	19.5	33.5	8	1	5	1		11
2	Hazardous Waste	1	Large Bay	N	7.0	36.0	8	1	5	1		11
TOTALS											184	1,330

\*Note:

Direct survey labor hours sums to 1,289 but due to rounding actual total is 1,330 (see Table A-6 in the 2006 Report prepared by Duratek).

**APPENDIX A-7**

Table A-7

**NON-IMPACTED OPEN LAND UNPAVED AREA SURVEY**

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

**NON-IMPACTED OPEN LAND UNPAVED AREA SURVEY**

<b>CODE</b>	<b>Surface Types</b>	<b>Area Description</b>	<b>Survey Package Required ? (Y/N)</b>	<b>Area Width (feet)</b>	<b>Area Length (feet)</b>	<b>Random Survey Sketches (each)</b>	<b>Survey Package Prep (hours)</b>	<b>10% Survey Labor (hours)</b>
4	Grass & soil	100 meter wide corridor outside fenced area	Y	328	4800	4	4	5.9
4	Grass & soil	50 meter wide corridor each side of remediated drainage ditch	Y	100	1600	4	4	5.5
<b>TOTALS</b>						<b>8</b>	<b>8</b>	<b>11.4</b>

**Honeywell - Metropolis Works (MTW) Metropolis, Illinois**

Loc Code	Surface Types	Area Description	Survey Package Required ? (Y/N)	Area Width Below (feet)	Area Length Below (feet)	Random Survey Sketches (each)	Survey Package Prep (hours)	10% Survey Labor (hours)
4	Asphalt	Employee parking	Y	235	240	1	4	4.3
4	Asphalt	Main entrance road	Y	30	350	1	4	4.3
4	Asphalt	Trucking entrance road	Y	30	350	1	4	4.3
					TOTALS	3	12	13



Table A-7

**IMPACTED UNPAVED OPEN LAND AREA SURVEY**

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

**IMPACTED UNPAVED OPEN LAND AREA SURVEY**

Loc Code	Surface Types	Area Description	Survey Package Required ? (Y/N)	Area Width (feet)	Area Length (feet)	Subsurface Activity Depth (feet)	Random Survey Sketches (each)	Direct Survey Labor (hours)
4	Soil	Corridor between two fences	Y	35	4850	1	2	270
3	Soil	Remediated CaF <sub>2</sub> Pond area	Y	450	600	1	2	382
3	Soil	Remediated Settling Pond area	Y	70	100	2	2	26
4	Soil	Remediated drainage ditch area	Y	6	1600	2	8	44
1	Soil	Remediated FM Building area	Y	110	150	2	2	52
4	Soil and Grass	Remainder of the fenced site	Y	900	525	1	8	664
							<b>TOTALS</b>	<b>1,438</b>

**Table A-7**

## IMPACTED PAVED OUTDOOR AREA SURVEY

**Honeywell - Metropolis Works (MTW) Metropolis, Illinois**

## IMPACTED PAVED OUTDOOR AREA SURVEY

Loc Code	Surface Types	Area Description	Survey Package Reqr'd ? (Y/N)	Area Width (feet)	Area Length (feet)	Random Survey Sketches (each)	Survey Package Prep (hours)	Direct Survey Labor (hours)
4	Asphalt	Paved roads inside fenced area	Y	24	3500	1	4	29
4	Asphalt	Paved lot by stores	Y	55	115	1	4	7
TOTALS							8	36

Table A-7

**DRAIN & SEWER SURVEY**

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

**CATCH BASIN AND CLEAN-OUT SURVEY**

Basin Survey Duration (hrs): 4 Basin Survey Crew Size (men): 2			D.I. Survey Duration (hrs): 2 D.I. Survey Crew Size (men): 1		
Loc Code	Area Description	Basin Diameter (feet)	Survey Package Required? (Y/N)	Survey Package Prep (hours)	Survey Labor (hours)
4	Drain #1 Grate on 10" Concrete Storm Drain	5.0	Y	4	12.0
4	Drain #2 Grate on 10" Concrete Storm Drain	5.0	N		8.0
4	Drain #3 Grate on 10" Concrete Storm Drain	5.0	N		8.0
4	Drain #4 Grate on 10" Concrete Storm Drain	5.0	N		8.0
4	Drain #5 Grate on 10" Concrete Storm Drain	5.0	N		8.0
4	Drain #6 Grate on 10" Concrete Storm Drain	5.0	N		8.0
4	Drain #7 Grate on 10" Concrete Storm Drain	5.0	N		8.0
4	Drain #8 Grate on 10" Concrete Storm Drain	5.0	N		8.0
4	Sanitary Sewer Manhole #1 on 4" line	5.0	N		8.0
4	Sanitary Sewer Manhole #1 on 4" line	5.0	N		8.0
4	Sanitary Sewer Manhole #1 on 4" line	5.0	N		8.0
4	Sanitary Sewer Manhole #1 on 4" line	5.0	N		8.0
4	Sanitary Sewer Manhole #1 on 4" line	5.0	N		8.0
4	Sanitary Sewer Manhole #1 on 4" line	5.0	N		8.0
4	Sanitary Sewer Manhole #1 on 4" line	5.0	N		8.0
4	Sanitary Sewer Manhole #1 on 4" line	5.0	N		8.0
			TOTALS	4	132.0

Table A-7

**DRAIN & SEWER SURVEY**

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

**DRAIN PIPE SURVEY**

Pipe Survey Rate (feet/hour): 40 Pipe Survey Crew Size (men): 3						
Loc Code	Area Description	Pipe Diameter (inch)	Pipe Length (feet)	Survey Package Required? (Y/N)	Survey Package Prep (hours)	Survey Labor (hours)
4	10" Storm Drain #1	10	300	Y	4	26.5
4	10" Storm Drain #2	10	300	N		22.5
4	10" Storm Drain #3	10	300	N		22.5
4	10" Storm Drain #4	10	300	Y	4	26.5
4	10" Storm Drain #5	10	300	N		22.5
4	10" Storm Drain #6	10	300	N		22.5
4	4" Cast Iron Drain #1	4	300	Y	4	26.5
4	4" Cast Iron Drain #1	4	300	N		22.5
4	4" Cast Iron Drain #1	4	300	N		22.5
4	4" Cast Iron Drain #1	4	300	Y	4	26.5
4	4" Cast Iron Drain #1	4	300	N		22.5
4	4" Cast Iron Drain #1	4	300	N		22.5
TOTALS					16	286

**APPENDIX A-8**

**Table A-8**  
**INSTRUMENT COSTS**  
**Honeywell - Metropolis Works (MTW) Metropolis, Illinois**

48 D&D Duration (months)  
5.0 Final Survey Duration (months)  
0.5 Characterization Survey Duration (months)

INSTRUMENT COSTS										
Item No.	Instrument Description	Monthly Commercial Rental Rate	Char Survey Number Instruments Required	D&D Number Instruments Required	Final Survey Number Instruments Required	D&D Full Project Duration	D&D Alternate Monthly Duration	Char Survey Instrument Lease Cost	D&D Instrument Lease Cost	Final Survey Instrument Lease Cost
	<b>INSTRUMENTATION</b>									
1	Becton Dickinson Tritium Air Monitor, Model Triton I	\$1,000								
2	Bicron Micro R Meter, Model MicroRerr	\$250								
3	Dosimeter Corp. of America 3090-3 with 50 ft cable and detecto	\$165								
4	Dosimeter Corporation of America 3090-3	\$125								
5	Dosimeter Corporation of America Self Reading Dosimeter, Mode 862/866	\$25								
6	Eberline Beta/Gamma Survey Meter, Model E-130C	\$100								
7	Eberline Beta/Gamma Survey Meter, Model E-14C	\$100								
8	Eberline Beta/Gamma Survey Meter, Model E-52C	\$110								
9	Eberline Neutron Survey Meter, Model PNR-4	\$450								
10	Eberline Radiation Monitors, Model RM-1A	\$75								
11	Eberline Radiation Monitors, Model RM-1C	\$100								
12	Eberline Radiation Monitors, Model RM-2C	\$130								
13	Eberline Ion Chambers, Model RO-2	\$100								
14	Eberline Ion Chambers, Model RO-2A	\$100								
15	Eberline Ion Chambers, Model RO-2C	\$140								
16	Eberline Low to High Ion Chamber Survey Instrument, Model RO-7 (includes detectors and cable)	\$785								
17	Eberline Teletector, Model 6112E	\$605								
18	F&J Personal Air Sampler (Breathing Zone), Model Buck S1	\$50								
19	F&J High Volume Air Sampler, Model HV-1	\$90		2		Y			\$8,640	
20	F&J Low Volume Air Sampler, LV-1	\$90		6		Y			\$25,920	
21	F&J Low Volume Gooseneck Air Sampler, LV-1A	\$145								
22	Gillian Personal Air Samplers (Breathing Zone), Model GilAir/GilAir-	\$80								
23	Ludlum Survey Meter, Model 3	\$50								
24	Ludlum Geiger Counter, Model 5	\$70								
25	Ludlum Geiger Counter, Model 6	\$50								
26	Ludlum Ion Chamber, Model 5	\$140								
27	Ludlum Survey Meter, Model 12	\$75		10		Y			\$36,000	
28	Ludlum Survey Meter Model 12 with Scaler Option	\$115								
29	Ludlum MicroR Meter, Model 15	\$120		2	2	Y			\$11,520	\$1,200
30	Ludlum Stretch Scope, Model 77-3	\$385								
31	Ludlum Stretch Scope, Model 78	\$385								
32	Ludlum Alarm Rateometer, Model 177	\$85								
33	Ludlum Area Monitor, Model 30C	\$195								
34	Ludlum Area Monitor, Model 37A	\$85								
35	Ludlum Area Monitor, Model 39A	\$80								
36	Ludlum Scaler/Rateometer, Model 2221	\$200								
37	Ludlum 2224 Alpha Beta Scaler Rateometer	\$135								
38	Ludlum Data Logger, Model 2350-1	\$200		12	7	Y			\$115,200	\$7,000
39	Ludlum Model 2360 Alpha Beta Data Logger	\$155								

**Table A-8**  
**INSTRUMENT COSTS**  
**Honeywell - Metropolis Works (MTW) Metropolis, Illinois**

48 D&D Duration (months)  
5.0 Final Survey Duration (months)  
0.5 Characterization Survey Duration (months)

INSTRUMENT COSTS										
Item No.	Instrument Description	Monthly Commercial Rental Rate	Char Survey Number Instruments Required	D&D Number Instruments Required	Final Survey Number Instruments Required	D&D Full Project Duration	D&D Alternate Monthly Duration	Char Survey Instrument Lease Cost	D&D Instrument Lease Cost	Final Survey Instrument Lease Cost
40	NE Technology Contamination Monitor (Simult. Alpha/Beta), Model CM7A	\$450								
41	Overhoff Tritium Monitor, Model 400SBE	\$600								
42	Reuter Stokes Pressurized Ion Chamber, Model RSS-112	\$1,450								
43	TSI Portacount Plus Respirator Fit Tester and Accessories, Model 8021	\$800								
44	Victoreen 450P Pressurized Ion Chambers	\$165								
45	Xetex Telescoping Doserate Meter with Accessories, Model 330A	\$395								
	<b>RADIATION DETECTORS FOR PORTABLE INSTRUMENTATION</b>									
46	Bicron G-5 Be Ruggedized Fiddler Detector	\$650								
47	Eberline Aluminum Shielded Pancake Detector, Model HP-210A1	\$50								
48	Eberline Tungsten Shielded Pancake Detector, Model HP-2107	\$100								
49	Eberline GM Pancake Detector, Model HP-261	\$30								
50	Eberline Spare Detector (Purging), for Model TCM-7	\$130								
51	Eberline GM Detector, Model HP-27C	\$35								
52	Eberline RO-7-LD Low Range Detector 2R/hr (RO-7 not included)	\$180								
53	Eberline RO-7-BM Mid Range Detector 200R/hr (RO-7 not included)	\$180								
54	Eberline RO-7 BH High Range Detector 20KR/hr (RO-7 not included)	\$180								
55	Ludlum 50cm <sup>2</sup> Alpha Scintillator, Model 43-4	\$50		12	7	Y			\$28,800	\$1,750
56	Ludlum 550cm <sup>2</sup> Gas Proportional Detector, Model 43-37	\$65			4					\$1,300
57	Ludlum 43-89 100 cm <sup>2</sup> Alpha Beta Scintillator	\$105								
58	Ludlum 125cm <sup>2</sup> Gas Proportional Detector, Model 43-6f	\$50		12	7	Y			\$28,800	\$1,750
59	Ludlum 125cm <sup>2</sup> Gas Proportional Detector, Model 43-10f	\$55								
60	Ludlum Beta Scintillator, Model 44-1	\$55		9	7	Y			\$23,760	\$1,925
61	Ludlum Gamma Scintillator Detector, Model 44-7	\$55		9	7	Y			\$23,760	\$1,925
62	Ludlum Pancake GM Detector, Model 44-5	\$35		10		Y			\$16,800	
63	Ludlum Gamma Scintillator Detector, Model 44-1f	\$100								
64	Ludlum Windowless Tritium Detector Model 44-11f	\$205								
65	Ludlum Gama Scintillator Detector, Model 44-1f	\$100								
66	Ludlum Energy Compensated GM Detector, Model 44-3f	\$20		9	7	Y			\$8,640	\$700
67	Ludlum Shielded Pancake GM Detector, Model 44-4f	\$40		6		Y			\$11,520	
	<b>SUPPORT EQUIPMENT FOR RADIATION PROTECTION INSTRUMENTATION</b>									
68	Ludlum Floor Monitor Cart, Model 239-1f	\$105			4					\$2,100
69	Modified Harper Cart	\$40		12	3					\$600
70	Concoa Gas Regulator, Model 212 for use with the large (L-P10) and medium (Q-P10) 80 cu ft capacity P-10 bottle	\$25								
71	Concoa Gas Regulator, Model 3251301-180 for use with the small (6R-P10) 35 cu ft capacity gas bottle	\$25		12	7					\$875
72	Chargers for Self Reading Dosimeters (battery or electric)	\$15								
	<b>SEMI-PORTABLE RADIATION PROTECTION INSTRUMENTATION</b>									
73	Eberline Personnel Contamination Monitor, Model PCM-1f	\$3,400								
74	Eberline Portal Monitor with Scintillation Detectors, Model PM-	\$3,000								
75	Eberline Tool Contamination Monitor, Model TCM-	\$2,000								
76	Hvdro Nuclear (HNS) Automated Laundry Frisker, Model ALF-	\$1,700								
77	Ludlum Beta Air Monitor, Model 333-2 with pump	\$650								
78	Eberline Continuous Alpha Air Particulate Monitor, Model Alpha-6A-1 w/integral radial entry sampling head and regulated air pump	\$718								
79	Eberline Continuous Beta Air Particulate Monitor, Model AMS-7 w/integral radial entry sampling head and RAP-1 (Regulated Air Pump 115v/60 hz)	\$1,021								

**Table A-8**  
**INSTRUMENT COSTS**  
**Honeywell - Metropolis Works (MTW) Metropolis, Illinois**

48 D&D Duration (months)  
5.0 Final Survey Duration (months)  
0.5 Characterization Survey Duration (months)

INSTRUMENT COSTS										
Item No.	Instrument Description	Monthly Commercial Rental Rate	Char Survey Number Instruments Required	D&D Number Instruments Required	Final Survey Number Instruments Required	D&D Full Project Duration	D&D Alternate Monthly Duration	Char Survey Instrument Lease Cost	D&D Instrument Lease Cost	Final Survey Instrument Lease Cost
	<b>LABORATORY &amp; ANALYTICAL COUNTING INSTRUMENTATION</b>									
80	Canberra Laboratory Based HGPc Gamma Spectroscopy System with Detector, PC, Software, Shield and Accessories, Model Genie PC	\$6,136								
81	Eberline Beta Sample counter, Model BC-4	\$325								
82	Eberline Alpha Scintillation Counter, Model SAC-	\$400								
83	Ludlum Scaler with Single Channel Analyzer, Model 2000/220	\$190								
84	Ludlum Scaler with M 43-10-1 Sample Counter, Model 2925	\$325								
85	Canberra PC Based Automatic Low Background Alpha/Beta Counter, Model Tennelec SXLB	\$3,950								
86	Packard PC Base Liquid Scintillation Counter with Alpha/Beta Option and Accessories, Model A-2550P2	\$4,489								
87	Protean Model IPC9025 Automatic Planchet Counter	\$3,200								
88	Denver Instruments Balance 3 kgm +/-0.1 gm, Model XE3000	\$70		2	2	Y			\$6,720	\$700
89	Mettler Balance -400 gm +/- 0.01 gm, Model S-400G	\$81								
90	Mettler 40 gm +/-0.01 gm, Model BB244	\$115								
91	Mettler 12 kgm +/-0.01 gm, Model PJ1220	\$148								
92	Troemner Weight Set 0-2000 gram, Model 2000	\$23		1	1	Y			\$1,104	\$115
	<b>PORTABLE GAMMA SPECTROSCOPY EQUIPMENT</b>									
	Bubble Technologies Portable Gamma Spectroscopy System:									
93	With Detector, PC, Software, Case and Accessories, Model Microspec 2	\$1,050								
	Canberra Portable Gamma Spectroscopy System:									
94	Model Inspector	\$4,750								
	EG&G Portable Gamma Spectroscopy System:									
95	Electronics package with GPGc Detector, PC, Software, Lab Dewar, Vertical Cryostat and Nuclear Lead, movable lead shield with table and liner, Model Nomad	\$3,450								
96	Exploranium Model GR-135 CZT gamma spec; NaI gamma spec; peak search; nuclide identification; neutron detection; and auto ranging dose rates from uR/hr to 10 R/hr (all options included)	\$1,600								
	Canberra Inspector Portable Gamma Spectroscopy System:									
97	Electronics package, w/HPGe detector in portable dewar, computer, software, nuclear lead-moveable shield/table and line	\$5,000		1	1	Y			\$240,000	\$25,000
	Stationary Gamma Spectroscopy System:									
98	Canberra Inspector MCA/GENIE 2000 Software, Inspector Acquisition Electronics Package with Unit 1 and f USEC shaping, Procount 2000 Counting procedures, HPGe Detector w/3.25" End-cap, Model 7500SL Cryostat (30 liter dewar), Genie-PC Interactive Peak Fit Software, Computer, Printer, Model 747 Top Opening 16" deep	\$7,475								
99	Portable ISOCS Gamma Spectroscopy System: Canberra In-Situ Object Counting System (ISOCS) w/Canberra Inspector Portable MCA/GENIE 2000 Software, Inspector Acquisition Electronics Package w/Unit 1 & 4 USEC Shaping, Procount 2000 counting Procedures, HPGe Detector w/3.25" End-cap, Model 7500SL Cryostat (30 liter dewar), Portable Detector Frame w/complete 2.5 and 5 cm Shields, Stationary Model 747 Top Opening 16" Deep Lead Shield, Genie-PC Interactive Peak Fit software, computer and printer	\$10,272								
100	Liquid Scintillation Counter: Packard LSC Model M11302 Tricarb Alpha/Beta Option, w/Ruggedization option (shock mounting)	\$5,712								
101	Mobile Analytical Laboratory Trailer: Two each Canberra Inspector with HPGe, 16 in deep lead shield, Packard Liquid Scintillation counter and Automatic Planchet Counter	\$21,143								



**Table A-8**  
**INSTRUMENT COSTS**  
**Honeywell - Metropolis Works (MTW) Metropolis, Illinois**

48 D&D Duration (months)  
5.0 Final Survey Duration (months)  
0.5 Characterization Survey Duration (months)

INSTRUMENT COSTS										
Item No.	Instrument Description	Monthly Commercial Rental Rate	Char Survey Number Instruments Required	D&D Number Instruments Required	Final Survey Number Instruments Required	D&D Full Project Duration	D&D Alternate Monthly Duration	Char Survey Instrument Lease Cost	D&D Instrument Lease Cost	Final Survey Instrument Lease Cost
	<b>IN-SITU PIPE MONITORING EQUIPMENT AND DETECTORS</b>									
102	Duratek GM Snake Probe, Model SN-050-8K	\$162								
103	Duratek GM Motorized 1.13" Spider Probe Extends/Retracts Detector and Allows All Detector Signals to be read as group or Indiv., Model SP-113-3M	\$175								
104	Duratek GM Motorized 1.13" Spider Probe Extends/Retracts Detector for Scanning and Direct Measurements of Piping internals 3 to 24 inch Diameter Pipes, Model SP-113-3T	\$175								
105	Duratek GM Motorized 1.13" Spider Probe Extends/Retracts Detector and Allows All Detector Signals to be read as Group or Indiv., Model SP-175-3M	\$175								
106	Ludlum 0.5 inch Gas Proportional Detector to Survey Straight Piping of 0.75 to 1 inch Diameters, Model 43-94	\$150								
107	Ludlum 1.5 inch Gas Proportional Detector to Survey Straight Piping of 2 to 3 inch Diameters, Model 43-94	\$125								
108	Ludlum 1 inch Gas Proportional Detector to Survey Straight Piping of 1.25 to 2 inch Diameters, Model 43-111	\$125								
109	AEES Model PSL-3 Gas Proportional Detector	\$290								
110	AEES Model PSL-4 Gas Proportional Detector	\$320								
	<b>SEALED SOURCES AND COUNTING STANDARDS</b>									
111	Tc-99 47 mm, Beta Source	\$100		12	7	Y				
112	Th-230 47 mm Alpha Source	\$100		2	2	Y				
113	Cs-137 Gamma Button Source	\$35								
114	Cs-137 10cm x 10cm Beta Source	\$115								
115	Mixed Gamma, 250 ml Sand Marinelli, 133N	\$200		1	1	Y				
116	Mixed Gamma, 1L Sand Marinelli, 133N	\$200								
117	Mixed Gamma, 1L Water Marinelli, 133N	\$200		1	1	Y				
118	Mixed Gamma, 45mm Petri Dish	\$200								
119	Mixed Gamma, 47 mm Filter Paper	\$200								
120	Mixed gamma, Point Geometry	\$200								
121	Th-230, 150 mm x 67 mm Anodized Alpha Source	\$150								
122	Tc-99 150 mm x 67 mm Anodized Beta Source	\$150								
123	Cs-137 100 mm x 100 mm Anodized Cesium Source	\$175								
2006 TOTAL INSTRUMENT LEASE COST									\$587,184	\$46,940
2015 TOTAL INSTRUMENT LEASE COST									\$869,816	\$69,534

**APPENDIX A-9**

Table A-9

**EQUIPMENT COSTS**
**Honeywell - Metropolis Works (MTW) Metropolis, Illinois**

48 D&amp;D Duration (months)

5.0 Final Survey Duration (months)

Item No.	Equipment Description	Monthly Commercial Rental Rate	D&D Number Items Required	Final Survey Number Items Required	D&D Full Project Duration	D&D Alternate Monthly Duration	D&D Equipment Lease Cost	Final Survey Equipment Lease Cost
	<b>DECON EQUIPMENT</b>							
1	Arizona Instruments Mercury Vapor Analyzer, Model Jerome 411	\$140						
2	Fisher Scientific Turbidity Meter, Model DRT-100B	\$135						
3	Metrosonics Heat Stress Monitor, Model 3600	\$140						
4	Rae Systems Photo Ionization Detector, Mini Rae	\$500	1	1	Y		\$24,000	\$2,500
5	Rae Systems Photo Ionization Detector, Multi Rae	\$600						
6	TSI Portacount Plus Respirator Fit Tester and Accessories, Model 8020	\$800						
	<b>SEMI PORTABLE DECONTAMINATION EQUIPMENT</b>							
7	ABB Raymond Grit Blast Unit	\$5,000						
8	Hako Twin Head HEPA Vacuum, Model C83985	\$150						
9	HEPA AIRE 110 Vac Ventilation Unit, Model H1990C	\$135						
10	HEPA AIRE 110 Vac Ventilation Unit, Model H2000	\$120						
11	LTC Grit Blast Unit, Model 1060	\$3,500						
12	LTC Grit Blast System, Model 1072	\$4,500						
13	Mac Donald Single Piston Hand Scabbler, Model H-5	\$90						
14	MacDonald Five Piston Floor Scabbler, Model U-5	\$825						
15	MacDonald Three Piston Wall Scabbler, Model 3 WCD	\$280						
16	Nor Clean Triple Head HEPA Vacuum, Model BB-105-3	\$530	3		Y		\$76,320	
17	Pentek 9A Vacuum System Base Unit, Model Vac Pac	\$3,780	3		Y		\$544,320	
18	Pentek Needle Gun Corner Cutters	\$315						
19	Bico Jaw Crusher, Model 241-36x35	\$475						
20	Ellis Band Saw, Model 3000	\$425						
	<b>OFFICE EQUIPMENT</b>							
21	Download Notebook Computers:	\$189	4	4	Y		\$36,288	\$3,780
22	Laser Jet Printer:	\$104	2	2	Y		\$9,984	\$1,040
	<b>SAMPLING EQUIPMENT</b>							
23	Bico Jaw Crusher, Model 241-36x35	\$497						
24	FISHER SCIENTIFIC - Oven, ISOTEMP 5.0 120VAC CAT.#13247750G:	\$124	2	2	Y		\$11,866	\$1,236
25	FORESTRY SUPPLIERS - Soil Sampling Auger Kit, CAT.#67352:	\$361						

**Table A-9**  
**EQUIPMENT COSTS**  
**Honeywell - Metropolis Works (MTW) Metropolis, Illinois**

48 D&D Duration (months)

5.0 Final Survey Duration (months)

Item No.	Equipment Description	Monthly Commercial Rental Rate	D&D Number Items Required	Final Survey Number Items Required	D&D Full Project Duration	D&D Alternate Monthly Duration	D&D Equipment Lease Cost	Final Survey Equipment Lease Cost
	<b>TOOLS</b>							
26	Set of Lifting Slings	\$70						
27	8' Fiberglass Step Ladder	\$56						
28	1" x 150' Air Hose	\$35						
29	Cutting Torch	\$137	1		Y		\$6,576	
30	Band Saw	\$72	2		Y		\$6,912	
31	Lighting standard, 2 500 W halogen quartz	\$46	1		Y		\$2,208	
	<b>HEAVY EQUIPMENT RENTAL</b>							
32	Truck Mounted Hydraulic Crane, 25 Ton	\$7,459	2		N	1	\$14,918	
33	40' Telescoping Boom Work Platform	\$3,375	2	1	N	2	\$13,500	\$16,875
34	Oxyacetylene Cutting Outfits, incl gas & tips	\$960	1		Y		\$46,073	
35	1-1/4 C.Y. Backhoe Loader	\$3,375	1		N	1	\$3,375	
36	Backhoe Attachment, 1,200 ft-lb Hydraulic Hammer	\$1,620	1		N	2	\$3,240	
37	Crew Carrier	\$1,188	1		Y		\$57,024	
	<b>SAFETY EQUIPMENT</b>							
38	Respirators	\$56						
39	Tripod Lifeline Rescue System	\$240	1	1	Y		\$11,520	\$1,200
40	Portable Axial Electric Blower with 25' ducting	\$208	1		Y		\$9,984	
41	Confined Space Safety Harness	\$31	1	1	Y		\$1,488	\$155
<b>2006 TOTAL EQUIPMENT LEASE COST</b>							\$879,596	\$26,786
<b>2015 TOTAL EQUIPMENT LEASE COST</b>							\$1,302,977	\$39,679

**APPENDIX A-10**

Table A-10  
DEMOLITION ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

**TASK-BASED DEMOLITION COSTS**

42% Hazardous &amp; Toxic Waste Productivity Factor: Level C, Heavy Work, 70-85°F

Percent Labor Cost 65.00%

Average Hourly Labor Rate

\$42.74

LOC Code	WBS No.	AREA	Quantity	Unit	Material Unit Price	Labor Unit Price	Equipment Unit Price	Material Total Price	Labor Total Price	Equipment Total Price	Total Price
1		FM Building Demolition	370,440	CF	\$0.00	\$0.09	\$0.11		\$76,336	\$97,020	\$173,356
1		FM Building 6" Floor Slab Demolition	5,145	SF		\$3.84	\$0.49		\$47,003	\$6,003	\$53,006
1		FM Building 8" Concrete Wall Demolition	308	LF		\$9.90	\$1.26		\$7,261	\$924	\$8,185
1		FM Building 1' Soil Removal	191	CY		\$5.77	\$5.95		\$2,618	\$2,700	\$5,318
1		FM Building 50' Buffer 1' Soil Removal	656	CY		\$5.77	\$5.95		\$9,006	\$9,287	\$18,293
1		KOH Muds Building Demolition	59,850	CF		\$0.09	\$0.11		\$12,333	\$15,675	\$28,008
1		FM Building South Pad East 6" Floor Slab Demolition	3,888	SF		\$3.84	\$0.49		\$35,520	\$4,536	\$40,056
1		FM Building South Pad East 18"x24" Concrete Footings Demolition	252	LF		\$6.46	\$3.77		\$3,877	\$2,262	\$6,139
1		FM Building South Pad East 2'x3' Equip. Concrete Footings Demolition	252	LF		\$9.23	\$5.40		\$5,539	\$3,240	\$8,779
1		FM Building South Pad East 1' Soil Removal	144	CY		\$5.77	\$5.95		\$1,978	\$2,040	\$4,018
1		FM Building South Pad West 6" Floor Slab Demolition	3,564	SF		\$3.84	\$0.49		\$32,560	\$4,158	\$36,718
1		FM Building South Pad West 18"x24" Concrete Footings Demolition	240	LF		\$6.46	\$3.77		\$3,693	\$2,154	\$5,847
1		FM Building South Pad West 2'x3' Equip. Concrete Footings Demolition	240	LF		\$9.23	\$5.40		\$5,275	\$3,086	\$8,361
1		FM Building South Pad West 1' Soil Removal	132	CY		\$5.77	\$5.95		\$1,813	\$1,870	\$3,683
1		Sodium Removal Building Demolition	93,240	CF		\$0.09	\$0.11		\$19,214	\$24,420	\$43,634
1		U Recovery Building Demolition	114,000	CF		\$0.09	\$0.11		\$23,492	\$29,857	\$53,349
1		Sample Plant Building Demolition	71,016	CF		\$0.09	\$0.11		\$14,634	\$18,599	\$33,233
2		Calcliner Building Demolition	22,500	CF		\$0.09	\$0.11		\$4,637	\$5,893	\$10,530
3		Setting Ponds #3 and #4 Excavation, 3' deep	500	CY		\$2.31	\$1.39		\$2,748	\$1,655	\$4,403
3		Backfill Settling Pond Area with Clay (9')	1,500	CY	\$6.10	\$1.42	\$1.87	\$9,150	\$5,071	\$6,679	\$20,900
4		Excavate Drainage Ditch to River, 1600'x6'x3'	1,067	CY		\$3.09	\$1.51		\$7,840	\$3,835	\$11,675
4		Backfill Drainage Ditch with Clay (5')	1,778	CY	\$4.77	\$1.42	\$1.87	\$8,480	\$6,011	\$7,915	\$22,406
4		Excavate Buried Drain Pipe, 2,000'x3'x5'	1,111	CY		\$3.09	\$1.51		\$8,166	\$3,995	\$12,161
4		Remove Buried Drain Pipe, 12"	2,000	LF		\$3.95	\$1.29		\$18,821	\$6,143	\$24,964
4		Remove Imbedded Drain Pipe	250	LF	\$1.55	\$6.12	\$2.01	\$388	\$3,641	\$1,196	\$5,225
4		Excavate Buried Sewer Pipe, 1,000'x3'x5'	556	CY		\$3.09	\$1.51		\$4,083	\$1,997	\$6,080
4		Remove Buried Sewer Pipe	1,000	LF		\$3.95	\$1.29		\$9,410	\$3,071	\$12,481
4		Remove Imbedded Sewer Pipe	250	LF	\$1.55	\$6.12	\$2.01	\$388	\$3,641	\$1,196	\$5,225
4		Remove manholes/Catch Basins	8	EA		\$173.10	\$56.50		\$3,297	\$1,076	\$4,373
4		Backfill Pipe Excavations	1,667	CY	\$4.77	\$1.42	\$1.87	\$7,950	\$5,635	\$7,421	\$21,006
4		Excavate Contaminated Soil from Site, 2 acres x 1' deep	3,227	CY		\$3.09	\$1.51		\$23,715	\$11,601	\$35,316
4		Backfill Soil Excavations	3,227	CY	\$4.77	\$1.42	\$1.87	\$15,391	\$10,909	\$14,366	\$40,666
1		R-123 Refrigerant Analyzer	0.03	ton		\$512.89			\$42	\$0	\$42
1		R-123 Refrigerant Analyzer	0.04	ton		\$512.89			\$53	\$0	\$53
1		Concentrate Elevator	16	ton		\$512.89			\$19,361	\$0	\$19,361
1		Prepared Feed Elevator	19	ton		\$512.89			\$22,665	\$0	\$22,665
1		"A" UF4 Elevator	17	ton		\$512.89			\$20,451	\$0	\$20,451
1		Bed Recycle Elevator	10	ton		\$512.89			\$12,296	\$0	\$12,296
1		Milled Feed Elevator	10	ton		\$512.89			\$12,395	\$0	\$12,395
1		Passenger Elevator	2	ton		\$512.89			\$2,992	\$0	\$2,992
1		Freight Elevator	0.25	ton		\$512.89			\$302	\$0	\$302
1		UF4 Feed Screw - 3rd Floor	0.12	ton		\$512.89			\$142	\$0	\$142
1		Green Salt Feed Screw - 2nd Floor	0.12	ton		\$512.89			\$142	\$0	\$142

Table A-10  
DEMOLITION ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

**TASK-BASED DEMOLITION COSTS**

42% Hazardous &amp; Toxic Waste Productivity Factor: Level C, Heavy Work, 70-85°F

Percent Labor Cost 65.00%

Average Hourly Labor Rate

\$42.74

LOC Code	WBS No.	AREA	Quantity	Unit	Material Unit Price	Labor Unit Price	Equipment Unit Price	Material Total Price	Labor Total Price	Equipment Total Price	Total Price
1		Green Salt Dispenser - 2nd Floor	0.12	ton		\$512.89			\$142	\$0	\$142
1		Ore Blender Disc. Screw	0.16	ton		\$512.89			\$194	\$0	\$194
1		"B" UF4 Elevator	14	ton		\$512.89			\$17,140	\$0	\$17,140
1		Prepared Feed Drum Inverter Discharge Screw	0.45	ton		\$512.89			\$550	\$0	\$550
1		UF6 Cyl. Hdlg. Crane - Runway & Bridge	6	ton		\$512.89			\$7,065	\$0	\$7,065
1		Crane Trolley Car	6	ton		\$512.89			\$7,065	\$0	\$7,065
1		Lifting Beam for Shannahan Crane	1	ton		\$512.89			\$1,224	\$0	\$1,224
1		"A" HF Preheater	4	ton		\$512.89			\$4,407	\$0	\$4,407
1		"A" Bot. Hydrofluorinator Heater	2	ton		\$512.89			\$2,057	\$0	\$2,057
1		#4 Steam Chest	6	ton		\$512.89			\$7,093	\$0	\$7,093
1		#3 Steam Chest	6	ton		\$512.89			\$7,093	\$0	\$7,093
1		Tempered Water Tank Cooling Coil	4	ton		\$512.89			\$5,222	\$0	\$5,222
1		Sample Cold Trap	0.28	ton		\$512.89			\$343	\$0	\$343
1		UF6 lab. Samples Cyl. Emptying Manifold	0.17	ton		\$512.89			\$208	\$0	\$208
1		Sample Cold Trap	0.17	ton		\$512.89			\$208	\$0	\$208
1		Unit Heater	1	ton		\$512.89			\$853	\$0	\$853
1		Oil Cooler heat Exchanger	0.02	ton		\$512.89			\$24	\$0	\$24
1		Glycol heat Exchanger	0.02	ton		\$512.89			\$24	\$0	\$24
1		Over Feed Brine Cooler	7	ton		\$512.89			\$8,900	\$0	\$8,900
1		Economizer	7	ton		\$512.89			\$8,900	\$0	\$8,900
1		R-134a Condenser	3	ton		\$512.89			\$3,725	\$0	\$3,725
1		R-134a Liquid Suction in Heat Exchanger	1	ton		\$512.89			\$769	\$0	\$769
1		Condenser - R-123 (Top)	1	ton		\$512.89			\$769	\$0	\$769
1		Condenser - Cooler - R-123 & R-134a (Bottom)	1	ton		\$512.89			\$1,722	\$0	\$1,722
1		Condenser - R-134a Pump Down	3	ton		\$512.89			\$3,725	\$0	\$3,725
1		#2 Steam Chest	6	ton		\$512.89			\$7,093	\$0	\$7,093
1		#1 Steam Chest	6	ton		\$512.89			\$7,093	\$0	\$7,093
1		"B" HF Preheater	4	ton		\$512.89			\$4,413	\$0	\$4,413
1		"B" Bottom HydroFluorinator Heater	7	ton		\$512.89			\$8,896	\$0	\$8,896
1		Flame Tower Preheater (Former "A")	1	ton		\$512.89			\$758	\$0	\$758
1		Strip Heaters - Upper Section Ctr.	0.21	ton		\$512.89			\$261	\$0	\$261
1		Strip Heaters - Upper Section Ctr.	0.21	ton		\$512.89			\$261	\$0	\$261
1		Cooling Coils - Lower Section Ctr.	0.21	ton		\$512.89			\$261	\$0	\$261
1		Cooling Coils - Lower Section Ctr.	0.21	ton		\$512.89			\$261	\$0	\$261
1		Mist Eliminator for Vacuum Pump	0.09	ton		\$512.89			\$110	\$0	\$110
1		Oxide Vacuum Filter	1	ton		\$512.89			\$1,232	\$0	\$1,232
1		UF4 Vacuum Filter	1	ton		\$512.89			\$1,232	\$0	\$1,232
1		Ash Vacuum Cleaner	1	ton		\$512.89			\$1,232	\$0	\$1,232
1		UF4 Vacuum Cleaner	45	ton		\$512.89			\$54,643	\$0	\$54,643
1		Ash Vacuum Cleaner	1	ton		\$512.89			\$1,232	\$0	\$1,232
1		Oxide Vacuum Cleaner - Dust Collector	3	ton		\$512.89			\$4,136	\$0	\$4,136
1		Oxide Vacuum Cleaner - Dust Collector	0.45	ton		\$512.89			\$545	\$0	\$545
1		UF4 Vacuum Cleaner	0.45	ton		\$512.89			\$545	\$0	\$545
1		Spar Filter Fines Drum Dumper	2	ton		\$512.89			\$2,355	\$0	\$2,355
1		Hot Box (East)	2	ton		\$512.89			\$2,266	\$0	\$2,266
1		Hot Box (West)	3	ton		\$512.89			\$3,959	\$0	\$3,959
1		500# Mit-E-Lift, Portable Hoist	0.02	ton		\$512.89			\$21	\$0	\$21

Table A-10

**DEMOLITION ESTIMATE**

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

**TASK-BASED DEMOLITION COSTS**

42% Hazardous &amp; Toxic Waste Productivity Factor: Level C, Heavy Work, 70-85°F

Percent Labor Cost 65.00%

Average Hourly Labor Rate \$42.74

LOC Code	WBS No.	AREA	Quantity	Unit	Material Unit Price	Labor Unit Price	Equipment Unit Price	Material Total Price	Labor Total Price	Equipment Total Price	Total Price
1		Crane Trolley Car	6	ton		\$512.89			\$7,065	\$0	\$7,065
1		Lifting Beam for Shannahan Crane	1	ton		\$512.89			\$1,224	\$0	\$1,224
1		UF4 Mill - 3rd Floor	1	ton		\$512.89			\$1,062	\$0	\$1,062
1		Stone Saw - Type M-75	1	ton		\$512.89			\$878	\$0	\$878
1		Bench Grinder - Queen Sity UF792	0.06	ton		\$512.89			\$71	\$0	\$71
1		Bench Grinder - Stand	1	ton		\$512.89			\$708	\$0	\$708
1		Drum Inverter	2	ton		\$512.89			\$2,550	\$0	\$2,550
1		Ore Concrete Blender	13	ton		\$512.89			\$15,313	\$0	\$15,313
1		UF6 Cylinder Cart	3	ton		\$512.89			\$3,679	\$0	\$3,679
1		UF4 Drum Inverter	2	ton		\$512.89			\$2,550	\$0	\$2,550
1		Articulated arm for Fluorinators	0.13	ton		\$512.89			\$156	\$0	\$156
1		Manlift - East	10	ton		\$512.89			\$11,775	\$0	\$11,775
1		Manlift - West	10	ton		\$512.89			\$11,775	\$0	\$11,775
1		Personnel Funnel Cone for Above	0.27	ton		\$512.89			\$329	\$0	\$329
1		10,000# Cap - Monorail - Maint Area	1	ton		\$512.89			\$1,250	\$0	\$1,250
1		2,000# Cap - Monorail - Spar Recycle Area	0.17	ton		\$512.89			\$212	\$0	\$212
1		4,500# Cap - Monorail - "A" Green Salt Area	0.09	ton		\$512.89			\$106	\$0	\$106
1		9,500# Cap - Monorail - G.E. Dissoc. Retorts	0.31	ton		\$512.89			\$376	\$0	\$376
1		4,500# Cap - Monorail - "A" Green Salt Area	0.11	ton		\$512.89			\$133	\$0	\$133
1		4,000# Cap - Monorail - "Q" Refrigeration Area	0.23	ton		\$512.89			\$276	\$0	\$276
1		#2 Vacuum Pump	0.30	ton		\$512.89			\$368	\$0	\$368
1		Cooling Air Blower - East	0.03	ton		\$512.89			\$35	\$0	\$35
1		Cooling Air Blower - West	0.03	ton		\$512.89			\$35	\$0	\$35
1		Gycol Circ. Pump - Basement	0.29	ton		\$512.89			\$354	\$0	\$354
1		R-123 Gear Aux. Oil Pump	0.03	ton		\$512.89			\$34	\$0	\$34
1		Bottom Hydrofluorinator Blower	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		FM Bldg. Exh. Fan	11	ton		\$512.89			\$13,450	\$0	\$13,450
1		Sample Vacuum Pump	0.03	ton		\$512.89			\$368	\$0	\$368
1		Exhaust Fan - Distillation	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Flame Tower Vacuum Pump - 2nd Floor	0.30	ton		\$512.89			\$368	\$0	\$368
1		Exhaust Fan - South Center	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Exhaust Fan - West	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Exhaust Fan - Maintenance Area	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Basement Exhaust Fan - Hoistwell	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Bottom Hydrofluorinator Air Circulation Fan	7	ton		\$512.89			\$8,896	\$0	\$8,896
1		Bottom Hydrofluorinator Comp. Air Blower	1	ton		\$512.89			\$956	\$0	\$956
1		Exhaust Fan - Sxw	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Refrigeration Vent Blower	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Water Cooler	0.17	ton		\$512.89			\$212	\$0	\$212
1		Portable Air conditioner	1	ton		\$512.89			\$885	\$0	\$885
1		R-123 Centrifugal Compressor	24	ton		\$512.89			\$28,756	\$0	\$28,756
1		R-123 Purge Unit	12	ton		\$512.89			\$14,513	\$0	\$14,513
1		R-134a Purge Unit	12	ton		\$512.89			\$14,513	\$0	\$14,513
1		Refrigerant Management System	1	ton		\$512.89			\$850	\$0	\$850
1		R-123 High Eff. Purge Unit	0.21	ton		\$512.89			\$255	\$0	\$255
1		"A" Bot. Hydrofluorinator	3	ton		\$512.89			\$3,965	\$0	\$3,965
1		"A" Hydrofluorinator	3	ton		\$512.89			\$3,965	\$0	\$3,965



Table A-10

**DEMOLITION ESTIMATE**

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

**TASK-BASED DEMOLITION COSTS**

42% Hazardous &amp; Toxic Waste Productivity Factor: Level C, Heavy Work, 70-85°F

Percent Labor Cost 65.00%

Average Hourly Labor Rate \$42.74

LOC Code	WBS No.	AREA	Quantity	Unit	Material Unit Price	Labor Unit Price	Equipment Unit Price	Material Total Price	Labor Total Price	Equipment Total Price	Total Price
1		"B" Hydrofluorinator	3	ton		\$512.89			\$3,965	\$0	\$3,965
1		"B" Bot. Hydrofluorinator	3	ton		\$512.89			\$3,965	\$0	\$3,965
1		"C" Hydrofluorinator	5	ton		\$512.89			\$5,499	\$0	\$5,499
1		12" Flame Tower Reactor	0.41	ton		\$512.89			\$496	\$0	\$496
1		Separator	0.44	ton		\$512.89			\$531	\$0	\$531
1		Separator	0.44	ton		\$512.89			\$531	\$0	\$531
1		Separator	0.44	ton		\$512.89			\$531	\$0	\$531
1		Switch Board - NW	1	ton		\$512.89			\$1,700	\$0	\$1,700
1		Switch Board - NE	1	ton		\$512.89			\$850	\$0	\$850
1		Switch Board - E - Ctr	1	ton		\$512.89			\$850	\$0	\$850
1		Switch Board - E - S	1	ton		\$512.89			\$637	\$0	\$637
1		High Boiler Still	8	ton		\$512.89			\$10,040	\$0	\$10,040
1		Low Boiler Still	7	ton		\$512.89			\$8,402	\$0	\$8,402
1		#2 Sample Vac. Pump Alumina Tower	1	ton		\$512.89			\$738	\$0	\$738
1		#1 Sample Vac. Pump Alumina Tower	1	ton		\$512.89			\$738	\$0	\$738
1		#2 Prepared Feed Hopper	19	ton		\$512.89			\$23,462	\$0	\$23,462
1		#1 Prepared Feed Hopper	19	ton		\$512.89			\$23,462	\$0	\$23,462
1		Tempered Water Tank	4	ton		\$512.89			\$4,342	\$0	\$4,342
1		#3 Prepared Feed Hopper	19	ton		\$512.89			\$23,462	\$0	\$23,462
1		Water Treatment Chem. Addition Pot	0.05	ton		\$512.89			\$56	\$0	\$56
1		Knock Out Pot	0.26	ton		\$512.89			\$319	\$0	\$319
1		R-134a Receiver	1	ton		\$512.89			\$1,781	\$0	\$1,781
1		R-134a Accumulator	1	ton		\$512.89			\$1,223	\$0	\$1,223
1		Distillate Crane Scale	0.01	ton		\$512.89			\$17	\$0	\$17
1		UF6 Cylinder Shipping Scale	5	ton		\$512.89			\$6,109	\$0	\$6,109
1		Delumper Flame Tower Reactor	0.10	ton		\$512.89			\$117	\$0	\$117
1		Rotary Valve - Dust Coll. Discharge	0.03	ton		\$512.89			\$35	\$0	\$35
1		Rotary Valve - Draw Off Leg. - Basmt.	0.03	ton		\$512.89			\$39	\$0	\$39
1		Rotary Valve - "A" Bot H'Flator Disc.	0.03	ton		\$512.89			\$32	\$0	\$32
1		Dust Valve - M-410 Spar	0.03	ton		\$512.89			\$32	\$0	\$32
1		Rotary Valve Bed Fines Hopper Disc. Rv.	0.03	ton		\$512.89			\$35	\$0	\$35
1		Rotary Valve "B" Bot. H'Flator Disc.	0.03	ton		\$512.89			\$35	\$0	\$35
1		Dryer Disch. Mill Feed Screw	0.47	ton		\$512.89			\$579	\$0	\$579
1		Calciner Elev. Disc. Screw	0.20	ton		\$512.89			\$248	\$0	\$248
1		Prepared Feed Hopper Feeder Screw	1	ton		\$512.89			\$806	\$0	\$806
1		Undersized Feed Material Screw	1	ton		\$512.89			\$1,671	\$0	\$1,671
1		Ore Conc. Surge Hopper Disch. Screw - N	1	ton		\$512.89			\$1,126	\$0	\$1,126
1		Ore Conc. Surge Hopper Disch. Screw - N	1	ton		\$512.89			\$1,126	\$0	\$1,126
1		UF6 Continuous Sample Vessel-East	1	ton		\$512.89			\$919	\$0	\$919
1		UF6 Continuous Sample Vessel-West	1	ton		\$512.89			\$919	\$0	\$919
1		"A" Fluorinator Heater	4	ton		\$512.89			\$5,100	\$0	\$5,100
1		"B" Fluorinator Heater	4	ton		\$512.89			\$5,100	\$0	\$5,100
1		Service Room Hot Water Heater	0.08	ton		\$512.89			\$97	\$0	\$97
1		Tempered Water Spiral Heat Exchanger	20	ton		\$512.89			\$24,921	\$0	\$24,921
1		Tempered Water Spiral Heat Exchanger	20	ton		\$512.89			\$24,921	\$0	\$24,921
1		Unit Heater	0.04	ton		\$512.89			\$46	\$0	\$46
1		Steam Jacket On U-430	0.45	ton		\$512.89			\$550	\$0	\$550

Table A-10

## DEMOLITION ESTIMATE

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

## TASK-BASED DEMOLITION COSTS

42% Hazardous &amp; Toxic Waste Productivity Factor: Level C, Heavy Work, 70-85°F

Percent Labor Cost 65.00%

Average Hourly Labor Rate

\$42.74

LOC Code	WBS No.	AREA	Quantity	Unit	Material Unit Price	Labor Unit Price	Equipment Unit Price	Material Total Price	Labor Total Price	Equipment Total Price	Total Price
1		"B" Top H/E Flator Heater	2	ton		\$512.89			\$2,656	\$0	\$2,656
1		"C" Flator Heater	2	ton		\$512.89			\$2,266	\$0	\$2,266
1		Fluidizing Air To All Flators	0.01	ton		\$512.89			\$11	\$0	\$11
1		Safety Shower Filter	0.14	ton		\$512.89			\$174	\$0	\$174
1		#1 Instrument Air Filter	0.00	ton		\$512.89			\$6	\$0	\$6
1		#2 Instrument Filter	0.00	ton		\$512.89			\$6	\$0	\$6
1		Welder - Ideal Arc 250	0.23	ton		\$512.89			\$283	\$0	\$283
1		Welder - Da 250	0.23	ton		\$512.89			\$283	\$0	\$283
1		500# Cap- Mit-E-Lift - Portable Hoist	0.02	ton		\$512.89			\$21	\$0	\$21
1		1000# Cap - Hoist - N	0.06	ton		\$512.89			\$73	\$0	\$73
1		500# Cap - Hoist - S	0.03	ton		\$512.89			\$37	\$0	\$37
1		500# Cap - Hoist - Cont Room Platform	0.03	ton		\$512.89			\$37	\$0	\$37
1		Drill Press	0.48	ton		\$512.89			\$591	\$0	\$591
1		Prepared Feed Mill	4	ton		\$512.89			\$4,616	\$0	\$4,616
1		Ore Dryer Discharge Crusher	1	ton		\$512.89			\$1,520	\$0	\$1,520
1		Scrap Recovery (UF4) Mill	1	ton		\$512.89			\$1,520	\$0	\$1,520
1		Prepared Feed Mill	4	ton		\$512.89			\$4,616	\$0	\$4,616
1		Ore Precrusher	1	ton		\$512.89			\$1,594	\$0	\$1,594
1		Motor Control Center (C-Fm-40)	3	ton		\$512.89			\$3,471	\$0	\$3,471
1		1000# Cap - Monorail - Valve Room	0.13	ton		\$512.89			\$159	\$0	\$159
1		2000# - Monorail - "B" Flator	0.07	ton		\$512.89			\$80	\$0	\$80
1		2000# Cap Monorail - "A" Flator	0.07	ton		\$512.89			\$89	\$0	\$89
1		Vacuum Pump - East	1	ton		\$512.89			\$850	\$0	\$850
1		Vacuum Pump - West	1	ton		\$512.89			\$850	\$0	\$850
1		Yard Safety Shower Circ. Pump	0.05	ton		\$512.89			\$57	\$0	\$57
1		Yard Safety Shower Circ. Pump	0.05	ton		\$512.89			\$57	\$0	\$57
1		Yard Safety Shower Circ. Pump	0.05	ton		\$512.89			\$57	\$0	\$57
1		Safety Shower Circ. Pump	0.06	ton		\$512.89			\$71	\$0	\$71
1		"A" Top H/E Flator Blower	2	ton		\$512.89			\$2,833	\$0	\$2,833
1		"A" Flator Blower	9	ton		\$512.89			\$10,412	\$0	\$10,412
1		"B" Flator Blower	9	ton		\$512.89			\$10,412	\$0	\$10,412
1		"B" Flator Comb. Air Blower	1	ton		\$512.89			\$956	\$0	\$956
1		"A" Flator Comb. Air Blower	0.11	ton		\$512.89			\$130	\$0	\$130
1		Exhaust Fan - Maint. Area	0.06	ton		\$512.89			\$67	\$0	\$67
1		Control Room A/C Blower	0.03	ton		\$512.89			\$35	\$0	\$35
1		Exh. Fan - Service Room	0.06	ton		\$512.89			\$67	\$0	\$67
1		Man-Cooling Fan	1	ton		\$512.89			\$637	\$0	\$637
1		"B" Top H/E Flator Air Circ. Fan	6	ton		\$512.89			\$7,649	\$0	\$7,649
1		Control Room Fan	1	ton		\$512.89			\$956	\$0	\$956
1		"C" Flator Heat Circ. Air Blower	9	ton		\$512.89			\$10,412	\$0	\$10,412
1		"C" Flator Heat Comb. Air Blower	1	ton		\$512.89			\$956	\$0	\$956
1		Drinking Water Cooler	0.17	ton		\$512.89			\$212	\$0	\$212
1		Refrigerator - Control Room	0.07	ton		\$512.89			\$81	\$0	\$81
1		Refrigerator - Cont. Room - Foreman	0.07	ton		\$512.89			\$81	\$0	\$81
1		A/C & Heating Unit	1	ton		\$512.89			\$1,062	\$0	\$1,062
1		A/C & Heating Unit	3	ton		\$512.89			\$3,718	\$0	\$3,718
1		"B" Top H-Flator	4	ton		\$512.89			\$4,656	\$0	\$4,656

Table A-10  
DEMOLITION ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

## TASK-BASED DEMOLITION COSTS

42% Hazardous &amp; Toxic Waste Productivity Factor: Level C, Heavy Work, 70-85°F

Percent Labor Cost 65.00%

Average Hourly Labor Rate

\$42.74

LOC Code	WBS No.	AREA	Quantity	Unit	Material Unit Price	Labor Unit Price	Equipment Unit Price	Material Total Price	Labor Total Price	Equipment Total Price	Total Price
1		Ore Crusher Grizzly Screen	0.36	ton		\$512.89			\$443	\$0	\$443
1		Calcliner Grizzly	0.36	ton		\$512.89			\$443	\$0	\$443
1		Scrap Recovery Screen	1	ton		\$512.89			\$1,062	\$0	\$1,062
1		Switchboard - N X E	4	ton		\$512.89			\$4,834	\$0	\$4,834
1		Switchboard - N X W	4	ton		\$512.89			\$4,834	\$0	\$4,834
1		Switchboard - N X W	3	ton		\$512.89			\$3,825	\$0	\$3,825
1		Dryer Surge Hopper	3	ton		\$512.89			\$3,187	\$0	\$3,187
1		UF6 Blow Off & Dump Truck	1	ton		\$512.89			\$1,226	\$0	\$1,226
1		Bed Fines Hopper	11	ton		\$512.89			\$13,280	\$0	\$13,280
1		Scrap Recovery Hopper	0.30	ton		\$512.89			\$362	\$0	\$362
1		Safety Shower Heater Storage Tank	1	ton		\$512.89			\$669	\$0	\$669
1		Ore Conc. Surge Hopper	8	ton		\$512.89			\$9,833	\$0	\$9,833
1		"A" Flator Bed - Vibrator	0.01	ton		\$512.89			\$8	\$0	\$8
1		"B" Flator Bed - Vibrator	0.01	ton		\$512.89			\$8	\$0	\$8
1		"B" Top H-Flator Disc. Line - Vibrator	0.01	ton		\$512.89			\$8	\$0	\$8
1		Undersize Feed Matl. Screw - Vibrator	0.01	ton		\$512.89			\$8	\$0	\$8
1		"C" Flator Bed - Vibrator	0.01	ton		\$512.89			\$8	\$0	\$8
1		Ore Conc. Surge Hopper - N- Vibrator	0.01	ton		\$512.89			\$8	\$0	\$8
1		Ore Conc. Surge Hopper - S - Vibrator	0.01	ton		\$512.89			\$8	\$0	\$8
1		Conc. Blender Feed Line - Vibrator	0.01	ton		\$512.89			\$8	\$0	\$8
1		"A" Bottom H-Flator Feeder	0.39	ton		\$512.89			\$481	\$0	\$481
1		In-Range Discharge	0.39	ton		\$512.89			\$481	\$0	\$481
1		Scrap Rec. Mill Feeder	0.39	ton		\$512.89			\$481	\$0	\$481
1		Fines Discharge	0.39	ton		\$512.89			\$481	\$0	\$481
1		"A" Flator Spar Feeder	0.39	ton		\$512.89			\$481	\$0	\$481
1		"B" Flator UF4 Feeder	0.39	ton		\$512.89			\$481	\$0	\$481
1		"A" Flator UF4 Feeder	0.39	ton		\$512.89			\$481	\$0	\$481
1		"B" Flator Spar Feeder	0.39	ton		\$512.89			\$481	\$0	\$481
1		"B" Bottom H-Flator Feeder	0.39	ton		\$512.89			\$481	\$0	\$481
1		"C" Flator UF4 Feeder	0.39	ton		\$512.89			\$481	\$0	\$481
1		"C" Flator Spar Feeder	0.39	ton		\$512.89			\$481	\$0	\$481
1		Ore In-Range Discharge	0.39	ton		\$512.89			\$481	\$0	\$481
1		Ore In-Range Discharge	0.39	ton		\$512.89			\$481	\$0	\$481
1		"A" Reoxidizer Screw	0.47	ton		\$512.89			\$579	\$0	\$579
1		Flator Filter Fines Screw	0.47	ton		\$512.89			\$579	\$0	\$579
1		Ore Dryer Feed Screw	1	ton		\$512.89			\$1,377	\$0	\$1,377
1		"B" Reoxidizer Screw	6	ton		\$512.89			\$7,649	\$0	\$7,649
1		Ore Classifier Feed Screw	0.46	ton		\$512.89			\$567	\$0	\$567
1		Hoist Trolley	0.11	ton		\$512.89			\$137	\$0	\$137
1		Hoist Trolley	0.11	ton		\$512.89			\$137	\$0	\$137
1		Ore Dryer	0.00	ton		\$512.89			\$0	\$0	\$0
1		Filter Dryer	4	ton		\$512.89			\$5,100	\$0	\$5,100
1		Ore Dryer Heater	5	ton		\$512.89			\$6,105	\$0	\$6,105
1		"A" Top Hflator Heater	4	ton		\$512.89			\$5,100	\$0	\$5,100
1		High Boiler Still Condenser	0.05	ton		\$512.89			\$59	\$0	\$59
1		H2O Filter for Metal Tube D/P Test - E	0.03	ton		\$512.89			\$39	\$0	\$39
1		H2O Filter for Metal Tube D/P Test - W	0.03	ton		\$512.89			\$39	\$0	\$39

Table A-10

## DEMOLITION ESTIMATE

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

## TASK-BASED DEMOLITION COSTS

42% Hazardous &amp; Toxic Waste Productivity Factor: Level C, Heavy Work, 70-85°F

Percent Labor Cost 65.00%

Average Hourly Labor Rate \$42.74

LOC Code	WBS No.	AREA	Quantity	Unit	Material Unit Price	Labor Unit Price	Equipment Unit Price	Material Total Price	Labor Total Price	Equipment Total Price	Total Price
1		Hot Glycol Filter	0.03	ton		\$512.89			\$39	\$0	\$39
1		Decon Trunk Vacuum	0.03	ton		\$512.89			\$39	\$0	\$39
1		Welder	0.19	ton		\$512.89			\$232	\$0	\$232
1		Hot Box	1	ton		\$512.89			\$719	\$0	\$719
1		500# Cap. Portable Hoist	0.02	ton		\$512.89			\$21	\$0	\$21
1		4000# Cap. Hoist	0.08	ton		\$512.89			\$96	\$0	\$96
1		2000# Cap. Hoist	0.06	ton		\$512.89			\$77	\$0	\$77
1		1000# Cap. Hoist	0.04	ton		\$512.89			\$45	\$0	\$45
1		1000# Cap. Hoist	0.12	ton		\$512.89			\$142	\$0	\$142
1		1000# Cap. Hoist - Electric	0.03	ton		\$512.89			\$42	\$0	\$42
1		Scrap Recycle Drum Inverter	2	ton		\$512.89			\$2,656	\$0	\$2,656
1		Washer - Decon	1	ton		\$512.89			\$1,275	\$0	\$1,275
1		2,500 Cap. Monorail	0.26	ton		\$512.89			\$319	\$0	\$319
1		2,000 Cap. Monorail	0.11	ton		\$512.89			\$133	\$0	\$133
1		4,500 Cap. Monorail	0.11	ton		\$512.89			\$133	\$0	\$133
1		4,000 Cap. Monorail	0.32	ton		\$512.89			\$386	\$0	\$386
1		Monorail	0.35	ton		\$512.89			\$425	\$0	\$425
1		4,000 Cap. Monorail	0.09	ton		\$512.89			\$106	\$0	\$106
1		Dryer Combustion Air Blower	0.01	ton		\$512.89			\$18	\$0	\$18
1		"A" Flator Offgas Lines Cooling Blower	0.23	ton		\$512.89			\$283	\$0	\$283
1		Exhaust Fan - Service Room	1	ton		\$512.89			\$956	\$0	\$956
1		Exhaust Fan - Decon	0.11	ton		\$512.89			\$130	\$0	\$130
1		Wall Exhaust Fan - South	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Wall Exhaust Fan - West	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		#317-1 Vent Unit	1	ton		\$512.89			\$963	\$0	\$963
1		Exhaust Fan	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Exhaust Fan	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Decon Bead Blaster	3	ton		\$512.89			\$3,400	\$0	\$3,400
1		Exhaust Fan	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		"B" Top Hflator Combustion Air Blower	1	ton		\$512.89			\$956	\$0	\$956
1		Wall Exhaust Fan - Southwest	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Drinking Cooler	0.17	ton		\$512.89			\$212	\$0	\$212
1		"A" Top Hflator	4	ton		\$512.89			\$4,636	\$0	\$4,636
1		4/E Dia. Prepared Feed Air Classifier	1	ton		\$512.89			\$918	\$0	\$918
1		6/E Dia. Prepared Feed Air Classifier	2	ton		\$512.89			\$1,965	\$0	\$1,965
1		Switchboard - East-West	3	ton		\$512.89			\$4,250	\$0	\$4,250
1		Switchboard - East-East	5	ton		\$512.89			\$6,374	\$0	\$6,374
1		Ultrasonic Cleaner Tank - Decon	1	ton		\$512.89			\$1,700	\$0	\$1,700
1		Dryer Feed Hopper	3	ton		\$512.89			\$3,400	\$0	\$3,400
1		#1 Still Feed Tank	4	ton		\$512.89			\$5,307	\$0	\$5,307
1		#2 Still Feed Tank	4	ton		\$512.89			\$5,307	\$0	\$5,307
1		Bed Fines Hopper	9	ton		\$512.89			\$11,067	\$0	\$11,067
1		Spar Discharge Hopper	3	ton		\$512.89			\$4,250	\$0	\$4,250
1		#3 Still Feed Tank	4	ton		\$512.89			\$5,307	\$0	\$5,307
1		Dryer Feed Hopper Vibrator - West	0.01	ton		\$512.89			\$8	\$0	\$8
1		"A" Reoxidizer Screw Disch. Vibrator	0.01	ton		\$512.89			\$8	\$0	\$8
1		"B" Flator Primary Filter Disch. Vibrator	0.01	ton		\$512.89			\$8	\$0	\$8

Table A-10

## DEMOLITION ESTIMATE

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

## TASK-BASED DEMOLITION COSTS

42% Hazardous &amp; Toxic Waste Productivity Factor: Level C, Heavy Work, 70-85°F

Percent Labor Cost 65.00%

Average Hourly Labor Rate \$42.74

LOC Code	WBS No.	AREA	Quantity	Unit	Material Unit Price	Labor Unit Price	Equipment Unit Price	Material Total Price	Labor Total Price	Equipment Total Price	Total Price
1		"B" Flator B.U. Filter Disch. Vibrator	0.01	ton		\$512.89			\$8	\$0	\$8
1		"A" Flator Primary Filter Disch. Vibrator	0.01	ton		\$512.89			\$8	\$0	\$8
1		"A" Flator B.U. Filter Disch. Vibrator	0.01	ton		\$512.89			\$8	\$0	\$8
1		F-416 Discharge Line Vibrator	0.01	ton		\$512.89			\$8	\$0	\$8
1		"C2" Flator Primary Filter D.O. Vibrator	0.01	ton		\$512.89			\$8	\$0	\$8
1		"C1" Flator Primary Filter D.O. Vibrator	0.01	ton		\$512.89			\$8	\$0	\$8
1		Dryer Feed Hopper Vibrator - East	0.01	ton		\$512.89			\$8	\$0	\$8
1		"A" Flator Primary Filter Disch. R/V	0.39	ton		\$512.89			\$481	\$0	\$481
1		"A" Flator Primary Filter Disch. R/V	0.39	ton		\$512.89			\$481	\$0	\$481
1		"B" Flator Primary Filter Disch. R/V	0.39	ton		\$512.89			\$481	\$0	\$481
1		"B" Flator Primary Filter Disch. R/V	0.39	ton		\$512.89			\$481	\$0	\$481
1		Spar Recycle Disch. R/V	0.39	ton		\$512.89			\$481	\$0	\$481
1		"C" Flator Primary Filter Disch. R/V	0.39	ton		\$512.89			\$481	\$0	\$481
1		"C" Flator Primary Filter Disch. R/V	0.39	ton		\$512.89			\$481	\$0	\$481
1		Screw Conveyor	0.33	ton		\$512.89			\$403	\$0	\$403
1		C Fluorinate Filter Fines Screw	0.20	ton		\$512.89			\$249	\$0	\$249
1		Rotex Feed Screw	0.23	ton		\$512.89			\$280	\$0	\$280
1		Mud Bailer Feed Screw	1	ton		\$512.89			\$1,230	\$0	\$1,230
1		Hoist Trolley - "A" Green Salt	0.03	ton		\$512.89			\$32	\$0	\$32
1		A-1 Primary Cold Trap	1	ton		\$512.89			\$1,617	\$0	\$1,617
1		A-2 Primary Cold Trap	1	ton		\$512.89			\$1,617	\$0	\$1,617
1		A-3 Primary Cold Trap	1	ton		\$512.89			\$1,617	\$0	\$1,617
1		Product Condenser	0.02	ton		\$512.89			\$25	\$0	\$25
1		A-4 Primary Cold Trap	2	ton		\$512.89			\$2,867	\$0	\$2,867
1		B-2 Primary Cold Trap	2	ton		\$512.89			\$2,867	\$0	\$2,867
1		B-3 Primary Cold Trap	2	ton		\$512.89			\$2,867	\$0	\$2,867
1		B-1 Primary Cold Trap	2	ton		\$512.89			\$2,867	\$0	\$2,867
1		B-4 Primary Cold Trap	2	ton		\$512.89			\$2,867	\$0	\$2,867
1		Alt. Primary Cold Trap - Nooter	2	ton		\$512.89			\$2,867	\$0	\$2,867
1		"B" Hydrogen Preheater	0.20	ton		\$512.89			\$244	\$0	\$244
1		"B" Reductor Heater - Surface Comb.	0.19	ton		\$512.89			\$230	\$0	\$230
1		Instrument Air Filter	0.00	ton		\$512.89			\$5	\$0	\$5
1		Chem. Trap - Fluorine Analyzer	0.00	ton		\$512.89			\$5	\$0	\$5
1		Chem. Trap - Fluorine Analyzer	0.00	ton		\$512.89			\$5	\$0	\$5
1		Chem. Trap - Fluorine Analyzer	0.00	ton		\$512.89			\$5	\$0	\$5
1		Chem. Trap - Fluorine Analyzer	0.00	ton		\$512.89			\$5	\$0	\$5
1		Chem. Trap - Sample Point	0.00	ton		\$512.89			\$5	\$0	\$5
1		Chem. Trap - Fluorine Analyzer	0.00	ton		\$512.89			\$5	\$0	\$5
1		Air Filter	1	ton		\$512.89			\$1,383	\$0	\$1,383
1		Welder - Idealarc 400	0.19	ton		\$512.89			\$237	\$0	\$237
1		Welder - 400 amp stick	0.19	ton		\$512.89			\$237	\$0	\$237
1		Hot Box	0.02	ton		\$512.89			\$19	\$0	\$19
1		E-409-A-1 Primary Cold Trap Hot Box	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		E-408-A-2 Primary Cold Trap Hot Box	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		E-410-A-3 Primary Cold Trap Hot Box	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		E-427-A-4 Primary Cold Trap Hot Box	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		E-426-B-2 Primary Cold Trap Hot Box	1	ton		\$512.89			\$1,133	\$0	\$1,133

Table A-10

**DEMOLITION ESTIMATE**

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

**TASK-BASED DEMOLITION COSTS**

42% Hazardous &amp; Toxic Waste Productivity Factor: Level C, Heavy Work, 70-85°F

Percent Labor Cost 65.00%

Average Hourly Labor Rate

\$42.74

LOC Code	WBS No.	AREA	Quantity	Unit	Material Unit Price	Labor Unit Price	Equipment Unit Price	Material Total Price	Labor Total Price	Equipment Total Price	Total Price
1		E-425-B-3 Primary Cold Trap Hot Box	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Distillation West - Hot Box	4	ton		\$512.89			\$4,604	\$0	\$4,604
1		Distillation East - Hot Box	4	ton		\$512.89			\$4,604	\$0	\$4,604
1		E-600-Alt. Primary Cold Trap Hot Box	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		E-492-B-1 Primary Cold Trap Hot Box	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		E-493-B-4 Primary Cold Trap Hot Box	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Mit-E-Lift-500# Cap	0.02	ton		\$512.89			\$21	\$0	\$21
1		Hoist - "A" Green Salt Train - 2000# Cap.	1	ton		\$512.89			\$744	\$0	\$744
1		Hoist - Cold Trap Area	0.02	ton		\$512.89			\$21	\$0	\$21
1		Hoist - Cold Trap Area	0.02	ton		\$512.89			\$21	\$0	\$21
1		#1 Mud Bailer - West	3	ton		\$512.89			\$4,250	\$0	\$4,250
1		#1 Mud Bailer - East	3	ton		\$512.89			\$3,187	\$0	\$3,187
1		#1 UF4 Mill - North	2	ton		\$512.89			\$2,975	\$0	\$2,975
1		UF4 Blender	17	ton		\$512.89			\$21,248	\$0	\$21,248
1		#2 UF4 Mill - South	4	ton		\$512.89			\$4,958	\$0	\$4,958
1		#3 Mudbailer - North	2	ton		\$512.89			\$2,656	\$0	\$2,656
1		Monorail - Over A-3 Prim Cold Trap 30,000#	1	ton		\$512.89			\$1,521	\$0	\$1,521
1		Monorail - Over A-2 Prim Cold Trap 30,000#	1	ton		\$512.89			\$1,521	\$0	\$1,521
1		Monorail - Over A-1 Prim Cold Trap 30,000#	1	ton		\$512.89			\$1,521	\$0	\$1,521
1		Monorail - Over Rotex Screen (S-600) 3,000#	0.10	ton		\$512.89			\$121	\$0	\$121
1		Monorail - "A" G. Salt Area, 2,000#	0.08	ton		\$512.89			\$92	\$0	\$92
1		Monorail - B-3 Prim. Cold Trap	1	ton		\$512.89			\$686	\$0	\$686
1		Monorail - A Bot. Hflourinator	0.12	ton		\$512.89			\$141	\$0	\$141
1		Vac. Pump - UF6 Fluorine Analyzer	0.07	ton		\$512.89			\$81	\$0	\$81
1		Vac. Pump - Sample Point	0.10	ton		\$512.89			\$124	\$0	\$124
1		"A" Reductor Blower	7	ton		\$512.89			\$8,924	\$0	\$8,924
1		Exh. Fan - HF Area - West Wall	0.08	ton		\$512.89			\$96	\$0	\$96
1		Exh. Fan - HF Area - South Wall	0.08	ton		\$512.89			\$96	\$0	\$96
1		Building Ventilation Unit	3	ton		\$512.89			\$4,250	\$0	\$4,250
1		Man Cooling Fan	0.06	ton		\$512.89			\$67	\$0	\$67
1		"B" Reductor Comb. Air Blower	1	ton		\$512.89			\$797	\$0	\$797
1		Exhaust Fan - South X West - 1 Lg	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Drinking Water Cooler	0.17	ton		\$512.89			\$212	\$0	\$212
1		#1 UF4 Mill Grizzly	10	ton		\$512.89			\$12,749	\$0	\$12,749
1		#2 UF4 Mill Grizzly	10	ton		\$512.89			\$12,749	\$0	\$12,749
1		Spar (Bed) Rotex Screen	2	ton		\$512.89			\$2,975	\$0	\$2,975
1		Rotex Screen	2	ton		\$512.89			\$2,975	\$0	\$2,975
1		Switchboard C-19 West	7	ton		\$512.89			\$8,924	\$0	\$8,924
1		Switchboard D-20 East	7	ton		\$512.89			\$8,924	\$0	\$8,924
1		Vibrator - #1 Ore Conc. Hopper	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - #2 Ore Conc. Hopper	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - #1 Dry Oxide Dust Coil	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - #1 Dry Oxide Dust Coil	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - #1 Dry Oxide Dust Coil	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - HF Filter (F-424) Disch. Line	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - HF Filter (F-425) Disch. Line	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vib. - "A" Reductor K.O. Pot Disch. Line	0.01	ton		\$512.89			\$8	\$0	\$8

Table A-10  
DEMOLITION ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

TASK-BASED DEMOLITION COSTS  
42% Hazardous & Toxic Waste Productivity Factor: Level C, Heavy Work, 70-85°F  
Percent Labor Cost 65.00% Average Hourly Labor Rate \$42.74

LOC Code	WBS No.	AREA	Quantity	Unit	Material Unit Price	Labor Unit Price	Equipment Unit Price	Material Total Price	Labor Total Price	Equipment Total Price	Total Price
1		Vibrator - UF4 Hopper	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - Spar Decay Hopper Disch. Line	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - #3 Ore Conc. Hopper	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - UF4 Hopper	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - "B3" HF Filter Disch. Line	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - "B4" HF Filter Disch. Line	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - "B5" HF Filter Disch. Line	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - "B6" HF Filter Disch. Line	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vib. - "B" Red.ER Fines Ko Pot Disch. Line	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator-Inlet Line To #2 UF4 Mill	0.01	ton		\$512.89			\$8	\$0	\$8
1		Rotary Value - #1 Mudbailer Ore Blender	0.03	ton		\$512.89			\$42	\$0	\$42
1		Rotary Value - #2 Mudbailer Ore Blender	0.03	ton		\$512.89			\$42	\$0	\$42
1		Rotary Value - "A" Top H/Eflator	0.04	ton		\$512.89			\$46	\$0	\$46
1		Rotary Value - F-494 Fines Discharge	0.04	ton		\$512.89			\$46	\$0	\$46
1		Rotary Value - F-493 Fines Discharge	0.04	ton		\$512.89			\$46	\$0	\$46
1		Rotary Value - F-495 Fines Discharge	0.04	ton		\$512.89			\$46	\$0	\$46
1		Rotary Value - #1 Dry Oxide Dust Col. Hop.	0.04	ton		\$512.89			\$46	\$0	\$46
1		Rotary Value - "A" Reductor Ko Pot Disch.	0.04	ton		\$512.89			\$46	\$0	\$46
1		Rotary Value - UF4 Mill Feeder - N	0.04	ton		\$512.89			\$46	\$0	\$46
1		Rotary Value - "B" Top H/Eflator	0.04	ton		\$512.89			\$46	\$0	\$46
1		Rotary Value - "B-1" Red. Filter Fines Disch.	0.04	ton		\$512.89			\$46	\$0	\$46
1		Rotary Value - #2 UF4 Crusher - S	0.04	ton		\$512.89			\$46	\$0	\$46
1		Conc. Feed Hopper Screw	1	ton		\$512.89			\$1,326	\$0	\$1,326
1		Wet Oxide Dust Collector Discharge Screw	1	ton		\$512.89			\$689	\$0	\$689
1		Trolley - B-4 & B-5 HF Filters	0.03	ton		\$512.89			\$33	\$0	\$33
1		"A" Reductor Filter Fines Hopper	0.06	ton		\$512.89			\$71	\$0	\$71
1		A-1 Tert. Cold Trap	2	ton		\$512.89			\$2,883	\$0	\$2,883
1		A-2 Tert. Cold Trap	2	ton		\$512.89			\$2,883	\$0	\$2,883
1		A-1 Sec. Cold Trap	2	ton		\$512.89			\$2,883	\$0	\$2,883
1		"A" Reductor Heater	8	ton		\$512.89			\$9,916	\$0	\$9,916
1		#A4 HF Filter Heater (F-424)	0.22	ton		\$512.89			\$269	\$0	\$269
1		#A 5 HF Filter Heater (F-424)	0.22	ton		\$512.89			\$269	\$0	\$269
1		A-2 Sec. Cold Trap	2	ton		\$512.89			\$2,883	\$0	\$2,883
1		B-1 Sec. Cold Trap	2	ton		\$512.89			\$2,883	\$0	\$2,883
1		B-2 Sec. Cold Trap	2	ton		\$512.89			\$2,883	\$0	\$2,883
1		B-1 Tert. Cold Trap	2	ton		\$512.89			\$2,883	\$0	\$2,883
1		B-2 Tert. Cold Trap	2	ton		\$512.89			\$2,883	\$0	\$2,883
1		Shower Water Heater	0.08	ton		\$512.89			\$94	\$0	\$94
1		A-3 Sec. Cold Trap	2	ton		\$512.89			\$2,883	\$0	\$2,883
1		B-3 Sec. Cold Trap	2	ton		\$512.89			\$2,883	\$0	\$2,883
1		Sample Cold Trap	2	ton		\$512.89			\$2,883	\$0	\$2,883
1		"B" Reductor Filter Fines Hopper "1 B"	0.06	ton		\$512.89			\$71	\$0	\$71
1		Bot. H/Eflator Filter #1 B - Heater	0.15	ton		\$512.89			\$183	\$0	\$183
1		Bot. H/Eflator Filter #2B - Heater	0.15	ton		\$512.89			\$183	\$0	\$183
1		"B" Red. Fines Hopper Disch. Piping Heater	0.15	ton		\$512.89			\$183	\$0	\$183
1		Top H/Eflator Filter #3B Heater	0.15	ton		\$512.89			\$183	\$0	\$183
1		Top H/Eflator Filter #4B Heater	0.15	ton		\$512.89			\$183	\$0	\$183

Table A-10

## DEMOLITION ESTIMATE

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

## TASK-BASED DEMOLITION COSTS

42% Hazardous &amp; Toxic Waste Productivity Factor: Level C, Heavy Work, 70-85°F

Percent Labor Cost 65.00%

Average Hourly Labor Rate

\$42.74

LOC Code	WBS No.	AREA	Quantity	Unit	Material Unit Price	Labor Unit Price	Equipment Unit Price	Material Total Price	Labor Total Price	Equipment Total Price	Total Price
1		#1 Dry Oxide Dust Collector	0.00	ton		\$512.89			\$0	\$0	\$0
1		Vessel Vacuum, Hop. & Controller Stand	1	ton		\$512.89			\$1,417	\$0	\$1,417
1		A4 Bot. HF Filter	1	ton		\$512.89			\$843	\$0	\$843
1		A5 Bot. HF Filter	1	ton		\$512.89			\$843	\$0	\$843
1		Chem Trap	2	ton		\$512.89			\$2,883	\$0	\$2,883
1		Chem Trap	2	ton		\$512.89			\$2,883	\$0	\$2,883
1		Chem Trap	2	ton		\$512.89			\$2,883	\$0	\$2,883
1		Chem Trap	2	ton		\$512.89			\$2,883	\$0	\$2,883
1		Inst. Air Filter	2	ton		\$512.89			\$2,883	\$0	\$2,883
1		B4 Bot. HF Filter	1	ton		\$512.89			\$942	\$0	\$942
1		3B Top HF Filter	1	ton		\$512.89			\$942	\$0	\$942
1		6B Top HF Filter	1	ton		\$512.89			\$942	\$0	\$942
1		5B Bottom HF Filter	1	ton		\$512.89			\$942	\$0	\$942
1		Welder - Idealarc	0.19	ton		\$512.89			\$237	\$0	\$237
1		Welder - Idealarc	0.19	ton		\$512.89			\$237	\$0	\$237
1		Hot Box - Cold Trap E-446-1A Sec.	1	ton		\$512.89			\$1,211	\$0	\$1,211
1		Hot Box - Cold Trap E-413-2A Sec.	1	ton		\$512.89			\$1,211	\$0	\$1,211
1		Hot Box - Cold Trap E411-1A Tert.	1	ton		\$512.89			\$1,211	\$0	\$1,211
1		Hot Box	1	ton		\$512.89			\$1,211	\$0	\$1,211
1		Hot Box - Cold Trap E412-2A Tert.	1	ton		\$512.89			\$1,211	\$0	\$1,211
1		Hot Box - Cold Trap E447-1B Sec.	1	ton		\$512.89			\$1,211	\$0	\$1,211
1		Hot Box - Cold Trap E448-2B Sec.	1	ton		\$512.89			\$1,211	\$0	\$1,211
1		Hot Box - Cold Trap E472-1B Tert.	1	ton		\$512.89			\$1,211	\$0	\$1,211
1		Hot Box - Cold Trap E473-2B Tert.	1	ton		\$512.89			\$1,211	\$0	\$1,211
1		Hot Box	1	ton		\$512.89			\$1,211	\$0	\$1,211
1		Hot Box - Cold Trap E-601	1	ton		\$512.89			\$1,211	\$0	\$1,211
1		Hot Box - Cold Trap E-602	1	ton		\$512.89			\$1,211	\$0	\$1,211
1		Hot Box - Cold Trap E-603	1	ton		\$512.89			\$1,211	\$0	\$1,211
1		Portable Hoist - Mite-E-Lift	0.02	ton		\$512.89			\$21	\$0	\$21
1		4000# - Hoist B4 & B5 HF Filters	0.08	ton		\$512.89			\$92	\$0	\$92
1		2000# - Hoist - Over "A" Reductor	0.04	ton		\$512.89			\$48	\$0	\$48
1		Hoist & Trolley Over A4 & A5 HF Filter	0.08	ton		\$512.89			\$92	\$0	\$92
1		4000# Hoist & Trolley Over B3 HF Filter	0.07	ton		\$512.89			\$90	\$0	\$90
1		1000# - Hoist - Rotary Va. Storage Area	0.04	ton		\$512.89			\$52	\$0	\$52
1		1000# Cap - Portable Hoist	0.04	ton		\$512.89			\$52	\$0	\$52
1		1000# Cap - Portable Hoist	0.04	ton		\$512.89			\$52	\$0	\$52
1		20,000# Monorail - Over Cold Trap 2B Tert.	1	ton		\$512.89			\$1,139	\$0	\$1,139
1		20,000# Monorail - Over Cold Trap 1B	1	ton		\$512.89			\$1,139	\$0	\$1,139
1		20,000# Mono - Cold Trap 2B Sec. & 1A Tert.	2	ton		\$512.89			\$1,903	\$0	\$1,903
1		20,000# Mono - Cold Trap 2A & 1B Sec.	2	ton		\$512.89			\$1,903	\$0	\$1,903
1		20,000# Mono - Cold Trap 1A Sec. & 2A Tert.	2	ton		\$512.89			\$1,903	\$0	\$1,903
1		11,000# Monorail - Over HF Filter A4 & A5	0.36	ton		\$512.89			\$437	\$0	\$437
1		7,000# Monorail - Over HF Filter B4 & B5	0.24	ton		\$512.89			\$289	\$0	\$289
1		5,000# Monorail - Over HF Filter B3	0.22	ton		\$512.89			\$264	\$0	\$264
1		1,000# Monorail - Over HF Filter B6	0.13	ton		\$512.89			\$157	\$0	\$157
1		1,000# Monorail - Over "A" Gs Area	0.13	ton		\$512.89			\$157	\$0	\$157
1		1,000# Monorail - Over "A" Gs Area	0.13	ton		\$512.89			\$157	\$0	\$157



Table A-10

## DEMOLITION ESTIMATE

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## TASK-BASED DEMOLITION COSTS

42% Hazardous &amp; Toxic Waste Productivity Factor: Level C, Heavy Work, 70-85°F

Percent Labor Cost 65.00%

Average Hourly Labor Rate

\$42.74

LOC Code	WBS No.	AREA	Quantity	Unit	Material Unit Price	Labor Unit Price	Equipment Unit Price	Material Total Price	Labor Total Price	Equipment Total Price	Total Price
1		MO-419 Monorail - Over (C-418) Mill Feed Elevator	0.16	ton		\$512.89			\$191	\$0	\$191
1		MO-420 1,000# Mono - Over Rotary Va. Stor. Area	0.09	ton		\$512.89			\$105	\$0	\$105
1		Vacuum Pump	0.07	ton		\$512.89			\$81	\$0	\$81
1		"A" Reductor Comb Air Blower	0.35	ton		\$512.89			\$425	\$0	\$425
1		Fluorine Compressor	0.35	ton		\$512.89			\$425	\$0	\$425
1		Exhaust Fan - South Wall - HF Area	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Exhaust Fan - West Wall - HF Area	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Emergency Exh. Fan	2	ton		\$512.89			\$2,266	\$0	\$2,266
1		Women's Shower Exhaust Fan	0.03	ton		\$512.89			\$35	\$0	\$35
1		Man Cooling Fan	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		"B" HF Primary Jet Scrubber - West	0.09	ton		\$512.89			\$106	\$0	\$106
1		"B" HF Secondary Jet Scrubber - East	0.09	ton		\$512.89			\$106	\$0	\$106
1		"B" Reductor Air Circ. Fan	9	ton		\$512.89			\$10,412	\$0	\$10,412
1		Exhaust Fan	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Water Cooler	0.04	ton		\$512.89			\$51	\$0	\$51
1		R-402 "A" Reductor - Surface Comb.	8	ton		\$512.89			\$10,139	\$0	\$10,139
1		R-600 "B" Reductor	8	ton		\$512.89			\$10,139	\$0	\$10,139
1		Spar Rotex Screen	0.08	ton		\$512.89			\$96	\$0	\$96
1		Exit - Wet Oxide Dust Coil. #2 (F-416)	0.08	ton		\$512.89			\$92	\$0	\$92
1		Exhaust Fan (P-524)	0.08	ton		\$512.89			\$96	\$0	\$96
1		Exhaust Fan (P-639)	0.08	ton		\$512.89			\$96	\$0	\$96
1		Exhaust Fan (P-523)	0.08	ton		\$512.89			\$96	\$0	\$96
1		Switch Board Nxw	10	ton		\$512.89			\$12,395	\$0	\$12,395
1		Motor Control Ctr Nxw	4	ton		\$512.89			\$5,100	\$0	\$5,100
1		#1 Conc. Hopper (Ctr)	2	ton		\$512.89			\$2,231	\$0	\$2,231
1		"A" Reductor Filter Fines Hopper	0.10	ton		\$512.89			\$117	\$0	\$117
1		#2 Conc. Hopper (East) - Cont. Boiler	2	ton		\$512.89			\$2,231	\$0	\$2,231
1		HF Filter Bump Tank	1	ton		\$512.89			\$790	\$0	\$790
1		UF6 Surge Tank	5	ton		\$512.89			\$6,258	\$0	\$6,258
1		"1B" Reductor Filter Fines Hopper	0.31	ton		\$512.89			\$375	\$0	\$375
1		#3 Conc. Hopper - West	2	ton		\$512.89			\$2,231	\$0	\$2,231
1		Vibrator - #1 Wet Oxide Dust Coil. Hop. (E)	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - #1 Wet Oxide Dust Coil. Hop. (W)	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - #2 Wet Oxide Dust Coil. Hop. (E)	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - #2 Wet Oxide Dust Coil. Hop. (W)	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - HF Filter "A1" (F-406) Disch. Line	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - HF Filter "A2" (F-407) Disch. Line	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - HF Filter "A3" (F-419) Disch. Line	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - HF Filter "A6" (F-443) Disch. Line	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vib. - "A" UF4 Prim. Dust Coll. (F-426) Hop.	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - A2 Prim Flation Filter (F-432)	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - A1 Prim Flation Filter (F-433)	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - B2 Prim Flation Filter (F-408)	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - B1 Prim Flation Filter (F-409)	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - Span Decay Hopper Disch. Line	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vib. - "A" Filter Fines Hopper Disch. Line	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - "A" Reductor Feeder	0.01	ton		\$512.89			\$8	\$0	\$8

Table A-10  
DEMOLITION ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

## TASK-BASED DEMOLITION COSTS

42% Hazardous &amp; Toxic Waste Productivity Factor: Level C, Heavy Work, 70-85°F

Percent Labor Cost 65.00%

Average Hourly Labor Rate

\$42.74

LOC Code	WBS No.	AREA	Quantity	Unit	Material Unit Price	Labor Unit Price	Equipment Unit Price	Material Total Price	Labor Total Price	Equipment Total Price	Total Price
1		Vibrator - UF4 Prim Dust Coll. (F-611)	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - "A" Reduction Feed Hopper	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - "B1" HF Filter (F-608) Disch. Line	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - "B2" HF Filter (F-609) Disch. Line	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - "B" Red. Feed Hopper (U-606)	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - "B" Red. Feed (R-600)	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - "B" Red. Prim Filter	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - "C2" Flator Prim Filter Shell	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - "C1" Flator Prim Filter Shell	0.01	ton		\$512.89			\$8	\$0	\$8
1		Rotary Va. - "A" Reductor Feeder (R-402)	0.03	ton		\$512.89			\$42	\$0	\$42
1		Rotary Va. - Prim. UF4 Dust Coll. Disch.	0.03	ton		\$512.89			\$42	\$0	\$42
1		Rotary Va. - Ash Dust Coll. Disch. (F-422)	0.03	ton		\$512.89			\$42	\$0	\$42
1		Rotary Va. - Spar Decay Hopper Disch.	0.03	ton		\$512.89			\$42	\$0	\$42
1		Rotary Va. - #2 Dry Oxide Dust Coll. Disch.	0.03	ton		\$512.89			\$42	\$0	\$42
1		Rotary Va. - #1 Wet Oxide Dust Coll. Disch.	0.03	ton		\$512.89			\$42	\$0	\$42
1		Rotary Va. - #2 Wet Oxide Dust Coll. Disch.	0.03	ton		\$512.89			\$42	\$0	\$42
1		Rotary Va. - #1 Wet Disch.	0.03	ton		\$512.89			\$42	\$0	\$42
1		Rotary Va. - "B" Reductor Feeder	0.04	ton		\$512.89			\$46	\$0	\$46
1		Rotary Va. - "B" UF4 Prim. Dust Coll. Disch.	0.03	ton		\$512.89			\$42	\$0	\$42
1		Rotary Va. - "Conc. Surge Hopper Feeder	0.03	ton		\$512.89			\$42	\$0	\$42
1		"A" Reductor Hopper Feed Conveyor	0.40	ton		\$512.89			\$484	\$0	\$484
1		Spar Decay Hopper Feed Screw	0.45	ton		\$512.89			\$550	\$0	\$550
1		"B" Reductor Hopper Feed Screw	1	ton		\$512.89			\$843	\$0	\$843
1		"B" UF4 Elevator Disch. Screw	2	ton		\$512.89			\$1,912	\$0	\$1,912
1		"A" UF4 Elevator Disch. Screw	1	ton		\$512.89			\$615	\$0	\$615
1		"B" UF4 Elevator Sec. Feed Screw	0.30	ton		\$512.89			\$365	\$0	\$365
1		Trolley - Over "A" Red BU Filter	0.03	ton		\$512.89			\$32	\$0	\$32
1		Trolley - Over "B.1" Red BU Filter	0.03	ton		\$512.89			\$32	\$0	\$32
1		Trolley - Over "B.2" Red BU Filter	0.03	ton		\$512.89			\$32	\$0	\$32
1		CR-401 Hoist Well Crane	0.00	ton		\$512.89			\$0	\$0	\$0
1		Dryer Prior to Chem Trap	0.03	ton		\$512.89			\$36	\$0	\$36
1		Dryer Prior to Chem Trap	0.03	ton		\$512.89			\$36	\$0	\$36
1		Dryer Prior to Chem Trap	0.20	ton		\$512.89			\$248	\$0	\$248
1		#1 Low Boiler Still Condenser	2	ton		\$512.89			\$2,037	\$0	\$2,037
1		"A" HF Filter Heater	0.28	ton		\$512.89			\$339	\$0	\$339
1		"A2" HF Filter Heater	0.28	ton		\$512.89			\$339	\$0	\$339
1		"A3" HF Filter Heater	0.28	ton		\$512.89			\$339	\$0	\$339
1		"A4" HF Filter Heater	0.28	ton		\$512.89			\$339	\$0	\$339
1		#2 Low Boiler Still Condenser	2	ton		\$512.89			\$2,037	\$0	\$2,037
1		#1 Dravo H&V Unit - Sw	17	ton		\$512.89			\$21,248	\$0	\$21,248
1		#2 Dravo H&V Unit - Se	17	ton		\$512.89			\$21,248	\$0	\$21,248
1		#4 Dravo H&V Unit - Nw	17	ton		\$512.89			\$21,248	\$0	\$21,248
1		Top Heater Filter No. 1B Htr	0.25	ton		\$512.89			\$308	\$0	\$308
1		Top Heater Filter No. 2B Htr	0.25	ton		\$512.89			\$308	\$0	\$308
1		Reductor Filter Htr No.	0.25	ton		\$512.89			\$308	\$0	\$308
1		"A" Reductor BU Filter Htr.	0.25	ton		\$512.89			\$308	\$0	\$308
1		"A" Reductor Exit Gas Cooler	0.02	ton		\$512.89			\$21	\$0	\$21

Table A-10  
DEMOLITION ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

**TASK-BASED DEMOLITION COSTS**

42% Hazardous &amp; Toxic Waste Productivity Factor: Level C, Heavy Work, 70-85°F

Percent Labor Cost 65.00%

Average Hourly Labor Rate

\$42.74

LOC Code	WBS No.	AREA	Quantity	Unit	Material Unit Price	Labor Unit Price	Equipment Unit Price	Material Total Price	Labor Total Price	Equipment Total Price	Total Price
1		"A" Reductor Exit Gas Cooler	0.02	ton		\$512.89			\$21	\$0	\$21
1		#3 Low Boiler Condenser	2	ton		\$512.89			\$2,037	\$0	\$2,037
1		#4 Low Boiler Condenser	2	ton		\$512.89			\$2,037	\$0	\$2,037
1		A Sec. UF4 Dust Cell	3	ton		\$512.89			\$3,825	\$0	\$3,825
1		A Reductor Backup Filter	1	ton		\$512.89			\$1,125	\$0	\$1,125
1		"A1" Top HF Filter	3	ton		\$512.89			\$3,931	\$0	\$3,931
1		"A2" Top HF Filter	3	ton		\$512.89			\$3,931	\$0	\$3,931
1		B-2 Fluorinator Primary Filter	1	ton		\$512.89			\$1,413	\$0	\$1,413
1		B-1 Fluorinator Primary Filter	1	ton		\$512.89			\$1,413	\$0	\$1,413
1		#2 Dry Oxide Dust Coll	29	ton		\$512.89			\$35,219	\$0	\$35,219
1		#1 Wet Oxide Dust Coll. - Primary	0.00	ton		\$512.89			\$0	\$0	\$0
1		A3 Top HF Filter	3	ton		\$512.89			\$3,931	\$0	\$3,931
1		Ash Dust Coll #1	2	ton		\$512.89			\$1,987	\$0	\$1,987
1		A Pri UF4 Dust Coll	17	ton		\$512.89			\$20,267	\$0	\$20,267
1		A-1 Fluorinator Primary Filter	3	ton		\$512.89			\$3,559	\$0	\$3,559
1		B-3 Fluorinator Primary Filter	3	ton		\$512.89			\$3,559	\$0	\$3,559
1		Ash Vac Cleaner	0.28	ton		\$512.89			\$336	\$0	\$336
1		Ash Dust Coll #2 Spar Recycle	5	ton		\$512.89			\$5,666	\$0	\$5,666
1		A6 Top HF Filter	0.43	ton		\$512.89			\$528	\$0	\$528
1		B-2 Fluorinator Backup Filter	0.11	ton		\$512.89			\$131	\$0	\$131
1		B-1 Fluorinator Backup Filter	0.11	ton		\$512.89			\$131	\$0	\$131
1		A-1 Fluorinator Backup Filter	0.11	ton		\$512.89			\$131	\$0	\$131
1		B-3 Fluorinator Backup Filter	0.11	ton		\$512.89			\$131	\$0	\$131
1		B UF4 Spec Dust Coll.	17	ton		\$512.89			\$20,267	\$0	\$20,267
1		Chem. Traps	0.03	ton		\$512.89			\$31	\$0	\$31
1		Chem. Traps	0.03	ton		\$512.89			\$31	\$0	\$31
1		Chem. Traps	0.03	ton		\$512.89			\$31	\$0	\$31
1		Chem. Traps	0.03	ton		\$512.89			\$31	\$0	\$31
1		Chem. Traps	0.03	ton		\$512.89			\$31	\$0	\$31
1		Chem. Traps	0.03	ton		\$512.89			\$31	\$0	\$31
1		Chem. Traps	0.03	ton		\$512.89			\$31	\$0	\$31
1		Chem. Traps	0.03	ton		\$512.89			\$31	\$0	\$31
1		Blow Back Air Filter On F-446	0.01	ton		\$512.89			\$16	\$0	\$16
1		C-1 Fluorinator Primary Filter - West	2	ton		\$512.89			\$2,001	\$0	\$2,001
1		C-2 Fluorinator Primary Filter - Center	2	ton		\$512.89			\$2,001	\$0	\$2,001
1		C-3 Fluorinator Primary Filter - East	2	ton		\$512.89			\$2,001	\$0	\$2,001
1		C-1 Fluorinator Backup Filter - West	1	ton		\$512.89			\$1,045	\$0	\$1,045
1		C-2 Fluorinator Backup Filter - Center	1	ton		\$512.89			\$1,045	\$0	\$1,045
1		C-3 Fluorinator Backup Filter - East	1	ton		\$512.89			\$1,045	\$0	\$1,045
1		"B" Reductor Fri Filter	1	ton		\$512.89			\$1,125	\$0	\$1,125
1		"B" Reductor Backup Filter	1	ton		\$512.89			\$942	\$0	\$942
1		1B Top Hflator Filter	1	ton		\$512.89			\$942	\$0	\$942
1		2B Top Hflator Filter	1	ton		\$512.89			\$942	\$0	\$942
1		B UF4 Pri. Dust Coll.	10	ton		\$512.89			\$12,395	\$0	\$12,395
1		1A Reductor Fri. Filter	1	ton		\$512.89			\$1,125	\$0	\$1,125
1		A-2 Fluorinator Primary Filter - West	1	ton		\$512.89			\$1,045	\$0	\$1,045
1		A-3 Fluorinator Primary Filter - Center	1	ton		\$512.89			\$1,045	\$0	\$1,045

Table A-10

**DEMOLITION ESTIMATE**

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

**TASK-BASED DEMOLITION COSTS**

42% Hazardous &amp; Toxic Waste Productivity Factor: Level C, Heavy Work, 70-85°F

Percent Labor Cost 65.00%

Average Hourly Labor Rate

\$42.74

LOC Code	WBS No.	AREA	Quantity	Unit	Material Unit Price	Labor Unit Price	Equipment Unit Price	Material Total Price	Labor Total Price	Equipment Total Price	Total Price
1		A-2 Fluorinator Backup Filter - West	1	ton		\$512.89			\$1,045	\$0	\$1,045
1		A-3 Fluorinator Backup Filter - Center	1	ton		\$512.89			\$1,045	\$0	\$1,045
1		Welder	0.19	ton		\$512.89			\$237	\$0	\$237
1		Hoist - 500# Cap. - Portable	0.02	ton		\$512.89			\$21	\$0	\$21
1		Hoist - "A" Reductor BU Filter	0.04	ton		\$512.89			\$48	\$0	\$48
1		Hoist - B-1 Filter	0.04	ton		\$512.89			\$48	\$0	\$48
1		Hoist - B-2 Filter	0.04	ton		\$512.89			\$48	\$0	\$48
1		Hoist - F-496 & F-497 Fluorinator Filter	0.04	ton		\$512.89			\$48	\$0	\$48
1		Hoist - F-493 & F-494 Fluorinator Filter	0.04	ton		\$512.89			\$48	\$0	\$48
1		Hoist - AB HF Filter	0.04	ton		\$512.89			\$48	\$0	\$48
1		Hoist - A1 & A2 HF Filter	0.04	ton		\$512.89			\$48	\$0	\$48
1		Hoist - "B" Reductor BU Filter	0.04	ton		\$512.89			\$48	\$0	\$48
1		Hoist - A2 Fri & BU Flation Filter	0.04	ton		\$512.89			\$48	\$0	\$48
1		Hoist - B1 BU Flation Filter & A6 HF Filter	0.04	ton		\$512.89			\$48	\$0	\$48
1		Hoist - Ash Dust Coll.	0.04	ton		\$512.89			\$48	\$0	\$48
1		Hoist - A1 & B2 BU & B2 Prim-Flation Filters	0.04	ton		\$512.89			\$48	\$0	\$48
1		Hoist - A1 & B2 BU & B2 Prim-Flation Filters	0.04	ton		\$512.89			\$48	\$0	\$48
1		Hoist - "B" Red. Prim. Filters	0.04	ton		\$512.89			\$48	\$0	\$48
1		Hoist - "C" Flator Prim. Filters	0.04	ton		\$512.89			\$48	\$0	\$48
1		Hoist - "C" Flator BU Filters	0.04	ton		\$512.89			\$48	\$0	\$48
1		3000# Monorail	0.12	ton		\$512.89			\$149	\$0	\$149
1		2000# Monorail - "C" Flaton Pri Filters	0.33	ton		\$512.89			\$398	\$0	\$398
1		2000# Monorail - "C" Flaton Sec. Filter	0.26	ton		\$512.89			\$319	\$0	\$319
1		6000# Monorail - A1 & B2 BU & B2 Fri Flation Fil.	0.26	ton		\$512.89			\$318	\$0	\$318
1		4000# Monorail - B1 BU Flation & A6 HF Flit.	0.24	ton		\$512.89			\$292	\$0	\$292
1		3500# Monorail - A1 BU, B1 Fri. & B2 BU Flation	0.23	ton		\$512.89			\$280	\$0	\$280
1		4000# Monorail - A2 Fri & A2 BU Flation Fil.	0.17	ton		\$512.89			\$212	\$0	\$212
1		1500# Monorail - #2 Wet Oxide Dust Coll.	0.17	ton		\$512.89			\$212	\$0	\$212
1		4000# Monorail - A1 HF Filter	0.43	ton		\$512.89			\$530	\$0	\$530
1		4000# Monorail - A1 & A2 HF Filter	0.29	ton		\$512.89			\$348	\$0	\$348
1		4000# Monorail - "A" UF4 Sec. Dust Coll	0.29	ton		\$512.89			\$348	\$0	\$348
1		4500# Monorail - "A" Red. BU Filter	0.13	ton		\$512.89			\$159	\$0	\$159
1		6000# Monorail - "B" Reductor BU Filter	0.11	ton		\$512.89			\$131	\$0	\$131
1		1900# Monorail - "B" Reductor BU Filter	0.16	ton		\$512.89			\$195	\$0	\$195
1		1700# Monorail - B2 HF Filter	0.16	ton		\$512.89			\$195	\$0	\$195
1		5500# Monorail - B1 HF Filter	0.16	ton		\$512.89			\$195	\$0	\$195
1		3000# Monorail - #1 Low Boiler Condenser	0.15	ton		\$512.89			\$186	\$0	\$186
1		3000# Monorail - #2 Low Boiler Condenser	0.15	ton		\$512.89			\$186	\$0	\$186
1		3000# Monorail - #3 Low Boiler Condenser	0.15	ton		\$512.89			\$186	\$0	\$186
1		3000# Monorail - #4 Low Boiler Condenser	0.15	ton		\$512.89			\$186	\$0	\$186
1		2000# Monorail - Ash Dust Coll. Blower	0.09	ton		\$512.89			\$106	\$0	\$106
1		2000# Monorail - Ash Dust Coll. Blower Motor	0.09	ton		\$512.89			\$106	\$0	\$106
1		10000# Monorail	0.22	ton		\$512.89			\$264	\$0	\$264
1		10000# Monorail	0.26	ton		\$512.89			\$318	\$0	\$318
1		Monorail - F-496 & F-497 Fluorinator Filter	0.26	ton		\$512.89			\$319	\$0	\$319
1		Monorail - F-493 & F-494 Fluorinator Filter	0.26	ton		\$512.89			\$319	\$0	\$319
1		Silencer - Ash Vac Cl. Exhst.	0.21	ton		\$512.89			\$255	\$0	\$255

Table A-10

**DEMOLITION ESTIMATE**

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

**TASK-BASED DEMOLITION COSTS**

42% Hazardous &amp; Toxic Waste Productivity Factor: Level C, Heavy Work, 70-85°F

Percent Labor Cost 65.00%

Average Hourly Labor Rate

\$42.74

LOC Code	WBS No.	AREA	Quantity	Unit	Material Unit Price	Labor Unit Price	Equipment Unit Price	Material Total Price	Labor Total Price	Equipment Total Price	Total Price
1		"A" UF4 D.C. Exhauster	2	ton		\$512.89			\$2,656	\$0	\$2,656
1		Wet Oxide Dust Coll. Blower	2	ton		\$512.89			\$2,334	\$0	\$2,334
1		UF4 BU D.C. Blower	2	ton		\$512.89			\$2,125	\$0	\$2,125
1		"A" Reducton Exit Cooling Blower	1	ton		\$512.89			\$637	\$0	\$637
1		Ash Vac. Cl. Exhauster	2	ton		\$512.89			\$2,833	\$0	\$2,833
1		Dry Oxide D.C. Blower	4	ton		\$512.89			\$4,869	\$0	\$4,869
1		"A" HF Pri. Jet Scrubber-East	0.05	ton		\$512.89			\$57	\$0	\$57
1		Ash D.C. Exhauster	1	ton		\$512.89			\$850	\$0	\$850
1		"A" HF Sec. Jet Scrubber-West	0.05	ton		\$512.89			\$57	\$0	\$57
1		Dravo H&V Unit #1	6	ton		\$512.89			\$7,012	\$0	\$7,012
1		Dravo H&V Unit #2	6	ton		\$512.89			\$7,012	\$0	\$7,012
1		Dravo H&V Unit #4	6	ton		\$512.89			\$7,012	\$0	\$7,012
1		Dravo Induced Draft Fan	6	ton		\$512.89			\$7,012	\$0	\$7,012
1		Dravo Induced Draft Fan	6	ton		\$512.89			\$7,012	\$0	\$7,012
1		Dravo Induced Draft Fan	6	ton		\$512.89			\$7,012	\$0	\$7,012
1		Roof Exhaust Blower Nxe	6	ton		\$512.89			\$7,012	\$0	\$7,012
1		Roof Exhaust Blower Hoist Well	6	ton		\$512.89			\$7,012	\$0	\$7,012
1		Trane Vent Unit No 317-1	3	ton		\$512.89			\$3,368	\$0	\$3,368
1		Trane Vent Unit No 222-1	5	ton		\$512.89			\$5,666	\$0	\$5,666
1		Exhaust Fan - Sxw	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Exhaust Fan - Wxs	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Exhaust Fan - Wxn	1	ton		\$512.89			\$1,133	\$0	\$1,133
1		Fan - Man Cooler	0.06	ton		\$512.89			\$67	\$0	\$67
1		Vent Fan	0.06	ton		\$512.89			\$67	\$0	\$67
1		"B" Reductor Exit Gas Cooler Blower	0.15	ton		\$512.89			\$183	\$0	\$183
1		Drinking Water Cooler	0.04	ton		\$512.89			\$51	\$0	\$51
1		Scrubber, A Green Salt Dust Collector	0.38	ton		\$512.89			\$464	\$0	\$464
1		Scrubber, B Green Salt Dust Collector	0.38	ton		\$512.89			\$464	\$0	\$464
1		SW-22 Switchboard - See Dwg MTW-A0029	0.33	ton		\$512.89			\$403	\$0	\$403
1		SW-23 Switchboard - See Dwg MTW-A0030	0.3	ton		\$512.89			\$366	\$0	\$366
1		UF4 Hopper	0	ton		\$512.89			\$0	\$0	\$0

Table A-10

## DEMOLITION ESTIMATE

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

## TASK-BASED DEMOLITION COSTS

42% Hazardous &amp; Toxic Waste Productivity Factor: Level C, Heavy Work, 70-85°F

Percent Labor Cost 65.00%

Average Hourly Labor Rate \$42.74

Percent Labor Cost 65.00 %					Average Hourly Labor Rate \$42.74						
LOC Code	WBS No.	AREA	Quantity	Unit	Material Unit Price	Labor Unit Price	Equipment Unit Price	Material Total Price	Labor Total Price	Equipment Total Price	Total Price
1		Spar Decay Hopper	0	ton		\$512.89			\$0	\$0	\$0
1		Air Blow Back Surge Tank	0.24	ton		\$512.89			\$297	\$0	\$297
1		"A" Reductor Feed Hopper	7	ton		\$512.89			\$8,853	\$0	\$8,853
1		"B" Reductor Feed Hopper	7	ton		\$512.89			\$8,853	\$0	\$8,853
1		Vibrtr-On No2 Dry Ox Dust Coil Hppr(F412)	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - On"A"Sec UF4 Dust Coil	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - On"B"Sect UF4 Dust Coll(F450)	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - On"A"Red Exit Gas Cooler(E625)	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - On"B"Red Exit Gas Cooler(E632)	0.01	ton		\$512.89			\$8	\$0	\$8
1		Vibrator - On (F-450)	0.01	ton		\$512.89			\$8	\$0	\$8
1		Rotary Valve-"A"UF4 Sec D.C. Disch	0.03	ton		\$512.89			\$42	\$0	\$42
1		Rotary Valve-"B"UF4 Sec D.C. Disch	0.03	ton		\$512.89			\$42	\$0	\$42
1		Equipment Removal Average Over Entire Basement	5,134	SF	\$0.00	\$49.78	\$0.00	\$0.00	\$255,594	\$0	\$255,594
1		Equipment Removal Sodium Removal/Ion Exchange Bldg	3,808	SF	\$0.00	\$49.78	\$0.00	\$0.00	\$189,579	\$0	\$189,579
1		Equipment Removal Sodium Removal/Ion Exchange Bldg	2,520	SF	\$0.00	\$49.78	\$0.00	\$0.00	\$125,457	\$0	\$125,457
1		Equipment Removal KOH Muds Building	2,394	SF	\$0.00	\$49.78	\$0.00	\$0.00	\$119,184	\$0	\$119,184
1		Equipment Removal Uranium Recovery Building	4,560	SF	\$0.00	\$49.78	\$0.00	\$0.00	\$227,017	\$0	\$227,017
1		Equipment Removal Uranium Recovery Building	1,100	SF	\$0.00	\$49.78	\$0.00	\$0.00	\$54,763	\$0	\$54,763
1		Equipment Removal FM Building Southeast pad	3,888	SF	\$0.00	\$49.78	\$0.00	\$0.00	\$193,562	\$0	\$193,562
1		Equipment Removal FM Building Southwest pad	3,564	SF	\$0.00	\$49.78	\$0.00	\$0.00	\$177,432	\$0	\$177,432
1		Equipment Removal Sample Plant	4,488	SF	\$0.00	\$49.78	\$0.00	\$0.00	\$223,433	\$0	\$223,433
2		Equipment Removal Pond Muds Filter Calciner Bldg	1,125	SF	\$0.00	\$49.78	\$0.00	\$0.00	\$56,008	\$0	\$56,008
2		Equipment Removal Cylinder Wash Building	504	SF	\$0.00	\$49.78	\$0.00	\$0.00	\$25,091	\$0	\$25,091
2		Equipment Removal Drum Crusher Building	5,340	SF	\$0.00	\$49.78	\$0.00	\$0.00	\$265,849	\$0	\$265,849
4		Contaminated Soil at Sampling Plant Railroad Tracks	132	CY		\$5.77	\$5.95		\$1,811	\$1,868	\$3,679
4		Contaminated Soil at Sampling Plant North Fence	5	CY		\$5.77	\$5.95		\$67	\$69	\$136
4		Contaminated Debris at Sampling Plant Railroad Tracks	2	ton		\$512.89			\$2,149	\$0	\$2,149
-		Miscellaneous Debris <sup>(3)</sup>	4,000	CF							\$25,000
							2012 TOTALS	\$53,635.13	\$4,972,507	\$395,460	\$5,421,602
							2015 TOTALS	\$61,841	\$5,733,300	\$455,965	\$6,251,107

Total over 1st to 5th floors of FM Building \$2,271,514

Floor area of 1st to 5th floors of FM Building: 30,804 ft<sup>2</sup>

Average per ft<sup>2</sup> for 1st to 5th floors of FM Building: \$73.74

## Notes:

- (1) Due to rounding of values, the calculated values may not be exact (see Table A-10 in the 2006 Report prepared by Duratek).
- (2) In the 2012 update, the following 2009 cost items were removed because these items have been disposed based on interviewing site personnel and verified through site inspection: BM/FM Building LLRW Trash in drums, Material on Waste Pad/Other, BM/FM Building LLRW Trash in B-25 Boxes, BM/FM Building LLRW Trash in Blue Boxes, Scrap Metal, New Scrap Metal, and 16"x16"x8" cubes on Metals Pad, Imhoff Sludge and Outfall Material in Crusher Building, RAM Flat Compactor, Conveyor for RAM Flat Compactor, HEPA unit for RAM Flat Compactor, Drum Washer, and Equipment Removal Surface Treatment Pad.  
Between 2009 and 2012, over 20 million pounds of waste has been removed and disposed of as a result of the improved waste management activities.
- (3) Improved waste management practices continued so the current steady state site radiological waste volume was not modified for the 2015 upate to the decommissioning cost estimate.

**APPENDIX A-11**

Table A-11

## DECONTAMINATION COSTS

Honeywell - Metropolis Works (MTW) Metropolis, Illinois

## SPECIFIC AREA SURFACE REMOVAL COST ANALYSES WITH ENERGYSOLUTIONS' DISPOSAL

APP. CODE	METHODOLOGY	AREA	ITEM	LOC CODE	SURFACE AREA (ft <sup>2</sup> )	MATERIAL THICK (inch)	CONTAM. REMOVAL DEPTH (inch)	CONTAM. WASTE DENSITY (lb/ft <sup>3</sup> )	CONTAMINATED VOLUME (ft <sup>3</sup> )	CONTAM. WEIGHT (pounds)	"ENERGYSOLUTIONS' WASTE DISPOSAL COSTS"				
											BURIAL & SHIP COST	PROCESS UNIT COST (\$/ft <sup>2</sup> )	PROCESS COST	SURFACE RELEASE COST	COST
25	EDCO CPU-10C Floor Plane - 1/2"	Sample Plant Building	Floor	1	4,488	8	0.5	66.7	280.5	18,700	\$65,097	2.619	\$11,754	\$6,565	\$83,416
25	EDCO CPU-10C Floor Plane - 1/2"	Ore Storage Building	Floor	2	611	8	0.5	66.7	38.2	2,546	\$8,862	2.619	\$1,600	\$894	\$11,356
25	EDCO CPU-10C Floor Plane - 1/2"	Bed Material Fines Building	Floor	2	14,140	8	0.5	66.7	883.8	58,917	\$205,097	2.619	\$37,033	\$20,684	\$262,814
25	EDCO CPU-10C Floor Plane - 1/2"	Cylinder Wash Building	Floor	2	1,125	8	0.5	66.7	70.3	4,688	\$16,318	2.619	\$2,946	\$1,646	\$20,910
25	EDCO CPU-10C Floor Plane - 1/2"	Drum Crusher Building	Floor	2	5,340	8	0.5	66.7	333.8	22,250	\$77,455	2.619	\$13,985	\$7,811	\$99,252
		Hazardous Waste Storage Building	Floor	2	750	8	0.5	66.7	46.9	3,125	\$10,879	2.619	\$1,964	\$1,097	\$13,940
25	EDCO CPU-10C Floor Plane - 1/2"	KOH Muds Building	Floor	1	2,394	8	0.5	66.7	149.6	9,975	\$34,724	2.619	\$6,270	\$3,502	\$44,496
25	EDCO CPU-10C Floor Plane - 1/2"	Sodium Removal Building	Floor	1	3,808	8	0.5	66.7	238.0	15,867	\$55,234	2.619	\$9,973	\$5,570	\$70,778
25	EDCO CPU-10C Floor Plane - 1/2"	U Recovery Building	Floor	1	4,560	8	0.5	66.7	285.0	19,000	\$66,142	2.619	\$11,943	\$6,670	\$84,755
25	EDCO CPU-10C Floor Plane - 1/2"	Calciner Building	Floor	1	1,125	8	0.5	66.7	70.3	4,688	\$16,318	2.619	\$2,946	\$1,646	\$20,910
25	EDCO CPU-10C Floor Plane - 1/2"	Ore Storage Pad #1	Floor	1	12,402	8	0.5	66.7	775.1	51,675	\$179,888	2.619	\$32,481	\$18,142	\$230,511
25	EDCO CPU-10C Floor Plane - 1/2"	Ore Storage Pad #2	Floor	1	14,040	8	0.5	66.7	877.5	58,500	\$203,647	2.619	\$36,771	\$20,538	\$260,955
25	EDCO CPU-10C Floor Plane - 1/2"	Ore Storage Pad #3	Floor	1	30,459	8	0.5	66.7	1903.7	126,913	\$441,800	2.619	\$79,772	\$44,556	\$566,128
25	EDCO CPU-10C Floor Plane - 1/2"	Ore Storage Pad #4	Floor	1	38,400	8	0.5	66.7	2400.0	160,000	\$556,982	2.619	\$100,570	\$56,172	\$713,724
25	EDCO CPU-10C Floor Plane - 1/2"	Ore Storage Pad #5	Floor	1	42,508	8	0.5	66.7	2656.8	177,117	\$616,568	2.619	\$111,328	\$62,181	\$790,077
25	EDCO CPU-10C Floor Plane - 1/2"	KOH Muds Storage Pad	Floor	1	8,652	8	0.5	66.7	540.8	36,050	\$125,495	2.619	\$22,660	\$12,656	\$160,811
25	EDCO CPU-10C Floor Plane - 1/2"	Drum Storage Pad	Floor	1	7,210	8	0.5	66.7	450.6	30,042	\$104,579	2.619	\$18,883	\$10,547	\$134,009
25	EDCO CPU-10C Floor Plane - 1/2"	Waste Storage Pad	Floor	1	3,721	8	0.5	66.7	232.6	15,504	\$53,972	2.619	\$9,745	\$5,443	\$69,161
TOTAL:									12,233.3	815,554	\$2,839,056		\$512,625	\$286,322	\$3,638,003

## SPECIFIC AREA SURFACE CLEANING COST ANALYSES WITH ENERGYSOLUTIONS' DISPOSAL

APP. CODE	METHODOLOGY	AREA	ITEM	LOC CODE	WBS No.	0.0929 SURFACE AREA (ft <sup>2</sup> )	ft <sup>2</sup> per m <sup>2</sup> GENERATED RW VOLUME (ft <sup>2</sup> )	GENERATED WASTE DENSITY (lb/ft <sup>3</sup> )	GENERATED WASTE WEIGHT (pound)	BURIAL & SHIP COST	PROCESS UNIT COST (\$/ft <sup>2</sup> )	PROCESS COST	SURFACE RELEASE COST	COST
42	Hands-On-Decon	Ore Storage Building	50% Walls	2		3,510	29.3	25.0	731.3	\$6,781	4.89	\$17,158	\$5,134	\$29,074
42	Hands-On-Decon	Ore Storage Building	10% Roof	2		1,306	10.9	25.0	272.2	\$2,524	4.89	\$6,384	\$1,910	\$10,819
42	Hands-On-Decon	Bed Material Fines Building	50% Walls	2		4,080	34.0	25.0	850.0	\$7,882	4.89	\$19,945	\$5,968	\$33,795
42	Hands-On-Decon	Bed Material Fines Building	10% Roof	2		1,414	11.8	25.0	294.6	\$2,732	4.89	\$6,912	\$2,068	\$11,713
42	Hands-On-Decon	Cylinder Wash Building	50% Walls	2		1,050	8.8	25.0	218.8	\$2,029	4.89	\$5,133	\$1,536	\$8,698
42	Hands-On-Decon	Cylinder Wash Building	10% Roof	2		113	0.9	25.0	23.4	\$217	4.89	\$552	\$165	\$935
42	Hands-On-Decon	Drum Crusher Building	50% Walls	2		2,235	18.6	25.0	465.6	\$4,318	4.89	\$10,926	\$3,269	\$18,513
42	Hands-On-Decon	Drum Crusher Building	10% Roof	2		534	4.5	25.0	111.3	\$1,032	4.89	\$2,610	\$781	\$4,424
		Hazardous Waste Storage Building	50% Walls	2		825	6.9	25.0	171.9	\$1,594	4.89	\$4,033	\$1,207	\$6,834
		Hazardous Waste Storage Building	10% Roof	2		75	0.6	25.0	15.6	\$145	4.89	\$367	\$110	\$621
42	Hands-On-Decon	Lab Sink Drains	Drain Pipe	5		500	4.2	25.0	104.2	\$966	4.89	\$2,444	\$731	\$4,142
SUBTOTAL:							130.5		3,258.9	\$30,220		\$76,464	\$22,881	\$129,566

Note: Due to rounding of values the calculated values may not be exact (see Table A-11 in the 2006 Report prepared by Duratek)





Table A-12  
VOLUME REDUCTION COSTS  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

SPECIFIC MATERIAL VOLUME REDUCTION COST ANALYSES - ENERGYSOLUTIONS' BEAR CREEK PROCESSING (BCO) FACILITY								
APP. CODE	VOLUME REDUCTION METHODOLOGY	AREA	ITEM	ITEM CODE	CONTAMINATED VOLUME (ft <sup>3</sup> )	BULK DENSITY (lb/ft <sup>3</sup> )	CONTAMINATED WEIGHT (pound)	PROCESS COST
88	Boxes >60 lbs/ft for BSFR	Sample Plant	Equipment Sample Plant	1	7,715	62	480,234	\$153,675
84	Added Charge for Failed BSFR	Sample Plant	Equipment Sample Plant	1	386	62	23,917	\$60,270
88	Boxes >60 lbs/ft for BSFR	Cylinder Wash Building	Equipment Cylinder Wash Building	2	866	62	53,930	\$17,258
84	Added Charge for Failed BSFR	Cylinder Wash Building	Equipment Cylinder Wash Building	2	43	62	2,685	\$6,765
88	Boxes >60 lbs/ft for BSFR	Drum Crusher Building	Equipment Drum Crusher Building	2	9,180	62	571,401	\$182,848
84	Added Charge for Failed BSFR	Drum Crusher Building	Equipment Drum Crusher Building	2	459	62	28,458	\$71,714
88	Boxes >60 lbs/ft for BSFR	FM Building	FM Building Demolition Concrete Rubble	1	9,677	75	725,775	\$232,248
84	Added Charge for Failed BSFR	FM Building	FM Building Demolition Concrete Rubble	1	484	75	36,289	\$91,448
88	Boxes >60 lbs/ft for BSFR	FM Building	FM Pads Demolition Concrete Rubble	1	2,650	107	282,490	\$90,397
84	Added Charge for Failed BSFR	FM Building	FM Pads Demolition Concrete Rubble	1	133	107	14,178	\$35,727
88	Boxes >60 lbs/ft for BSFR	Storage Pads	Cold Concrete (Construction Rubble)	3	5,250	60	315,000	\$100,800
88	Boxes >60 lbs/ft for BSFR	FM Building	Soil Under FM Bldg - 1'	1	7,332	80	586,530	\$187,690
84	Added Charge for Failed BSFR	FM Building	Soil Under FM Bldg - 1'	1	367	80	29,328	\$73,907
88	Boxes >60 lbs/ft for BSFR	FM Building	Soil Under FM Bldg Pad SE - 1'	1	5,540	80	443,232	\$141,834
84	Added Charge for Failed BSFR	FM Building	Soil Under FM Bldg Pad SE - 1'	1	277	80	22,160	\$55,843
88	Boxes >60 lbs/ft for BSFR	FM Building	Soil Under FM Bldg Pad SW - 1'	1	5,079	80	406,296	\$130,015
84	Added Charge for Failed BSFR	FM Building	Soil Under FM Bldg Pad SW - 1'	1	254	80	20,316	\$51,196
88	Boxes >60 lbs/ft for BSFR	Outdoor Plant Areas	Plant areas P-1 through P-25 1 foot depth	1	694,998	80	55,599,816	\$17,791,941
84	Added Charge for Failed BSFR	Outdoor Plant Areas	Plant areas P-1 through P-25 1 foot depth	1	34,750	80	2,779,991	\$7,005,577
88	Boxes >60 lbs/ft for BSFR	Outdoor Plant Areas	Plant areas P-1 through P-25 1 to 6 foot depth	1	325,545	80	26,043,595	\$8,333,950
84	Added Charge for Failed BSFR	Outdoor Plant Areas	Plant areas P-1 through P-25 1 to 6 foot depth	1	16,277	80	1,302,180	\$3,281,493
88	Boxes >60 lbs/ft for BSFR	Settling Ponds	Settling Ponds #3 & #4 - 3'	3	19,238	80	1,539,000	\$492,480
84	Added Charge for Failed BSFR	Settling Ponds	Settling Ponds #3 & #4 - 3'	3	962	80	76,952	\$193,919
88	Boxes >60 lbs/ft for BSFR	Outdoor Non-Plant Areas	Additional non-plant soils & sub-surface piping	4	340,539	80	27,243,098	\$8,717,791
84	Added Charge for Failed BSFR	Outdoor Non-Plant Areas	Additional non-plant soils & sub-surface piping	4	17,027	80	1,362,155	\$3,432,630
88	Boxes >60 lbs/ft for BSFR	Drum Compactor Area	Conveyor from Drum Compactor	2	75	20	1,500	\$480
84	Added Charge for Failed BSFR	Drum Compactor Area	Conveyor from Drum Compactor	2	4	20	75	\$189
-	Boxes >60 lbs/ft for BSFR	General Plant Area	Miscellaneous Debris	7	2,750	62	170,500	\$54,560
-	Added Charge for Failed BSFR	General Plant Area	Miscellaneous Debris	7	138	62	8,525	\$21,483
							TOTAL	\$51,010,128

Notes

- (1) Due to rounding of values, the calculated values may not be exact.
- (2) BSFR = Bulk Survey for Release
- (3) Assumed 5 percent BSFR failure for all contaminated items.
- (4) The 2015 costs for BSFR disposal is \$0.32/pound (which includes \$0.02/pound tax levied by State of Tennessee) based on public quote from EnergySolutions. The cost to disposal of materials not meeting the BSFR criteria is \$2.52/pound.
- (5) In 2009, the following cost items were removed: Scrap Metal, New Scrap Metal, and 16" x 16" x 8" cubes on Metals Pad, Thin Walled UF6 Cylinders, and I-HF Mitigation & Fire Water Line Rupture because these items have been removed from the site based on interviewing site personnel and verified through site inspection. Between 2009 and 2012, over 20 million pounds of waste has been removed and disposed of as a result of the improved waste management.
- (5) In 2015, the molyflush cylinders were removed.



Table A-13  
MISCELLANEOUS ITEM VOLUME ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

DESCRIPTION	LOC CODE	UNITS	NO. OF UNITS	MAT'L OF CONST.	BULK DENSITY (lb/ft <sup>3</sup> )	UNIT WEIGHT (lb)	UNIT VOLUME (ft <sup>3</sup> )	TOTAL WEIGHT (pound)	TOTAL VOLUME (ft <sup>3</sup> )	PERCENT DIRECT BURY (vol %)	ESOLUTIONS DISPOSAL WEIGHT (pound)	ESOLUTIONS DISPOSAL VOLUME (ft <sup>3</sup> )
Equipment Average Over Entire Basement	1	ft <sup>2</sup>	5,134	FM-Basement	62.2			549,358	8,825.94	70%	384,551	6,178
R-123 Refrigerant Analyzer	1	each	1	FM-1st Floor	58.0	69.0	1.2	70	1.20	100%	70	1
R-123 Refrigerant Analyzer	1	each	1	FM-1st Floor	58.0	86.0	1.5	87	1.50	100%	87	2
Concentrate Elevator	1	each	1	FM-1st Floor	58.0	31,706.7	546.7	31,709	546.70	100%	31,709	547
Prepared Feed Elevator	1	each	1	FM-1st Floor	58.0	37,120.0	640.0	37,120	640.00	100%	37,120	640
"A" UF4 Elevator	1	each	1	FM-1st Floor	58.0	33,495.0	577.5	33,495	577.50	100%	33,495	578
Bed Recycle Elevator	1	each	1	FM-1st Floor	58.0	20,138.9	347.2	20,138	347.20	100%	20,138	347
Milled Feed Elevator	1	each	1	FM-1st Floor	58.0	20,300.0	350.0	20,300	350.00	100%	20,300	350
Passenger Elevator	1	each	1	FM-1st Floor	58.0	4,900.0	84.5	4,901	84.50	100%	4,901	85
Freight Elevator	1	each	1	FM-1st Floor	115.0	500.0	4.3	495	4.30	100%	495	4
UF4 Feed Screw - 3rd Floor	1	each	1	FM-1st Floor	58.0	232.0	4.0	232	4.00	100%	232	4
Green Salt Feed Screw - 2nd Floor	1	each	1	FM-1st Floor	58.0	232.0	4.0	232	4.00	100%	232	4
Green Salt Dispenser - 2nd floor	1	each	1	FM-1st Floor	58.0	232.0	4.0	232	4.00	100%	232	4
Ore Blender Disc. Screw	1	each	1	FM-1st Floor	187.0	313.0	1.7	318	1.70	100%	318	2
"B" UF4 Elevator	1	each	1	FM-1st Floor	58.0	28,072.0	484.0	28,072	484.00	100%	28,072	484
Prepared Feed Drum Inverter Discharge Screw	1	each	1	FM-1st Floor	200.0	906.0	4.5	900	4.50	100%	900	5
UF6 Cyl. Hdlg. Crane - Runway & Bridge	1	each	1	FM-1st Floor	58.0	11,571.0	199.5	11,571	199.50	100%	11,571	200
Crane Trolley Car	1	each	1	FM-1st Floor	58.0	11,571.0	199.5	11,571	199.50	100%	11,571	200
Lifting Beam for Shannahan Crane	1	each	1	FM-1st Floor	167.0	2,000.0	12.0	2,004	12.00	100%	2,004	12
"A" HF Preheater	1	each	1	FM-1st Floor	151.0	7,200.0	47.8	7,218	47.80	100%	7,218	48
"A" Bot. Hydrofluorinator Heater	1	each	1	FM-1st Floor	216.0	3,364.4	15.6	3,370	15.60	100%	3,370	16
#4 Steam Chest	1	each	1	FM-1st Floor	58.0	11,616.0	200.3	11,617	200.30	100%	11,617	200
#3 Steam Chest	1	each	1	FM-1st Floor	58.0	11,616.0	200.3	11,617	200.30	100%	11,617	200
Tempered Water Tank Cooling Coil	1	each	1	FM-1st Floor	89.0	8,529.6	96.1	8,553	96.10	100%	8,553	96
Sample Cold Trap	1	each	1	FM-1st Floor	117.0	566.0	4.8	562	4.80	100%	562	5
UF6 lab. Samples Cyl. Emptying Manifold	1	each	1	FM-1st Floor	71.0	345.0	4.8	341	4.80	100%	341	5
Sample Cold Trap	1	each	1	FM-1st Floor	71.0	345.0	4.8	341	4.80	100%	341	5
Unit Heater	1	each	1	FM-1st Floor	58.0	245.0	24.1	1,398	24.10	100%	1,398	24
Oil Cooler heat Exchanger	1	each	1	FM-1st Floor	200.0	31.0	0.2	40	0.20	100%	40	0
Glycol heat Exchanger	1	each	1	FM-1st Floor	200.0	31.0	0.2	40	0.20	100%	40	0
Over Feed Brine Cooler	1	each	1	FM-1st Floor	152.0	14,550.0	95.9	14,577	95.90	100%	14,577	96
Economizer	1	each	1	FM-1st Floor	152.0	14,550.0	95.9	14,577	95.90	100%	14,577	96
R-134a Condenser	1	each	1	FM-1st Floor	200.0	6,108.6	30.5	6,100	30.50	100%	6,100	31
R-134a Liquid Suction in Heat Exchanger	1	each	1	FM-1st Floor	200.0	1,260.0	6.3	1,260	6.30	100%	1,260	6
Condenser - R-123 (Top)	1	each	1	FM-1st Floor	200.0	1,254.5	6.3	1,260	6.30	100%	1,260	6
Condenser - Cooler - R-123 & R-134a (Bottom)	1	each	1	FM-1st Floor	200.0	2,822.5	14.1	2,820	14.10	100%	2,820	14
Condenser - R-134a Pump Down	1	each	1	FM-1st Floor	200.0	6,100.0	30.5	6,100	30.50	100%	6,100	31
#2 Steam Chest	1	each	1	FM-1st Floor	58.0	11,616.0	200.3	11,617	200.30	100%	11,617	200
#1 Steam Chest	1	each	1	FM-1st Floor	58.0	11,616.0	200.3	11,617	200.30	100%	11,617	200
"B" HF Preheater	1	each	1	FM-1st Floor	139.0	7,200.0	52.0	7,228	52.00	100%	7,228	52
"B" Bottom Hydrofluorinator Heater	1	each	1	FM-1st Floor	58.0	14,570.7	251.2	14,570	251.20	100%	14,570	251
Flame Tower Preheater (Former "A")	1	each	1	FM-1st Floor	58.0	1,240.6	21.4	1,241	21.40	100%	1,241	21
Strip Heaters - Upper Section Ctr.	1	each	1	FM-1st Floor	62.0	428.0	6.9	428	6.90	100%	428	7

Table A-13  
MISCELLANEOUS ITEM VOLUME ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

DESCRIPTION	LOC CODE	UNITS	NO. OF UNITS	MAT'L OF CONST.	BULK DENSITY (lb/ft <sup>3</sup> )	UNIT WEIGHT (lb)	UNIT VOLUME (ft <sup>3</sup> )	TOTAL WEIGHT (pound)	TOTAL VOLUME (ft <sup>3</sup> )	PERCENT DIRECT BURY (vol %)	ESOLUTIONS DISPOSAL WEIGHT (pound)	ESOLUTIONS DISPOSAL VOLUME (ft <sup>3</sup> )
Strip Heaters - Upper Section Ctr.	1	each	1	FM-1st Floor	62.0	428.0	6.9	428	6.90	100%	428	7
Cooling Coils - Lower Section Ctr.	1	each	1	FM-1st Floor	62.0	428.0	6.9	428	6.90	100%	428	7
Cooling Coils - Lower Section Ctr.	1	each	1	FM-1st Floor	62.0	428.0	6.9	428	6.90	100%	428	7
Mist Eliminator for Vacuum Pump	1	each	1	FM-1st Floor	58.0	120.0	3.1	180	3.10	100%	180	3
Oxide Vacuum Filter	1	each	1	FM-1st Floor	58.0	1,390.2	34.8	2,018	34.80	100%	2,018	35
UF4 Vacuum Filter	1	each	1	FM-1st Floor	58.0	1,390.2	34.8	2,018	34.80	100%	2,018	35
Ash Vacuum Cleaner	1	each	1	FM-1st Floor	58.0	1,390.2	34.8	2,018	34.80	100%	2,018	35
UF4 Vacuum Cleaner	1	each	1	FM-1st Floor	58.0	7,855.0	1,543.0	89,494	1,543.00	100%	89,494	1,543
Ash Vacuum Cleaner	1	each	1	FM-1st Floor	58.0	1,390.2	34.8	2,018	34.80	100%	2,018	35
Oxide Vacuum Cleaner - Dust Collector	1	each	1	FM-1st Floor	58.0	4,670.4	116.8	6,774	116.80	100%	6,774	117
Oxide Vacuum Cleaner - Dust Collector	1	each	1	FM-1st Floor	77.0	900.0	11.6	893	11.60	100%	893	12
UF4 Vacuum Cleaner	1	each	1	FM-1st Floor	77.0	900.0	11.6	893	11.60	100%	893	12
Spar Filter Fines Drum Dumper	1	each	1	FM-1st Floor	58.0	1,661.5	66.5	3,857	66.50	100%	3,857	67
Hot Box (East)	1	each	1	FM-1st Floor	58.0	1,600.0	64.0	3,712	64.00	100%	3,712	64
Hot Box (West)	1	each	1	FM-1st Floor	58.0	2,795.0	111.8	6,484	111.80	100%	6,484	112
500# Mit-E-Lift, Portable Hoist	1	each	1	FM-1st Floor	58.0	56.0	0.58	34	0.58	100%	34	1
Crane Trolley Car	1	each	1	FM-1st Floor	58.0	11,571.0	199.5	11,571	199.50	100%	11,571	200
Lifting Beam for Shannahan Crane	1	each	1	FM-1st Floor	167.0	2,000.0	12.0	2,004	12.00	100%	2,004	12
UF4 Mill - 3rd Floor	1	each	1	FM-1st Floor	58.0	2,500.0	30.0	1,740	30.00	100%	1,740	30
Stone Saw - Type M-75	1	each	1	FM-1st Floor	58.0	1,440.9	24.8	1,438	24.80	100%	1,438	25
Bench Grinder - Queen Sity UF792	1	each	1	FM-1st Floor	58.0	116.0	2.0	116	2.00	100%	116	2
Bench Grinder - Stand	1	each	1	FM-1st Floor	58.0	400.0	20.0	1,160	20.00	100%	1,160	20
Drum Inverter	1	each	1	FM-1st Floor	58.0	4,176.0	72.0	4,176	72.00	100%	4,176	72
Ore Concrete Blender	1	each	1	FM-1st Floor	58.0	10,300.0	432.4	25,079	432.40	100%	25,079	432
UF6 Cylinder Cart	1	each	1	FM-1st Floor	58.0	6,027.2	103.9	6,026	103.90	100%	6,026	104
UF4 Drum Inverter	1	each	1	FM-1st Floor	58.0	4,176.0	72.0	4,176	72.00	100%	4,176	72
Articulated arm for Fluorinators	1	each	1	FM-1st Floor	58.0	258.0	4.4	255	4.40	100%	255	4
Manlift - East	1	each	1	FM-1st Floor	58.0	2,400.0	332.5	19,285	332.50	100%	19,285	333
Manlift - West	1	each	1	FM-1st Floor	58.0	2,400.0	332.5	19,285	332.50	100%	19,285	333
Personnel Funnel Cone for Above	1	each	1	FM-1st Floor	58.0	288.0	9.3	539	9.30	100%	539	9
10,000# Cap - Monorail -Maint Area	1	each	1	FM-1st Floor	117.0	2,040.0	17.5	2,048	17.50	100%	2,048	18
2,000# Cap - Monorail -Spar Recycle Area	1	each	1	FM-1st Floor	124.0	345.0	2.8	347	2.80	100%	347	3
4,500# Cap - Monorail -"A" Green Salt Area	1	each	1	FM-1st Floor	145.0	173.0	1.2	174	1.20	100%	174	1
9,500# Cap - Monorail -G.E. Dissoc. Retorts	1	each	1	FM-1st Floor	220.0	612.0	2.8	616	2.80	100%	616	3
4,500# Cap - Monorail -"A" Green Salt Area	1	each	1	FM-1st Floor	145.0	216.0	1.5	218	1.50	100%	218	2
4,000# Cap - Monorail - "Q" Refrigeration Area	1	each	1	FM-1st Floor	133.0	450.0	3.4	452	3.40	100%	452	3
#2 Vacuum Pump	1	each	1	FM-1st Floor	58.0	230.0	10.4	603	10.40	100%	603	10
Cooling Air Blower - East	1	each	1	FM-1st Floor	95.0	56.0	0.6	57	0.60	100%	57	1
Cooling Air Blower - West	1	each	1	FM-1st Floor	95.0	56.0	0.6	57	0.60	100%	57	1
Glycol Circ. Pump - Basement	1	each	1	FM-1st Floor	58.0	286.0	10.0	580	10.00	100%	580	10
R-123 Gear Aux. Oil Pump	1	each	1	FM-1st Floor	550.0	50.0	0.11	55	0.10	100%	55	0
Bottom Hydrofluorinator Blower	1	each	1	FM-1st Floor	58.0	300.0	32.0	1,856	32.00	100%	1,856	32
FM Bldg. Exh. Fan	1	each	1	FM-1st Floor	58.0	400.0	379.8	22,028	379.80	100%	22,028	380

Table A-13  
MISCELLANEOUS ITEM VOLUME ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

DESCRIPTION	LOC CODE	UNITS	NO. OF UNITS	MAT'L OF CONST.	BULK DENSITY (lb/ft <sup>3</sup> )	UNIT WEIGHT (lb)	UNIT VOLUME (ft <sup>3</sup> )	TOTAL WEIGHT (pound)	TOTAL VOLUME (ft <sup>3</sup> )	PERCENT DIRECT BURY (vol %)	ESOLUTIONS DISPOSAL WEIGHT (pound)	ESOLUTIONS DISPOSAL VOLUME (ft <sup>3</sup> )
Sample Vacuum Pump	1	each	1	FM-1st Floor	58.0	230.0	10.4	603	10.40	100%	603	10
Exhaust Fan - Distillation	1	each	1	FM-1st Floor	58.0	230.0	32.0	1,856	32.00	100%	1,856	32
Flame Tower Vacuum Pump - 2nd Floor	1	each	1	FM-1st Floor	58.0	230.0	10.4	603	10.40	100%	603	10
Exhaust Fan - South Center	1	each	1	FM-1st Floor	58.0	230.0	32.0	1,856	32.00	100%	1,856	32
Exhaust Fan - West	1	each	1	FM-1st Floor	58.0	230.0	32.0	1,856	32.00	100%	1,856	32
Exhaust Fan - Maintenance Area	1	each	1	FM-1st Floor	58.0	230.0	32.0	1,856	32.00	100%	1,856	32
Basement Exhaust Fan - Hoistwell	1	each	1	FM-1st Floor	58.0	230.0	32.0	1,856	32.00	100%	1,856	32
Bottom Hydrofluorinator Air Circulation Fan	1	each	1	FM-1st Floor	58.0	600.0	251.2	14,570	251.20	100%	14,570	251
Bottom Hydrofluorinator Comp. Air Blower	1	each	1	FM-1st Floor	58.0	450.0	27.0	1,566	27.00	100%	1,566	27
Exhaust Fan - Sxw	1	each	1	FM-1st Floor	58.0	230.0	32.0	1,856	32.00	100%	1,856	32
Refrigeration Vent Blower	1	each	1	FM-1st Floor	58.0	230.0	32.0	1,856	32.00	100%	1,856	32
Water Cooler	1	each	1	FM-1st Floor	58.0	83.0	6.0	348	6.00	100%	348	6
Portable Air conditioner	1	each	1	FM-1st Floor	58.0	440.0	25.0	1,450	25.00	100%	1,450	25
R-123 Centrifugal Compressor	1	each	1	FM-1st Floor	58.0	32,480.0	812.0	47,096	812.00	100%	47,096	812
R-123 Purge Unit	1	each	1	FM-1st Floor	58.0	16,393.8	409.8	23,768	409.80	100%	23,768	410
R-134a Purge Unit	1	each	1	FM-1st Floor	58.0	16,393.8	409.8	23,768	409.80	100%	23,768	410
Refrigerant Management System	1	each	1	FM-1st Floor	58.0	960.0	24.0	1,392	24.00	100%	1,392	24
R-123 High Eff. Purge Unit	1	each	1	FM-1st Floor	58.0	230.0	7.2	418	7.20	100%	418	7
"A" Bot. Hydrofluorinator	1	each	1	FM-1st Floor	155.0	6,483.8	41.9	6,495	41.90	100%	6,495	42
"A" Hydrofluorinator	1	each	1	FM-1st Floor	155.0	6,483.8	41.9	6,495	41.90	100%	6,495	42
"B" Hydrofluorinator	1	each	1	FM-1st Floor	155.0	6,483.8	41.9	6,495	41.90	100%	6,495	42
"B" Bot. Hydrofluorinator	1	each	1	FM-1st Floor	155.0	6,483.8	41.9	6,495	41.90	100%	6,495	42
"C" Hydrofluorinator	1	each	1	FM-1st Floor	158.0	9,000.0	57.0	9,006	57.00	100%	9,006	57
12" Flame Tower Reactor	1	each	1	FM-1st Floor	58.0	540.0	14.0	812	14.00	100%	812	14
Separator	1	each	1	FM-1st Floor	58.0	420.0	15.0	870	15.00	100%	870	15
Separator	1	each	1	FM-1st Floor	58.0	420.0	15.0	870	15.00	100%	870	15
Separator	1	each	1	FM-1st Floor	58.0	420.0	15.0	870	15.00	100%	870	15
Switch Board - NW	1	each	1	FM-1st Floor	58.0	480.0	48.0	2,784	48.00	100%	2,784	48
Switch Board - NE	1	each	1	FM-1st Floor	58.0	240.0	24.0	1,392	24.00	100%	1,392	24
Switch Board - E - Ctr	1	each	1	FM-1st Floor	58.0	240.0	24.0	1,392	24.00	100%	1,392	24
Switch Board - E - S	1	each	1	FM-1st Floor	58.0	180.0	18.0	1,044	18.00	100%	1,044	18
High Boiler Still	1	each	1	FM-1st Floor	145.0	16,500.0	113.4	16,443	113.40	100%	16,443	113
Low Boiler Still	1	each	1	FM-1st Floor	83.0	13,719.0	165.8	13,761	165.80	100%	13,761	166
#2 Sample Vac. Pump Alumina Tower	1	each	1	FM-1st Floor	77.0	1,216.0	15.7	1,209	15.70	100%	1,209	16
#1 Sample Vac. Pump Alumina Tower	1	each	1	FM-1st Floor	77.0	1,216.0	15.7	1,209	15.70	100%	1,209	16
#2 Prepared Feed Hopper	1	each	1	FM-1st Floor	58.0	6,000.0	662.5	38,425	662.50	100%	38,425	663
#1 Prepared Feed Hopper	1	each	1	FM-1st Floor	58.0	6,000.0	662.5	38,425	662.50	100%	38,425	663
Tempered Water Tank	1	each	1	FM-1st Floor	74.0	7,111.6	96.1	7,111	96.10	100%	7,111	96
#3 Prepared Feed Hopper	1	each	1	FM-1st Floor	58.0	6,000.0	662.5	38,425	662.50	100%	38,425	663
Water Treatment Chem. Addition Pot	1	each	1	FM-1st Floor	101.0	96.0	0.9	91	0.90	100%	91	1
Knock Out Pot	1	each	1	FM-1st Floor	58.0	238.0	9.0	522	9.00	100%	522	9
R-134a Receiver	1	each	1	FM-1st Floor	58.0	1,936.6	50.3	2,917	50.30	100%	2,917	50
R-134a Accumulator	1	each	1	FM-1st Floor	189.0	2,013.9	10.6	2,003	10.60	100%	2,003	11

Table A-13  
MISCELLANEOUS ITEM VOLUME ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

DESCRIPTION	LOC CODE	UNITS	NO. OF UNITS	MAT'L OF CONST.	BULK DENSITY (lb/ft <sup>3</sup> )	UNIT WEIGHT (lb)	UNIT VOLUME (ft <sup>3</sup> )	TOTAL WEIGHT (pound)	TOTAL VOLUME (ft <sup>3</sup> )	PERCENT DIRECT BURY (vol %)	ESOLUTIONS DISPOSAL WEIGHT (pound)	ESOLUTIONS DISPOSAL VOLUME (ft <sup>3</sup> )
Distillate Crane Scale	1	each	1	FM-1st Floor	140.0	25.0	0.2	28	0.20	100%	28	0
UF6 Cylinder Shipping Scale	1	each	1	FM-1st Floor	58.0	3,450.0	172.5	10,005	172.50	100%	10,005	173
Delumper Flame Tower Reactor	1	each	1	FM-1st Floor	58.0	150.0	3.3	191	3.30	100%	191	3
Rotary Valve - Dust Coll. Discharge	1	each	1	FM-1st Floor	58.0	57.0	1.0	58	1.00	100%	58	1
Rotary Valve - Draw Off Leg. - Basmt.	1	each	1	FM-1st Floor	58.0	63.0	1.1	64	1.10	100%	64	1
Rotary Valve "A" Bot H'Flator Disc.	1	each	1	FM-1st Floor	58.0	54.0	0.9	52	0.90	100%	52	1
Dust Valve - M-410 Spar	1	each	1	FM-1st Floor	58.0	50.0	0.9	52	0.90	100%	52	1
Rotary Valve Bed Fines Hopper Disc. Rv.	1	each	1	FM-1st Floor	58.0	57.0	1.0	58	1.00	100%	58	1
Rotary Valve "B" Bot. H'Flator Disc.	1	each	1	FM-1st Floor	58.0	57.0	1.0	58	1.00	100%	58	1
Dryer Disch. Mill Feed Screw	1	each	1	FM-2nd Floor	120.0	943.0	7.9	948	7.90	100%	948	8
Calcliner Elev. Disc. Screw	1	each	1	FM-2nd Floor	58.0	54.0	7.0	406	7.00	100%	406	7
Prepared Feed Hopper Feeder Screw	1	each	1	FM-2nd Floor	120.0	1,319.5	11.0	1,320	11.00	100%	1,320	11
Undersized Feed Material Screw	1	each	1	FM-2nd Floor	120.0	2,733.2	22.8	2,736	22.80	100%	2,736	23
Ore Conc. Surge Hopper Disch. Screw -N	1	each	1	FM-2nd Floor	58.0	1,700.0	31.8	1,844	31.80	100%	1,844	32
Ore Conc. Surge Hopper Disch. Screw -N	1	each	1	FM-2nd Floor	58.0	1,700.0	31.8	1,844	31.80	100%	1,844	32
UF6 Continuous Sample Vessel-East	1	each	1	FM-2nd Floor	215.0	1,500.0	7.0	1,505	7.00	100%	1,505	7
UF6 Continuous Sample Vessel-West	1	each	1	FM-2nd Floor	215.0	1,500.0	7.0	1,505	7.00	100%	1,505	7
"A" Fluorinator Heater	1	each	1	FM-2nd Floor	58.0	5,760.0	144.0	8,352	144.00	100%	8,352	144
"B" Fluorinator Heater	1	each	1	FM-2nd Floor	58.0	5,760.0	144.0	8,352	144.00	100%	8,352	144
Service Room Hot Water Heater	1	each	1	FM-2nd Floor	99.0	154.0	1.6	158	1.60	100%	158	2
Tempered Water Spiral Heat Exchanger	1	each	1	FM-2nd Floor	58.0	14,074.3	703.7	40,815	703.70	100%	40,815	704
Tempered Water Spiral Heat Exchanger	1	each	1	FM-2nd Floor	58.0	14,074.3	703.7	40,815	703.70	100%	40,815	704
Unit Heater	1	each	1	FM-2nd Floor	58.0			75	1.29	100%	75	1
Steam Jacket On U-430	1	each	1	FM-2nd Floor	58.0			900	15.50	100%	900	16
"B" Top H/EFlator Heater	1	each	1	FM-2nd Floor	58.0	1,500.0	75.0	4,350	75.00	100%	4,350	75
"C" Flator Heater	1	each	1	FM-2nd Floor	58.0	1,280.0	64.0	3,712	64.00	100%	3,712	64
Fluidizing Air To All Flators	1	each	1	FM-2nd Floor	87.0	17.0	0.2	17	0.20	100%	17	0
Safety Shower Filter	1	each	1	FM-2nd Floor	92.0	290.0	3.1	285	3.10	100%	285	3
#1 Instrument Air Filter	1	each	1	FM-2nd Floor	92.0	8.0	0.1	9	0.10	100%	9	0
#2 Instrument Air Filter	1	each	1	FM-2nd Floor	92.0	8.0	0.1	9	0.10	100%	9	0
Welder - Ideal Arc 250	1	each	1	FM-2nd Floor	58.0	375.0	8.0	464	8.00	100%	464	8
Welder - Da 250	1	each	1	FM-2nd Floor	58.0	375.0	8.0	464	8.00	100%	464	8
500# Cap - Mite-Lift - Portable Hoist	1	each	1	FM-2nd Floor	58.0	56.0	0.58	34	0.58	100%	34	1
1000# Cap - Hoist - N	1	each	1	FM-2nd Floor	60.0	120.0	2.0	120	2.00	100%	120	2
500# Cap - Hoist - S	1	each	1	FM-2nd Floor	121.0	60.0	0.5	61	0.50	100%	61	1
500# Cap - Hoist - Cont Room Platform	1	each	1	FM-2nd Floor	121.0	60.0	0.5	61	0.50	100%	61	1
Drill Press	1	each	1	FM-2nd Floor	58.0	250.0	16.7	969	16.70	100%	969	17
Prepared Feed Mill	1	each	1	FM-2nd Floor	60.0	7,500.0	126.0	7,560	126.00	100%	7,560	126
Ore Dryer Discharge Crusher	1	each	1	FM-2nd Floor	83.0	2,500.0	30.0	2,490	30.00	100%	2,490	30
Scrap Recovery (UF4) Mill	1	each	1	FM-2nd Floor	83.0	2,500.0	30.0	2,490	30.00	100%	2,490	30
Prepared Feed Mill	1	each	1	FM-2nd Floor	60.0	7,500.0	126.0	7,560	126.00	100%	7,560	126
Ore Precrusher	1	each	1	FM-2nd Floor	58.0	2,000.0	45.0	2,610	45.00	100%	2,610	45
Motor Control Center (C-Fm-40)	1	each	1	FM-2nd Floor	58.0	1,960.0	98.0	5,684	98.00	100%	5,684	98

Table A-13  
MISCELLANEOUS ITEM VOLUME ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

DESCRIPTION	LOC CODE	UNITS	NO. OF UNITS	MAT'L OF CONST.	BULK DENSITY (lb/ft <sup>3</sup> )	UNIT WEIGHT (lb)	UNIT VOLUME (ft <sup>3</sup> )	TOTAL WEIGHT (pound)	TOTAL VOLUME (ft <sup>3</sup> )	PERCENT DIRECT BURY (vol %)	ESOLUTIONS DISPOSAL WEIGHT (pound)	ESOLUTIONS DISPOSAL VOLUME (ft <sup>3</sup> )
1000# Cap - Monorail - Valve Room	1	each	1	FM-2nd Floor	145.0	259.0	1.8	261	1.80	100%	261	2
2000# - Monorail - "B" Flator	1	each	1	FM-2nd Floor	145.0	129.0	0.9	131	0.90	100%	131	1
2000# Cap Monorail - "A" Flator	1	each	1	FM-2nd Floor	145.0	151.0	1.0	145	1.00	100%	145	1
Vacuum Pump - East	1	each	1	FM-2nd Floor	58.0	1,392.0	24.0	1,392	24.00	100%	1,392	24
Vacuum Pump - West	1	each	1	FM-2nd Floor	58.0	1,392.0	24.0	1,392	24.00	100%	1,392	24
Yard Safety Shower Circ. Pump	1	each	1	FM-2nd Floor	58.0	91.0	1.6	93	1.60	100%	93	2
Yard Safety Shower Circ. Pump	1	each	1	FM-2nd Floor	58.0	91.0	1.6	93	1.60	100%	93	2
Yard Safety Shower Circ. Pump	1	each	1	FM-2nd Floor	58.0	91.0	1.6	93	1.60	100%	93	2
Safety Shower Circ. Pump	1	each	1	FM-2nd Floor	58.0	116.0	2.0	116	2.00	100%	116	2
"A" Top HÆFlator Blower	1	each	1	FM-2nd Floor	58.0	800.0	80.0	4,640	80.00	100%	4,640	80
"A" Flator Blower	1	each	1	FM-2nd Floor	58.0	2,940.0	294.0	17,052	294.00	100%	17,052	294
"B" Flator Blower	1	each	1	FM-2nd Floor	58.0	2,940.0	294.0	17,052	294.00	100%	17,052	294
"B" Flator Comb. Air Blower	1	each	1	FM-2nd Floor	58.0	270.0	27.0	1,566	27.00	100%	1,566	27
"A" Flator Comb. Air Blower	1	each	1	FM-2nd Floor	76.0	212.0	2.8	213	2.80	100%	213	3
Exhaust Fan - Maint. Area	1	each	1	FM-2nd Floor	58.0	60.0	1.9	110	1.90	100%	110	2
Control Room A/C Blower	1	each	1	FM-2nd Floor	95.0	56.0	0.6	57	0.60	100%	57	1
Exh. Fan - Service Room	1	each	1	FM-2nd Floor	58.0	60.0	1.9	110	1.90	100%	110	2
Man-Cooling Fan	1	each	1	FM-2nd Floor	58.0	148.0	18.0	1,044	18.00	100%	1,044	18
"B" Top HÆFlator Air Circ. Fan	1	each	1	FM-2nd Floor	58.0	2,160.0	216.0	12,528	216.00	100%	12,528	216
Control Room Fan	1	each	1	FM-2nd Floor	58.0	270.0	27.0	1,566	27.00	100%	1,566	27
"C" Flator Heat Circ. Air Blower	1	each	1	FM-2nd Floor	58.0	2,940.0	294.0	17,052	294.00	100%	17,052	294
"C" Flator Heat Comb. Air Blower	1	each	1	FM-2nd Floor	58.0	270.0	27.0	1,566	27.00	100%	1,566	27
Drinking Water Cooler	1	each	1	FM-2nd Floor	58.0	83.0	6.0	348	6.00	100%	348	6
Refrigerator - Control Room	1	each	1	FM-2nd Floor	11.8	133.0	11.3	133	11.30	0%	0	0
Refrigerator - Cont. Room - Foreman	1	each	1	FM-2nd Floor	11.8	133.0	11.3	133	11.30	0%	0	0
A/C & Heating Unit	1	each	1	FM-2nd Floor	58.0	1,200.0	30.0	1,740	30.00	100%	1,740	30
A/C & Heating Unit	1	each	1	FM-2nd Floor	58.0	4,200.0	105.0	6,090	105.00	100%	6,090	105
"B" Top H-Flator	1	each	1	FM-2nd Floor	182.0	7,653.3	41.9	7,626	41.90	100%	7,626	42
Ore Crusher Grizzly Screen	1	each	1	FM-2nd Floor	58.0	725.0	12.5	725	12.50	100%	725	13
Calcliner Grizzly	1	each	1	FM-2nd Floor	58.0	725.0	12.5	725	12.50	100%	725	13
Scrap Recovery Screen	1	each	1	FM-2nd Floor	58.0	1,200.0	30.0	1,740	30.00	100%	1,740	30
Switchboard - N X E	1	each	1	FM-2nd Floor	58.0	1,365.0	136.5	7,917	136.50	100%	7,917	137
Switchboard - N X W	1	each	1	FM-2nd Floor	58.0	1,365.0	136.5	7,917	136.50	100%	7,917	137
Switchboard - N X W	1	each	1	FM-2nd Floor	58.0	1,080.0	108.0	6,264	108.00	100%	6,264	108
Dryer Surge Hopper	1	each	1	FM-2nd Floor	58.0	900.0	90.0	5,220	90.00	100%	5,220	90
UF6 Blow Off & Dump Tank	1	each	1	FM-2nd Floor	97.0	2,016.9	20.7	2,008	20.70	100%	2,008	21
Bed Fines Hopper	1	each	1	FM-2nd Floor	58.0	3,750.0	375.0	21,750	375.00	100%	21,750	375
Scrap Recovery Hopper	1	each	1	FM-2nd Floor	76.0	589.0	7.8	593	7.80	100%	593	8
Safety Shower Heater Storage Tank	1	each	1	FM-2nd Floor	146.0	1,092.0	7.5	1,095	7.50	100%	1,095	8
Ore Conc. Surge Hopper	1	each	1	FM-2nd Floor	60.0	16,000.0	268.4	16,104	268.40	100%	16,104	268
"A" Flator Bed - Vibrator	1	each	1	FM-2nd Floor	123.0	9.0	0.1	12	0.10	100%	12	0
"B" Flator Bed - Vibrator	1	each	1	FM-2nd Floor	123.0	9.0	0.1	12	0.10	100%	12	0
"B" Top H-Flator Disc. Line - Vibrator	1	each	1	FM-2nd Floor	123.0	9.0	0.1	12	0.10	100%	12	0



Table A-13  
MISCELLANEOUS ITEM VOLUME ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

DESCRIPTION	LOC CODE	UNITS	NO. OF UNITS	MAT'L OF CONST.	BULK DENSITY (lb/ft <sup>3</sup> )	UNIT WEIGHT (lb)	UNIT VOLUME (ft <sup>3</sup> )	TOTAL WEIGHT (pound)	TOTAL VOLUME (ft <sup>3</sup> )	PERCENT DIRECT BURY (vol %)	ESOLUTIONS DISPOSAL WEIGHT (pound)	ESOLUTIONS DISPOSAL VOLUME (ft <sup>3</sup> )
Undersize Feed Matl. Screw - Vibrator	1	each	1	FM-2nd Floor	123.0	9.0	0.1	12	0.10	100%	12	0
"C" Flator Bed - Vibrator	1	each	1	FM-2nd Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Ore Conc. Surge Hopper - N - Vibrator	1	each	1	FM-2nd Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Ore Conc. Surge Hopper - S - Vibrator	1	each	1	FM-2nd Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Conc. Blender Feed Line - Vibrator	1	each	1	FM-2nd Floor	123.0	9.0	0.1	12	0.10	100%	12	0
"A" Bottom H-Flator Feeder	1	each	1	FM-2nd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
In - Range Discharge	1	each	1	FM-2nd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
Scrap Rec. Mill Feeder	1	each	1	FM-2nd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
Fines Discharge	1	each	1	FM-2nd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
"A" Flator Spar Feeder	1	each	1	FM-2nd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
"B" Flator UF4 Feeder	1	each	1	FM-2nd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
"A" Flator UF4 Feeder	1	each	1	FM-2nd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
"B" Flator Spar Feeder	1	each	1	FM-2nd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
"B" Bottom H-Flator Feeder	1	each	1	FM-2nd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
"C" Flator UF4 Feeder	1	each	1	FM-2nd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
"C" Flator Spar Feeder	1	each	1	FM-2nd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
Ore In-Range Discharge	1	each	1	FM-2nd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
Ore In-Range Discharge	1	each	1	FM-2nd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
"A" Reoxidizer Screw	1	each	1	FM-3rd Floor	120.0	943.0	7.9	948	7.90	100%	948	8
Flator Filter Fines Screw	1	each	1	FM-3rd Floor	120.0	943.0	7.9	948	7.90	100%	948	8
Ore Dryer Feed Screw	1	each	1	FM-3rd Floor	120.0	2,261.9	18.8	2,256	18.80	100%	2,256	19
"B" Reoxidizer Screw	1	each	1	FM-3rd Floor	58.0	4,500.0	216.0	12,528	216.00	100%	12,528	216
Ore Classifier Feed Screw	1	each	1	FM-3rd Floor	58.0	500.0	16.0	928	16.00	100%	928	16
Hoist Trolley	1	each	1	FM-3rd Floor	75.0	225.0	3.0	225	3.00	100%	225	3
Hoist Trolley	1	each	1	FM-3rd Floor	75.0	225.0	3.0	225	3.00	100%	225	3
Ore Dryer	1	each	1	FM-3rd Floor	58.0	35,000.0	1,085.0	62,930	1,085.00	100%	62,930	1,085
Filter Dryer	1	each	1	FM-3rd Floor	58.0	2,000.0	144.0	8,352	144.00	100%	8,352	144
Ore Dryer Heater	1	each	1	FM-3rd Floor	58.0	10,000.0	172.4	9,999	172.40	100%	9,999	172
"A" Top Hflator Heater	1	each	1	FM-3rd Floor	58.0	5,760.0	144.0	8,352	144.00	100%	8,352	144
High Boiler Still Condenser	1	each	1	FM-3rd Floor	120.0	94.0	0.8	96	0.80	100%	96	1
H2O Filter For Metal Tube D/P Test - E	1	each	1	FM-3rd Floor	58.0	63.0	1.1	64	1.10	100%	64	1
H2O Filter For Metal Tube D/P Test - W	1	each	1	FM-3rd Floor	58.0	63.0	1.1	64	1.10	100%	64	1
Hot Glycol Filter	1	each	1	FM-3rd Floor	58.0	63.0	1.1	64	1.10	100%	64	1
Decon Trunk Vacuum	1	each	1	FM-3rd Floor	58.0	63.0	1.1	64	1.10	100%	64	1
Welder	1	each	1	FM-3rd Floor	214.3	380.0	9.1	1,950	9.10	100%	1,950	9
Hot Box	1	each	1	FM-3rd Floor	58.0	1,174.5	20.3	1,177	20.30	100%	1,177	20
500# Cap. Portable Hoist	1	each	1	FM-3rd Floor	58.0	56.0	0.6	34	0.58	100%	34	1
4000# Cap Hoist	1	each	1	FM-3rd Floor	225.0	150.0	0.7	158	0.70	100%	158	1
2000# Cap Hoist	1	each	1	FM-3rd Floor	63.0	125.0	2.0	126	2.00	100%	126	2
1000# Cap. Hoist	1	each	1	FM-3rd Floor	105.0	70.0	0.7	74	0.70	100%	74	1
1000# Cap. Hoist	1	each	1	FM-3rd Floor	58.0	70.0	4.0	232	4.00	100%	232	4
1000# Cap. Hoist - Electric	1	each	1	FM-3rd Floor	63.0	70.0	1.1	69	1.10	100%	69	1
Scrap Recycle Drum Inverter	1	each	1	FM-3rd Floor	58.0	4,350.0	75.0	4,350	75.00	100%	4,350	75

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Washer - Decon	1	each	1	FM-3rd Floor	58.0	150.0	36.0	2,088	36.00	100%	2,088	36
2,500 Cap. Monorail	1	each	1	FM-3rd Floor	145.0	518.0	3.6	522	3.60	100%	522	4
2,000 Cap. Monorail	1	each	1	FM-3rd Floor	145.0	216.0	1.5	218	1.50	100%	218	2
4,500 Cap. Monorail	1	each	1	FM-3rd Floor	145.0	216.0	1.5	218	1.50	100%	218	2
4,000 Cap. Monorail	1	each	1	FM-3rd Floor	124.0	633.0	5.1	632	5.10	100%	632	5
Monorail	1	each	1	FM-3rd Floor	145.0	690.0	4.8	696	4.80	100%	696	5
4,000 Cap. Monorail	1	each	1	FM-3rd Floor	124.0	173.0	1.4	174	1.40	100%	174	1
Dryer Combustion Air Blower	1	each	1	FM-3rd Floor	58.0	5.0	0.5	29	0.50	100%	29	1
"A" Flator Offgas Lines Cooling Blower	1	each	1	FM-3rd Floor	58.0	80.0	8.0	464	8.00	100%	464	8
Exhaust Fan - Service Room	1	each	1	FM-3rd Floor	58.0	270.0	27.0	1,566	27.00	100%	1,566	27
Exhaust Fan - Decon	1	each	1	FM-3rd Floor	76.0	213.0	2.8	213	2.80	100%	213	3
Wall Exhaust Fan - South	1	each	1	FM-3rd Floor	58.0	200.0	32.0	1,856	32.00	100%	1,856	32
Wall Exhaust Fan - West	1	each	1	FM-3rd Floor	58.0	200.0	32.0	1,856	32.00	100%	1,856	32
#317-1 Vent Unit	1	each	1	FM-3rd Floor	58.0	544.0	27.2	1,578	27.20	100%	1,578	27
Exhaust Fan	1	each	1	FM-3rd Floor	58.0	200.0	32.0	1,856	32.00	100%	1,856	32
Exhaust Fan	1	each	1	FM-3rd Floor	58.0	200.0	32.0	1,856	32.00	100%	1,856	32
Decon Bead Blaster	1	each	1	FM-3rd Floor	58.0	960.0	96.0	5,568	96.00	100%	5,568	96
Exhaust Fan	1	each	1	FM-3rd Floor	58.0	200.0	32.0	1,856	32.00	100%	1,856	32
"B" Top Hflator Combustion Air Blower	1	each	1	FM-3rd Floor	58.0	270.0	27.0	1,566	27.00	100%	1,566	27
Wall Exhaust Fan - Southwest	1	each	1	FM-3rd Floor	58.0	200.0	32.0	1,856	32.00	100%	1,856	32
Drinking Cooler	1	each	1	FM-3rd Floor	58.0	83.0	6.0	348	6.00	100%	348	6
"A" Top Hflator	1	each	1	FM-3rd Floor	58.0	7,592.2	130.9	7,592	130.90	100%	7,592	131
4Æ Dia. Prepared Feed Air Classifier	1	each	1	FM-3rd Floor	113.0	1,500.0	13.3	1,503	13.30	100%	1,503	13
6Æ Dia. Prepared Feed Air Classifier	1	each	1	FM-3rd Floor	72.0	3,200.0	44.7	3,218	44.70	100%	3,218	45
Switchboard East-West	1	each	1	FM-3rd Floor	58.0	1,200.0	120.0	6,960	120.00	100%	6,960	120
Switchboard East-East	1	each	1	FM-3rd Floor	58.0	1,800.0	180.0	10,440	180.00	100%	10,440	180
Ultrasonic Cleaner Tank - Decon	1	each	1	FM-3rd Floor	58.0	300.0	48.0	2,784	48.00	100%	2,784	48
Dryer Feed Hopper	1	each	1	FM-3rd Floor	58.0	1,920.0	96.0	5,568	96.00	100%	5,568	96
#1 Still Feed Tank	1	each	1	FM-3rd Floor	212.0	8,710.0	41.0	8,692	41.00	100%	8,692	41
#2 Still Feed Tank	1	each	1	FM-3rd Floor	212.0	8,710.0	41.0	8,692	41.00	100%	8,692	41
Bed Fines Hopper	1	each	1	FM-3rd Floor	58.0	6,400.0	312.5	18,125	312.50	100%	18,125	313
Spar Discharge Hopper	1	each	1	FM-3rd Floor	58.0	2,400.0	120.0	6,960	120.00	100%	6,960	120
#3 Still Feed Tank	1	each	1	FM-3rd Floor	212.0	8,710.0	41.0	8,692	41.00	100%	8,692	41
Dryer Feed Hopper Vibrator - West	1	each	1	FM-3rd Floor	123.0	9.0	0.1	12	0.10	100%	12	0
"A" Reoxidizer Screw Disch. Vibrator	1	each	1	FM-3rd Floor	123.0	9.0	0.1	12	0.10	100%	12	0
"B" Flator Primary Filter Disch. Vibrator	1	each	1	FM-3rd Floor	123.0	9.0	0.1	12	0.10	100%	12	0
"B" Flator B.U. Filter Disch. Vibrator	1	each	1	FM-3rd Floor	123.0	9.0	0.1	12	0.10	100%	12	0
"A" Flator Primary Filter Disch. Vibrator	1	each	1	FM-3rd Floor	123.0	9.0	0.1	12	0.10	100%	12	0
"A" Flator B.U. Filter Disch. Vibrator	1	each	1	FM-3rd Floor	123.0	9.0	0.1	12	0.10	100%	12	0
F-416 Discharge Line Vibrator	1	each	1	FM-3rd Floor	123.0	9.0	0.1	12	0.10	100%	12	0
"C2" Flator Primary Filter D.O. Vibrator	1	each	1	FM-3rd Floor	123.0	9.0	0.1	12	0.10	100%	12	0
"C1" Flator Primary Filter D.O. Vibrator	1	each	1	FM-3rd Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Dryer Feed Hopper Vibrator - East	1	each	1	FM-3rd Floor	123.0	9.0	0.1	12	0.10	100%	12	0

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"A" Flator Primary Filter Disch. R/V	1	each	1	FM-3rd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
"A" Flator Primary Filter Disch. R/V	1	each	1	FM-3rd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
"B" Flator Primary Filter Disch. R/V	1	each	1	FM-3rd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
"B" Flator Primary Filter Disch. R/V	1	each	1	FM-3rd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
Spar Recycle Disch. R/V	1	each	1	FM-3rd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
"C" Flator Primary Filter Disch. R/V	1	each	1	FM-3rd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
"C" Flator Primary Filter Disch. R/V	1	each	1	FM-3rd Floor	358.0	800.0	2.2	788	2.20	100%	788	2
Screw Conveyor	1	each	1	FM-4th Floor	120.0	655.0	5.5	660	5.50	100%	660	6
C Fluorinate Filter Fines Screw	1	each	1	FM-4th Floor	120.0	412.0	3.4	408	3.40	100%	408	3
Rotex Feed Screw	1	each	1	FM-4th Floor	58.0	400.0	7.9	458	7.90	100%	458	8
Mud Bailer Feed Screw	1	each	1	FM-4th Floor	255.0	2,000.0	7.9	2,015	7.90	100%	2,015	8
Hoist Trolley - "A" Green Salt	1	each	1	FM-4th Floor	75.0	54.0	0.7	53	0.70	100%	53	1
A-1 Primary Cold Trap	1	each	1	FM-4th Floor	97.0	2,634.3	27.3	2,648	27.30	100%	2,648	27
A-2 Primary Cold Trap	1	each	1	FM-4th Floor	97.0	2,634.3	27.3	2,648	27.30	100%	2,648	27
A-3 Primary Cold Trap	1	each	1	FM-4th Floor	97.0	2,634.3	27.3	2,648	27.30	100%	2,648	27
Product Condenser	1	each	1	FM-4th Floor	58.0	0.0	0.7	41	0.70	100%	41	1
A-4 Primary Cold Trap	1	each	1	FM-4th Floor	172.0	4,700.0	27.3	4,696	27.30	100%	4,696	27
B-2 Primary Cold Trap	1	each	1	FM-4th Floor	172.0	4,700.0	27.3	4,696	27.30	100%	4,696	27
B-3 Primary Cold Trap	1	each	1	FM-4th Floor	172.0	4,700.0	27.3	4,696	27.30	100%	4,696	27
B-1 Primary Cold Trap	1	each	1	FM-4th Floor	172.0	4,700.0	27.3	4,696	27.30	100%	4,696	27
B-4 Primary Cold Trap	1	each	1	FM-4th Floor	172.0	4,700.0	27.3	4,696	27.30	100%	4,696	27
Alt. Primary Cold Trap - Nooter	1	each	1	FM-4th Floor	172.0	4,700.0	27.3	4,696	27.30	100%	4,696	27
"B" Hydrogen Preheater	1	each	1	FM-4th Floor	58.0	400.0	6.9	400	6.90	100%	400	7
"B" Reductor Heater - Surface Comb.	1	each	1	FM-4th Floor	80.0	375.0	4.7	376	4.70	100%	376	5
Instrument Air Filter	1	each	1	FM-4th Floor	80.0	8.0	0.1	8	0.10	100%	8	0
Chem. Trap - Fluorine Analyzer	1	each	1	FM-4th Floor	80.0	8.0	0.1	8	0.10	100%	8	0
Chem. Trap - Fluorine Analyzer	1	each	1	FM-4th Floor	80.0	8.0	0.1	8	0.10	100%	8	0
Chem. Trap - Fluorine Analyzer	1	each	1	FM-4th Floor	80.0	8.0	0.1	8	0.10	100%	8	0
Chem. Trap - Fluorine Analyzer	1	each	1	FM-4th Floor	80.0	8.0	0.1	8	0.10	100%	8	0
Chem. Trap - Sample Point	1	each	1	FM-4th Floor	80.0	8.0	0.1	8	0.10	100%	8	0
Chem. Trap - Fluorine Analyzer	1	each	1	FM-4th Floor	80.0	8.0	0.1	8	0.10	100%	8	0
Air Filter	1	each	1	FM-4th Floor	76.0	2,261.9	29.8	2,265	29.80	100%	2,265	30
Welder - Idealarc 400	1	each	1	FM-4th Floor	42.0	391.0	9.3	389	9.25	100%	389	9
Welder-400 amp stick	1	each	1	FM-4th Floor	42.0	391.0	9.3	389	9.25	100%	389	9
Hot Box	1	each	1	FM-4th Floor	58.0	31.0	0.5	31	0.53	100%	31	1
E-409- A-1Primary Cold Trap Hot Box	1	each	1	FM-4th Floor	58.0	320.0	32.0	1,856	32.00	100%	1,856	32
E-408- A-2 Primary Cold Trap Hot Box	1	each	1	FM-4th Floor	58.0	320.0	32.0	1,856	32.00	100%	1,856	32
E-410- A-3 Primary Cold Trap Hot Box	1	each	1	FM-4th Floor	58.0	320.0	32.0	1,856	32.00	100%	1,856	32
E-427- A-4 Primary Cold Trap Hot Box	1	each	1	FM-4th Floor	58.0	320.0	32.0	1,856	32.00	100%	1,856	32
E-426- B-2 Primary Cold Trap Hot Box	1	each	1	FM-4th Floor	58.0	320.0	32.0	1,856	32.00	100%	1,856	32
E-425- B-3 Primary Cold Trap Hot Box	1	each	1	FM-4th Floor	58.0	320.0	32.0	1,856	32.00	100%	1,856	32
Distillation West - Hot Box	1	each	1	FM-4th Floor	58.0	1,300.0	130.0	7,540	130.00	100%	7,540	130
Distillation East - Hot Box	1	each	1	FM-4th Floor	58.0	1,300.0	130.0	7,540	130.00	100%	7,540	130

Table A-13  
MISCELLANEOUS ITEM VOLUME ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

DESCRIPTION	LOC CODE	UNITS	NO. OF UNITS	MAT'L OF CONST.	BULK DENSITY (lb/ft <sup>3</sup> )	UNIT WEIGHT (lb)	UNIT VOLUME (ft <sup>3</sup> )	TOTAL WEIGHT (pound)	TOTAL VOLUME (ft <sup>3</sup> )	PERCENT DIRECT BURY (vol %)	ESOLUTIONS DISPOSAL WEIGHT (pound)	ESOLUTIONS DISPOSAL VOLUME (ft <sup>3</sup> )
E-600-Alt. Primary Cold Trap Hot Box	1	each	1	FM-4th Floor	58.0	320.0	32.0	1,856	32.00	100%	1,856	32
E-492- B-1 Primary Cold Trap Hot Box	1	each	1	FM-4th Floor	58.0	320.0	32.0	1,856	32.00	100%	1,856	32
E-493- B-4 Primary Cold Trap Hot Box	1	each	1	FM-4th Floor	58.0	320.0	32.0	1,856	32.00	100%	1,856	32
Mit-E-Lift - 500# Cap	1	each	1	FM-4th Floor	58.0	56.0	0.6	34	0.58	100%	34	1
Hoist - "A" Green Salt Train - 2000# Cap.	1	each	1	FM-4th Floor	58.0	125.0	21.0	1,218	21.00	100%	1,218	21
Hoist - Cold Trap Area	1	each	1	FM-4th Floor	58.0	56.0	0.6	34	0.58	100%	34	1
Hoist - Cold Trap Area	1	each	1	FM-4th Floor	58.0	56.0	0.6	34	0.58	100%	34	1
#1 Mud bailer - West	1	each	1	FM-4th Floor	58.0	4,000.0	120.0	6,960	120.00	100%	6,960	120
#2 Mud bailer - East	1	each	1	FM-4th Floor	58.0	4,000.0	90.0	5,220	90.00	100%	5,220	90
#1 UF4 Mill - North	1	each	1	FM-4th Floor	58.0	4,872.0	84.0	4,872	84.00	100%	4,872	84
UF4 Blender	1	each	1	FM-4th Floor	58.0	10,500.0	600.0	34,800	600.00	100%	34,800	600
#2 UF4 Mill - South	1	each	1	FM-4th Floor	58.0	8,120.0	140.0	8,120	140.00	100%	8,120	140
#3 Mudbailer - North	1	each	1	FM-4th Floor	58.0	4,000.0	75.0	4,350	75.00	100%	4,350	75
Monorail - Over A-3 Prim. Cold Trap, 30,000#	1	each	1	FM-4th Floor	106.0	2,500.0	23.5	2,491	23.50	100%	2,491	24
Monorail - Over A-2 Prim. Cold Trap, 30,000#	1	each	1	FM-4th Floor	106.0	2,500.0	23.5	2,491	23.50	100%	2,491	24
Monorail - Over A-1 Prim. Cold Trap, 30,000#	1	each	1	FM-4th Floor	106.0	2,500.0	23.5	2,491	23.50	100%	2,491	24
Monorail - Over Rotex Screen (S-600), 3,000#	1	each	1	FM-4th Floor	62.0	200.0	3.2	198	3.20	100%	198	3
Monorail - "A" G. Salt Area, 2,000#	1	each	1	FM-4th Floor	58.0	151.0	2.6	151	2.60	100%	151	3
Monorail - B-3 Prim. Cold Trap	1	each	1	FM-4th Floor	106.0	1,125.0	10.6	1,124	10.60	100%	1,124	11
Monorail - A Bot. Hflourinator	1	each	1	FM-4th Floor	66.0	230.0	3.5	231	3.50	100%	231	4
Vac. Pump - UF6 Fluorine Analyzer	1	each	1	FM-4th Floor	58.0	131.0	2.3	133	2.30	100%	133	2
Vac. Pump - Sample Point	1	each	1	FM-4th Floor	58.0	203.0	3.5	203	3.50	100%	203	4
"A" Reductor Blower	1	each	1	FM-4th Floor	58.0	2,520.0	252.0	14,616	252.00	100%	14,616	252
Exh. Fan - HF Area - West Wail	1	each	1	FM-4th Floor	58.0	27.0	2.7	157	2.70	100%	157	3
Exh. Fan - HF Area - South Wail	1	each	1	FM-4th Floor	58.0	27.0	2.7	157	2.70	100%	157	3
Building Ventilation Unit	1	each	1	FM-4th Floor	58.0	800.0	120.0	6,960	120.00	100%	6,960	120
Man Cooling Fan	1	each	1	FM-4th Floor	58.0	60.0	1.9	110	1.90	100%	110	2
"B" Reductor Comb. Air Blower	1	each	1	FM-4th Floor	58.0	146.0	22.5	1,305	22.50	100%	1,305	23
Exhaust Fan - South X West - 1 Lg	1	each	1	FM-4th Floor	58.0	200.0	32.0	1,856	32.00	100%	1,856	32
Drinking Water Cooler	1	each	1	FM-4th Floor	58.0	83.0	6.0	348	6.00	100%	348	6
#1 UF4 Mill Grizzly	1	each	1	FM-4th Floor	58.0	3,600.0	360.0	20,880	360.00	100%	20,880	360
#2 UF4 Mill Grizzly	1	each	1	FM-4th Floor	58.0	3,600.0	360.0	20,880	360.00	100%	20,880	360
Spar (Bed) Rotex Screen	1	each	1	FM-4th Floor	58.0	840.0	84.0	4,872	84.00	100%	4,872	84
Rotex Screen	1	each	1	FM-4th Floor	58.0	840.0	84.0	4,872	84.00	100%	4,872	84
Switchboard C-19 West	1	each	1	FM-4th Floor	58.0	2,520.0	252.0	14,616	252.00	100%	14,616	252
Switchboard D-20 East	1	each	1	FM-4th Floor	58.0	2,520.0	252.0	14,616	252.00	100%	14,616	252
Vibrator - #1 Ore Conc. Hopper	1	each	1	FM-4th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - #2 Ore Conc. Hopper	1	each	1	FM-4th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - #1 Dry Oxide Dust Coil.	1	each	1	FM-4th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - #1 Dry Oxide Dust Coil.	1	each	1	FM-4th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - #1 Dry Oxide Dust Coil.	1	each	1	FM-4th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - HF Filter (F-424) Disch. Line	1	each	1	FM-4th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - HF Filter (F-425) Disch. Line	1	each	1	FM-4th Floor	123.0	9.0	0.1	12	0.10	100%	12	0

Table A-13  
MISCELLANEOUS ITEM VOLUME ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

DESCRIPTION	LOC CODE	UNITS	NO. OF UNITS	MAT'L OF CONST.	BULK DENSITY (lb/ft <sup>3</sup> )	UNIT WEIGHT (lb)	UNIT VOLUME (ft <sup>3</sup> )	TOTAL WEIGHT (pound)	TOTAL VOLUME (ft <sup>3</sup> )	PERCENT DIRECT BURY (vol %)	ESOLUTIONS DISPOSAL WEIGHT (pound)	ESOLUTIONS DISPOSAL VOLUME (ft <sup>3</sup> )
Vib. - "A" Reductor K.O. Pot Disch. Line	1	each	1	FM-4th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - UF4 Hopper	1	each	1	FM-4th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - Spar Decay Hopper Disch. Line	1	each	1	FM-4th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - #3 Ore Conc. Hopper	1	each	1	FM-4th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - UF4 Hopper	1	each	1	FM-4th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - "B3" HF Filter Disch. Line	1	each	1	FM-4th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - "B4" HF Filter Disch. Line	1	each	1	FM-4th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - "B5" HF Filter Disch. Line	1	each	1	FM-4th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - "B6" HF Filter Disch. Line	1	each	1	FM-4th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vib. - "B" Reducer Fines Ko Pot Disch. Line	1	each	1	FM-4th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator-Inlet Line To #2 UF4 Mill	1	each	1	FM-4th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Rotary Valve - #1 Mudbailer Ore Blender	1	each	1	FM-4th Floor	58.0	68.0	1.2	70	1.20	100%	70	1
Rotary Valve - #2 Mudbailer Ore Blender	1	each	1	FM-4th Floor	58.0	68.0	1.2	70	1.20	100%	70	1
Rotary Valve - "A" Top HÆFlator	1	each	1	FM-4th Floor	58.0	73.0	1.3	75	1.30	100%	75	1
Rotary Valve - F-494 Fines Discharge	1	each	1	FM-4th Floor	58.0	73.0	1.3	75	1.30	100%	75	1
Rotary Valve - F-493 Fines Discharge	1	each	1	FM-4th Floor	58.0	73.0	1.3	75	1.30	100%	75	1
Rotary Valve - F-495 Fines Discharge	1	each	1	FM-4th Floor	58.0	73.0	1.3	75	1.30	100%	75	1
Rotary Valve - #1 Dry Oxide Dust Col. Hop.	1	each	1	FM-4th Floor	58.0	73.0	1.3	75	1.30	100%	75	1
Rotary Valve - "A" Reductor Ko Pot Disch.	1	each	1	FM-4th Floor	58.0	73.0	1.3	75	1.30	100%	75	1
Rotary Valve - UF4 Mill Feeder - N	1	each	1	FM-4th Floor	58.0	73.0	1.3	75	1.30	100%	75	1
Rotary Valve - "B" Top HÆFlator	1	each	1	FM-4th Floor	58.0	73.0	1.3	75	1.30	100%	75	1
Rotary Valve - "B-1" Red. Filter Fines Disch.	1	each	1	FM-4th Floor	58.0	73.0	1.3	75	1.30	100%	75	1
Rotary Valve - #2 UF4 Crusher - S	1	each	1	FM-4th Floor	58.0	73.0	1.3	75	1.30	100%	75	1
Conc. Feed Hopper Screw	1	each	1	FM-5th Floor	120.0	2,167.7	18.1	2,172	18.10	100%	2,172	18
Wet Oxide Dust Collector Discharge Screw	1	each	1	FM-5th Floor	120.0	1,131.0	9.4	1,128	9.40	100%	1,128	9
Trolley - B-4 & B-5 HF Filters	1	each	1	FM-5th Floor	77.1	54.0	0.7	54	0.70	100%	54	1
"A" Reductor Filter Fines Hopper	1	each	1	FM-5th Floor	58.0	120.0	2.0	116	2.00	100%	116	2
A-1 Tert. Cold Trap	1	each	1	FM-5th Floor	74.0	4,700.0	63.8	4,721	63.80	100%	4,721	64
A-2 Tert. Cold Trap	1	each	1	FM-5th Floor	74.0	4,700.0	63.8	4,721	63.80	100%	4,721	64
A-1 Sec. Cold Trap	1	each	1	FM-5th Floor	74.0	4,700.0	63.8	4,721	63.80	100%	4,721	64
"A" Reductor Heater	1	each	1	FM-5th Floor	58.0	1,400.0	280.0	16,240	280.00	100%	16,240	280
#A4 HF Filter Heater (F-424)	1	each	1	FM-5th Floor	38.0	440.0	11.6	441	11.60	100%	441	12
#A5 HF Filter Heater (F-424)	1	each	1	FM-5th Floor	38.0	440.0	11.6	441	11.60	100%	441	12
A-2 Sec. Cold Trap	1	each	1	FM-5th Floor	74.0	4,700.0	63.8	4,721	63.80	100%	4,721	64
B-1 Sec. Cold Trap	1	each	1	FM-5th Floor	74.0	4,700.0	63.8	4,721	63.80	100%	4,721	64
B-2 Sec. Cold Trap	1	each	1	FM-5th Floor	74.0	4,700.0	63.8	4,721	63.80	100%	4,721	64
B-1 Tert. Cold Trap	1	each	1	FM-5th Floor	74.0	4,700.0	63.8	4,721	63.80	100%	4,721	64
B-2 Tert. Cold Trap	1	each	1	FM-5th Floor	74.0	4,700.0	63.8	4,721	63.80	100%	4,721	64
Shower Water Heater	1	each	1	FM-5th Floor	13.0	154.0	11.8	153	11.80	100%	153	12
A-3 Sec. Cold Trap	1	each	1	FM-5th Floor	74.0	4,700.0	63.8	4,721	63.80	0%	0	0
B-3 Sec. Cold Trap	1	each	1	FM-5th Floor	74.0	4,700.0	63.8	4,721	63.80	100%	4,721	64
Sample Cold Trap	1	each	1	FM-5th Floor	74.0	4,700.0	63.8	4,721	63.80	100%	4,721	64
B" Reductor Filter Fines Hopper "1 B"	1	each	1	FM-5th Floor	58.0	120.0	2.0	116	2.00	100%	116	2

Table A-13  
MISCELLANEOUS ITEM VOLUME ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

DESCRIPTION	LOC CODE	UNITS	NO. OF UNITS	MAT'L OF CONST.	BULK DENSITY (lb/ft <sup>3</sup> )	UNIT WEIGHT (lb)	UNIT VOLUME (ft <sup>3</sup> )	TOTAL WEIGHT (pound)	TOTAL VOLUME (ft <sup>3</sup> )	PERCENT DIRECT BURY (vol %)	ESOLUTIONS DISPOSAL WEIGHT (pound)	ESOLUTIONS DISPOSAL VOLUME (ft <sup>3</sup> )
Bot. H <sup>2</sup> Flator Filter #1 B - Heater	1	each	1	FM-5th Floor	40.0	300.0	7.5	300	7.50	100%	300	8
Bot. H <sup>2</sup> Flator Filter #2B - Heater	1	each	1	FM-5th Floor	40.0	300.0	7.5	300	7.50	100%	300	8
"B" Red. Fines Hopper Disch. Piping Heater	1	each	1	FM-5th Floor	40.0	300.0	7.5	300	7.50	100%	300	8
Top H <sup>2</sup> Flator Filter #3B Heater	1	each	1	FM-5th Floor	40.0	300.0	7.5	300	7.50	100%	300	8
Top H <sup>2</sup> Flator Filter #4B Heater	1	each	1	FM-5th Floor	40.0	300.0	7.5	300	7.50	100%	300	8
#1 Dry Oxide Dust Collector	1	each	1	FM-5th Floor	58.0	6,930.0	1,386.0	80,388	1,386.00	100%	80,388	1,386
Vessel Vacuum, Hop. & Controller Stand	1	each	1	FM-5th Floor	58.0	500.0	40.0	2,320	40.00	100%	2,320	40
A4 Bot. HF Filter	1	each	1	FM-5th Floor	119.0	1,381.8	11.6	1,380	11.60	100%	1,380	12
A5 Bot. HF Filter	1	each	1	FM-5th Floor	119.0	1,381.8	11.6	1,380	11.60	100%	1,380	12
Chem Trap	1	each	1	FM-5th Floor	74.0	4,700.0	63.8	4,721	63.80	100%	4,721	64
Chem Trap	1	each	1	FM-5th Floor	74.0	4,700.0	63.8	4,721	63.80	100%	4,721	64
Chem Trap	1	each	1	FM-5th Floor	74.0	4,700.0	63.8	4,721	63.80	100%	4,721	64
Chem Trap	1	each	1	FM-5th Floor	74.0	4,700.0	63.8	4,721	63.80	100%	4,721	64
Inst. Air Filter	1	each	1	FM-5th Floor	74.0	4,700.0	63.8	4,721	63.80	100%	4,721	64
B4 Bot. HF Filter	1	each	1	FM-5th Floor	116.0	1,535.2	13.3	1,543	13.30	100%	1,543	13
3B Top HF Filter	1	each	1	FM-5th Floor	116.0	1,535.2	13.3	1,543	13.30	100%	1,543	13
6B Top HF Filter	1	each	1	FM-5th Floor	116.0	1,535.2	13.3	1,543	13.30	100%	1,543	13
5B Bottom HF Filter	1	each	1	FM-5th Floor	116.0	1,535.2	13.3	1,543	13.30	100%	1,543	13
Welder - Idealarc	1	each	1	FM-5th Floor	42.0	391.0	9.3	389	9.25	100%	389	9
Welder - Idealarc	1	each	1	FM-5th Floor	42.0	391.0	9.3	389	9.25	100%	389	9
Hot Box - Cold Trap E-446-1A Sec.	1	each	1	FM-5th Floor	58.0	199.0	34.2	1,984	34.20	100%	1,984	34
Hot Box - Cold Trap E-413-2A Sec.	1	each	1	FM-5th Floor	58.0	199.0	34.2	1,984	34.20	100%	1,984	34
Hot Box - Cold Trap E411-1A Tert.	1	each	1	FM-5th Floor	58.0	199.0	34.2	1,984	34.20	100%	1,984	34
Hot Box	1	each	1	FM-5th Floor	58.0	199.0	34.2	1,984	34.20	100%	1,984	34
Hot Box - Cold Trap - E-412-2A Tert.	1	each	1	FM-5th Floor	58.0	199.0	34.2	1,984	34.20	100%	1,984	34
Hot Box - Cold Trap - E-447-1B Sec.	1	each	1	FM-5th Floor	58.0	199.0	34.2	1,984	34.20	100%	1,984	34
Hot Box - Cold Trap - E-448-2B Sec.	1	each	1	FM-5th Floor	58.0	199.0	34.2	1,984	34.20	100%	1,984	34
Hot Box - Cold Trap - E-472-1B Tert.	1	each	1	FM-5th Floor	58.0	199.0	34.2	1,984	34.20	100%	1,984	34
Hot Box - Cold Trap - E-473-2B Tert.	1	each	1	FM-5th Floor	58.0	199.0	34.2	1,984	34.20	100%	1,984	34
Hot Box	1	each	1	FM-5th Floor	58.0	199.0	34.2	1,984	34.20	100%	1,984	34
Hot Box - Cold Trap - E-601	1	each	1	FM-5th Floor	58.0	199.0	34.2	1,984	34.20	100%	1,984	34
Hot Box - Cold Trap - E-602	1	each	1	FM-5th Floor	58.0	199.0	34.2	1,984	34.20	100%	1,984	34
Hot Box - Cold Trap - E-603	1	each	1	FM-5th Floor	58.0	199.0	34.2	1,984	34.20	100%	1,984	34
Portable Hoist - Mite-E-Lift	1	each	1	FM-5th Floor	58.0	56.0	0.6	34	0.58	100%	34	1
4000# - Hoist B4 & B5 HF Filters	1	each	1	FM-5th Floor	75.0	150.0	2.0	150	2.00	100%	150	2
2000# - Hoist - Over "A" Reductor	1	each	1	FM-5th Floor	98.0	80.0	0.8	78	0.80	100%	78	1
Hoist & Trolley Over A4 & A5 HF Filter	1	each	1	FM-5th Floor	75.0	150.0	2.0	150	2.00	100%	150	2
4000# Hoist & Trolley Oven B3 HF Filter	1	each	1	FM-5th Floor	113.0	150.0	1.3	147	1.30	100%	147	1
1000# - Hoist - Rotary Va. Storage Area	1	each	1	FM-5th Floor	66.0	88.0	1.3	86	1.30	100%	86	1
1000# Cap - Portable Hoist	1	each	1	FM-5th Floor	66.0	88.0	1.3	86	1.30	100%	86	1
1000# Cap - Portable Hoist	1	each	1	FM-5th Floor	66.0	88.0	1.3	86	1.30	100%	86	1
20,000# Monorail - Over Cold Trap 2B Tert.	1	each	1	FM-5th Floor	106.0	1,875.0	17.6	1,866	17.60	100%	1,866	18
20,000# Monorail - Over Cold Trap 1B	1	each	1	FM-5th Floor	106.0	1,875.0	17.6	1,866	17.60	100%	1,866	18

Table A-13  
MISCELLANEOUS ITEM VOLUME ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

DESCRIPTION	LOC CODE	UNITS	NO. OF UNITS	MAT'L OF CONST.	BULK DENSITY (lb/ft <sup>3</sup> )	UNIT WEIGHT (lb)	UNIT VOLUME (ft <sup>3</sup> )	TOTAL WEIGHT (pound)	TOTAL VOLUME (ft <sup>3</sup> )	PERCENT DIRECT BURY (vol %)	ESOLUTIONS DISPOSAL WEIGHT (pound)	ESOLUTIONS DISPOSAL VOLUME (ft <sup>3</sup> )
20,000# Mono - Cold Trap 2B Sec. & 1A Tert.	1	each	1	FM-5th Floor	106.0	3,125.0	29.4	3,116	29.40	100%	3,116	29
20,000# Mono - Oven Cold Trap 2A & 1B Sec.	1	each	1	FM-5th Floor	106.0	3,125.0	29.4	3,116	29.40	100%	3,116	29
20,000# Mono - Cold Trap 1A Sec. & 2A Tert.	1	each	1	FM-5th Floor	106.0	3,125.0	29.4	3,116	29.40	100%	3,116	29
11,000# Monorail - Over HF Filter A4 & A5	1	each	1	FM-5th Floor	77.0	719.0	9.3	716	9.30	100%	716	9
7,000# Monorail - Over HF Filter B4 & B5	1	each	1	FM-5th Floor	103.0	474.0	4.6	474	4.60	100%	474	5
5,000# Monorail - Over HF Filter B3	1	each	1	FM-5th Floor	103.0	431.0	4.2	433	4.20	100%	433	4
1,000# Monorail - Over HF Filter B6	1	each	1	FM-5th Floor	103.0	259.0	2.5	258	2.50	100%	258	3
1,000# Monorail - Oven "A" Gs Area	1	each	1	FM-5th Floor	103.0	259.0	2.5	258	2.50	100%	258	3
1,000# Monorail - Over "A" Gs Area	1	each	1	FM-5th Floor	103.0	259.0	2.5	258	2.50	100%	258	3
MO-419 Monorail - Over (C-418) Mill Feed Elevator	1	each	1	FM-5th Floor	78.0	311.0	4.0	312	4.00	100%	312	4
MO-420 1,000# Mono - Over Rotary Va. Stor. Area	1	each	1	FM-5th Floor	115.0	173.0	1.5	173	1.50	100%	173	2
Vacuum Pump	1	each	1	FM-5th Floor	58.0	131.0	2.3	133	2.30	100%	133	2
"A" Reductor Comb Air Blower	1	each	1	FM-5th Floor	58.0	120.0	12.0	696	12.00	100%	696	12
Fluorine Compressor	1	each	1	FM-5th Floor	58.0	120.0	12.0	696	12.00	100%	696	12
Exhaust Fan - South Wall - HF Area	1	each	1	FM-5th Floor	58.0	230.0	32.0	1,856	32.00	100%	1,856	32
Exhaust Fan - West Wall - HF Area	1	each	1	FM-5th Floor	58.0	230.0	32.0	1,856	32.00	100%	1,856	32
Emergency Exh. Fan	1	each	1	FM-5th Floor	58.0	320.0	64.0	3,712	64.00	100%	3,712	64
Women's Shower Exhaust Fan	1	each	1	FM-5th Floor	58.0	15.0	1.0	58	1.00	100%	58	1
Man Cooling Fan	1	each	1	FM-5th Floor	58.0	230.0	32.0	1,856	32.00	100%	1,856	32
"B" HF Primary Jet Scrubber - West	1	each	1	FM-5th Floor	58.0	174.0	3.0	174	3.00	100%	174	3
"B" HF Secondary Jet Scrubber - East	1	each	1	FM-5th Floor	58.0	174.0	3.0	174	3.00	100%	174	3
"B" Reductor Air Circ. Fan	1	each	1	FM-5th Floor	58.0	1,470.0	294.0	17,052	294.00	100%	17,052	294
Exhaust Fan	1	each	1	FM-5th Floor	58.0	230.0	32.0	1,856	32.00	100%	1,856	32
Water Cooler	1	each	1	FM-5th Floor	13.8	83.0	6.0	83	6.00	0%	0	0
R-402 "A" Reductor - Surface Comb.	1	each	1	FM-5th Floor	58.0	10,900.0	286.3	16,605	286.30	100%	16,605	286
R-600 "B" Reductor	1	each	1	FM-5th Floor	58.0	10,900.0	286.3	16,605	286.30	100%	16,605	286
Spar Rotex Screen	1	each	1	FM-5th Floor	58.0	155.0	2.7	157	2.70	100%	157	3
Exit - Wet Oxide Dust Coil. #2 (F-416)	1	each	1	FM-5th Floor	60.0	150.0	2.5	150	2.50	100%	150	3
Exhaust Fan (P-524)	1	each	1	FM-5th Floor	58.0	27.0	2.7	157	2.70	100%	157	3
Exhaust Fan (P-639)	1	each	1	FM-5th Floor	58.0	27.0	2.7	157	2.70	100%	157	3
Exhaust Fan (P-523)	1	each	1	FM-5th Floor	58.0	27.0	2.7	157	2.70	100%	157	3
Switch Board Nxw	1	each	1	FM-5th Floor	58.0	3,500.0	350.0	20,300	350.00	100%	20,300	350
Motor Control Ctr Nxw	1	each	1	FM-5th Floor	58.0	1,440.0	144.0	8,352	144.00	100%	8,352	144
#1 Conc. Hopper (Ctr)	1	each	1	FM-5th Floor	58.0	2,500.0	63.0	3,654	63.00	100%	3,654	63
"A" Reductor Filter Fines Hopper	1	each	1	FM-5th Floor	58.0	0.0	3.3	191	3.30	100%	191	3
#2 Conc. Hopper (East) - Cont. Boiler	1	each	1	FM-5th Floor	58.0	2,500.0	63.0	3,654	63.00	100%	3,654	63
HF Filter Bump Tank	1	each	1	FM-5th Floor	58.0	1,083.4	22.3	1,293	22.30	100%	1,293	22
UF6 SurgeTank	1	each	1	FM-5th Floor	58.0	6,583.0	176.7	10,249	176.70	100%	10,249	177
"1B" Reductor Filter Fines Hopper	1	each	1	FM-5th Floor	58.0	615.0	10.6	615	10.60	100%	615	11
#3 Conc. Hopper - West	1	each	1	FM-5th Floor	58.0	2,500.0	63.0	3,654	63.00	100%	3,654	63
Vibrator - #1 Wet Oxide Dust Coil. Hop. (E)	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - #1 Wet Oxide Dust Coil. Hop. (W)	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - #2 Wet Oxide Dust Coil. Hop. (E)	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0

Table A-13  
MISCELLANEOUS ITEM VOLUME ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

DESCRIPTION	LOC CODE	UNITS	NO. OF UNITS	MAT'L OF CONST.	BULK DENSITY (lb/ft <sup>3</sup> )	UNIT WEIGHT (lb)	UNIT VOLUME (ft <sup>3</sup> )	TOTAL WEIGHT (pound)	TOTAL VOLUME (ft <sup>3</sup> )	PERCENT DIRECT BURY (vol %)	ESOLUTIONS DISPOSAL WEIGHT (pound)	ESOLUTIONS DISPOSAL VOLUME (ft <sup>3</sup> )
Vibrator - #2 Wet Oxide Dust Coll. Hop. (W)	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - HF Filter "A1" (F-406) Disch. Line	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - HF Filter "A2" (F-407) Disch. Line	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - HF Filter "A3" (F-419) Disch. Line	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - HF Filter "A6" (F-443) Disch. Line	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vib. - "A" UF4 Prim. Dust Coll. (F-426) Hop.	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - A2 Prim Flation Filter (F-432)	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - A1 Prim Flation Filter (F-433)	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - B2 Prim Flation Filter (F-408)	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - B1 Prim Flation Filter (F-409)	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - Span Decay Hopper Disch. Line	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vib. - "A" Filter Fines Hopper Disch. Line	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - "A" Reductor Feeder	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - UF4 Prim Dust Coll. (F-611)	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - "A" Reduction Feed Hopper	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - "B1" HF Filter (F-608) Disch. Line	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - "B2" HF Filter (F-609) Disch. Line	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - "B" Red. Feed Hopper (U-606)	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - "B" Red. Feeder (R-600)	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - "B" Red. Prim Filter	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - "C2" Fiator Prim Filter Shell	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - "C1" Fiator Prim Filter Shell	1	each	1	FM-5th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Rotary Va. - "A" Red uctor Feeder (R-402)	1	each	1	FM-5th Floor	58.0	68.0	1.2	70	1.20	100%	70	1
Rotary Va. - "A" Prim. UF4 Dust Coll. Disch.	1	each	1	FM-5th Floor	58.0	68.0	1.2	70	1.20	100%	70	1
Rotary Va. - Ash Dust Coll. Disch. (F-422)	1	each	1	FM-5th Floor	58.0	68.0	1.2	70	1.20	100%	70	1
Rotary Va. - Spar Decay Hopper Disch.	1	each	1	FM-5th Floor	58.0	68.0	1.2	70	1.20	100%	70	1
Rotary Va. - #2 Dry Oxide Dust Coll. Disch.	1	each	1	FM-5th Floor	58.0	68.0	1.2	70	1.20	100%	70	1
Rotary Va. - #1 Wet Oxide Dust Coll. Disch.	1	each	1	FM-5th Floor	58.0	68.0	1.2	70	1.20	100%	70	1
Rotary Va. - #2 Wet Oxide Dust Coll. Disch.	1	each	1	FM-5th Floor	58.0	68.0	1.2	70	1.20	100%	70	1
Rotary Va. - #1 Wet Disch.	1	each	1	FM-5th Floor	58.0	68.0	1.2	70	1.20	100%	70	1
Rotary Va. - "B" Reductor Feeder	1	each	1	FM-5th Floor	58.0	0.0	1.3	75	1.30	100%	75	1
Rotary Va. - "B" UF4 Prim. Dust Coll. Disch.	1	each	1	FM-5th Floor	58.0	68.0	1.2	70	1.20	100%	70	1
Rotary Va. - "Conc. Surge Hopper Feeder	1	each	1	FM-5th Floor	58.0	68.0	1.2	70	1.20	100%	70	1
"A" Reductor Hopper Feed Conveyer	1	each	1	FM-6th Floor	120.0	795.0	6.6	792	6.60	100%	792	7
Spar Decay Hopper Feed Screw	1	each	1	FM-6th Floor	120.0	900.0	7.5	900	7.50	100%	900	8
"B" Reductor Hopper Feed Screw	1	each	1	FM-6th Floor	120.0	1,378.4	11.5	1,380	11.50	100%	1,380	12
B" UF4 Elevator Disch. Screw	1	each	1	FM-6th Floor	120.0	3,127.8	26.1	3,132	26.10	100%	3,132	26
"A" UF4 Elevator Disch. Screw	1	each	1	FM-6th Floor	120.0	1,007.3	8.4	1,008	8.40	100%	1,008	8
"B" UF4 Elevator Sec. Feed Screw	1	each	1	FM-6th Floor	136.0	600.0	4.4	598	4.40	100%	598	4
Trolley - Over "A" Red BU Filter	1	each	1	FM-6th Floor	75.0	54.0	0.7	53	0.70	100%	53	1
Trolley - Over "B.1" Red BU Filter	1	each	1	FM-6th Floor	75.0	54.0	0.7	53	0.70	100%	53	1
Trolley - Oven "B.2" Red BU Filter	1	each	1	FM-6th Floor	75.0	54.0	0.7	53	0.70	100%	53	1
CR-401 Hoist Well Crane	1	each	1	FM-6th Floor	58.0	96,787.5	1,668.8	96,790	1,668.80	100%	96,790	1,669



Table A-13  
MISCELLANEOUS ITEM VOLUME ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

DESCRIPTION	LOC CODE	UNITS	NO. OF UNITS	MAT'L OF CONST.	BULK DENSITY (lb/ft <sup>3</sup> )	UNIT WEIGHT (lb)	UNIT VOLUME (ft <sup>3</sup> )	TOTAL WEIGHT (pound)	TOTAL VOLUME (ft <sup>3</sup> )	PERCENT DIRECT BURY (vol %)	ESOLUTIONS DISPOSAL WEIGHT (pound)	ESOLUTIONS DISPOSAL VOLUME (ft <sup>3</sup> )
Dryer Prior To Chem Trap	1	each	1	FM-6th Floor	73.0	57.0	0.8	58	0.80	100%	58	1
Dryer Prior To Chem Trap	1	each	1	FM-6th Floor	73.0	57.0	0.8	58	0.80	100%	58	1
Dryer Prior To Chem Trap	1	each	1	FM-6th Floor	58.0	287.0	7.0	406	7.00	100%	406	7
#1 Low Boiler Still Condenser	1	each	1	FM-6th Floor	139.0	3,340.0	24.0	3,336	24.00	100%	3,336	24
"A" HF Filter Heater	1	each	1	FM-6th Floor	40.0	555.0	13.9	556	13.90	100%	556	14
"A2" HF Filter Heater	1	each	1	FM-6th Floor	40.0	555.0	13.9	556	13.90	100%	556	14
"A3" HF Filter Heater	1	each	1	FM-6th Floor	40.0	555.0	13.9	556	13.90	100%	556	14
"A4" HF Filter Heater	1	each	1	FM-6th Floor	40.0	555.0	13.9	556	13.90	100%	556	14
#2 Low Boiler Still Condenser	1	each	1	FM-6th Floor	139.0	3,340.0	24.0	3,336	24.00	100%	3,336	24
#1 Dravo H&V Unit - Sw	1	each	1	FM-6th Floor	58.0	6,000.0	600.0	34,800	600.00	100%	34,800	600
#2 Dravo H&V Unit - Se	1	each	1	FM-6th Floor	58.0	6,000.0	600.0	34,800	600.00	100%	34,800	600
#4 Dravo H&V Unit - Nw	1	each	1	FM-6th Floor	58.0	6,000.0	600.0	34,800	600.00	100%	34,800	600
Top Heater Filter No. 1B Htr	1	each	1	FM-6th Floor	40.0	503.0	12.6	504	12.60	100%	504	13
Top Heater Filter No. 2B Htr	1	each	1	FM-6th Floor	40.0	503.0	12.6	504	12.60	100%	504	13
Reductor Filter Htr No.	1	each	1	FM-6th Floor	40.0	503.0	12.6	504	12.60	100%	504	13
"A" Reductor BU Filter Htr.	1	each	1	FM-6th Floor	40.0	503.0	12.6	504	12.60	100%	504	13
"A" Reductor Exit Gas Cooler	1	each	1	FM-6th Floor	58.0	34.0	0.6	35	0.60	100%	35	1
"A" Reductor Exit Gas Cooler	1	each	1	FM-6th Floor	58.0	34.0	0.6	35	0.60	100%	35	1
#3 Low Boiler Condenser	1	each	1	FM-6th Floor	139.0	3,340.0	24.0	3,336	24.00	100%	3,336	24
#4 Low Boiler Condenser	1	each	1	FM-6th Floor	139.0	3,340.0	24.0	3,336	24.00	100%	3,336	24
A Sec. UF4 Dust Cell	1	each	1	FM-6th Floor	58.0	1,975.0	108.0	6,264	108.00	100%	6,264	108
A Reductor Backup Filter	1	each	1	FM-6th Floor	111.0	1,841.9	16.6	1,843	16.60	100%	1,843	17
"A1" Top HF Filter	1	each	1	FM-6th Floor	58.0	4,425.0	111.0	6,438	111.00	100%	6,438	111
"A2" Top HF Filter	1	each	1	FM-6th Floor	58.0	4,425.0	111.0	6,438	111.00	100%	6,438	111
B-2 Fluoninator Primary Filter	1	each	1	FM-6th Floor	174.0	2,300.0	13.3	2,314	13.30	100%	2,314	13
B-1 Fluoninator Primary Filter	1	each	1	FM-6th Floor	174.0	2,300.0	13.3	2,314	13.30	100%	2,314	13
#2 Dry Oxide Dust Coll.	1	each	1	FM-6th Floor	58.0	4,972.5	994.5	57,681	994.50	100%	57,681	995
#1 Wet Oxide Dust Coll. - Primary	1	each	1	FM-6th Floor	58.0	16,600.0	3,169.8	183,848	3,169.80	100%	183,848	3,170
A3 Top HF Filter	1	each	1	FM-6th Floor	58.0	4,425.0	111.0	6,438	111.00	100%	6,438	111
Ash Dust Coll #1	1	each	1	FM-6th Floor	58.0	3,250.0	39.2	3,254	39.20	100%	3,254	39
A Pri UF4 Dust Coll	1	each	1	FM-6th Floor	58.0	2,861.0	572.3	33,193	572.30	100%	33,193	572
A-1 Fluorinator Primary Filter	1	each	1	FM-6th Floor	58.0	2,200.0	100.5	5,829	100.50	100%	5,829	101
B-3 Fluorinator Primary Filter	1	each	1	FM-6th Floor	58.0	2,200.0	100.5	5,829	100.50	100%	5,829	101
Ash Vac Cleaner	1	each	1	FM-6th Floor	58.0	361.0	9.5	551	9.50	100%	551	10
Ash Dust Coil #2 Spar Recycle	1	each	1	FM-6th Floor	58.0	800.0	160.0	9,280	160.00	100%	9,280	160
A6 Top HF Filter	1	each	1	FM-6th Floor	58.0	566.0	14.9	864	14.90	100%	864	15
B-2 Fluorinator Backup Filter	1	each	1	FM-6th Floor	58.0	141.0	3.7	215	3.70	100%	215	4
B-1 Fluorinator Backup Filter	1	each	1	FM-6th Floor	58.0	141.0	3.7	215	3.70	100%	215	4
A-1 Fluorinator Backup Filter	1	each	1	FM-6th Floor	58.0	141.0	3.7	215	3.70	100%	215	4
B-3 Fluorinator Backup Filter	1	each	1	FM-6th Floor	58.0	141.0	3.7	215	3.70	100%	215	4
B UF4 Sec Dust Coll.	1	each	1	FM-6th Floor	58.0	2,861.3	572.3	33,193	572.30	100%	33,193	572
Chem. Traps	1	each	1	FM-6th Floor	102.0	50.0	0.5	51	0.50	100%	51	1
Chem. Traps	1	each	1	FM-6th Floor	102.0	50.0	0.5	51	0.50	100%	51	1

Table A-13  
MISCELLANEOUS ITEM VOLUME ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

DESCRIPTION	LOC CODE	UNITS	NO. OF UNITS	MAT'L OF CONST.	BULK DENSITY (lb/ft <sup>3</sup> )	UNIT WEIGHT (lb)	UNIT VOLUME (ft <sup>3</sup> )	TOTAL WEIGHT (pound)	TOTAL VOLUME (ft <sup>3</sup> )	PERCENT DIRECT BURY (vol %)	ESOLUTIONS DISPOSAL WEIGHT (pound)	ESOLUTIONS DISPOSAL VOLUME (ft <sup>3</sup> )
Chem. Traps	1	each	1	FM-6th Floor	102.0	50.0	0.5	51	0.50	100%	51	1
Chem. Traps	1	each	1	FM-6th Floor	102.0	50.0	0.5	51	0.50	100%	51	1
Chem. Traps	1	each	1	FM-6th Floor	102.0	50.0	0.5	51	0.50	100%	51	1
Chem. Traps	1	each	1	FM-6th Floor	102.0	50.0	0.5	51	0.50	100%	51	1
Chem. Traps	1	each	1	FM-6th Floor	102.0	50.0	0.5	51	0.50	100%	51	1
Chem. Traps	1	each	1	FM-6th Floor	102.0	50.0	0.5	51	0.50	100%	51	1
Blow Back Air Filter On F-446	1	each	1	FM-6th Floor	127.0	25.0	0.2	25	0.20	100%	25	0
C-1 Fluoninator Primary Filter - West	1	each	1	FM-6th Floor	58.0	3,170.0	56.5	3,277	56.50	100%	3,277	57
C-2 Fluoninator Primary Filter - Center	1	each	1	FM-6th Floor	58.0	3,170.0	56.5	3,277	56.50	100%	3,277	57
C-3 Fluorinator Primary Filter - East	1	each	1	FM-6th Floor	58.0	3,170.0	56.5	3,277	56.50	100%	3,277	57
C-1 Fluorinator Backup Filter - West	1	each	1	FM-6th Floor	58.0	1,492.0	29.5	1,711	29.50	100%	1,711	30
C-2 Fluoninator Backup Filter - Center	1	each	1	FM-6th Floor	58.0	1,492.0	29.5	1,711	29.50	100%	1,711	30
C-3 Fluoninator Backup Filter - East	1	each	1	FM-6th Floor	58.0	1,492.0	29.5	1,711	29.50	100%	1,711	30
"B" Reductor Fri Filter	1	each	1	FM-6th Floor	111.0	1,841.9	16.6	1,843	16.60	100%	1,843	17
"B" Reductor Backup Filter	1	each	1	FM-6th Floor	116.0	1,535.2	13.3	1,543	13.30	100%	1,543	13
1B Top Hflator Filter	1	each	1	FM-6th Floor	116.0	1,535.2	13.3	1,543	13.30	100%	1,543	13
2B Top Hflator Filter	1	each	1	FM-6th Floor	116.0	1,535.2	13.3	1,543	13.30	100%	1,543	13
B UF4 Pri. Dust Coil.	1	each	1	FM-6th Floor	58.0	2,200.0	350.0	20,300	350.00	100%	20,300	350
1A Reductor Fri. Filter	1	each	1	FM-6th Floor	111.0	1,841.9	16.6	1,843	16.60	100%	1,843	17
A-2 Fluoninator Primary Filter - West	1	each	1	FM-6th Floor	58.0	1,492.0	29.5	1,711	29.50	100%	1,711	30
A-3 Fluoninator Primary Filter - Center	1	each	1	FM-6th Floor	58.0	1,492.0	29.5	1,711	29.50	100%	1,711	30
A-2 Fluoninator Backup Filter - West	1	each	1	FM-6th Floor	58.0	1,492.0	29.5	1,711	29.50	100%	1,711	30
A-3 Fluoninator Backup Filter - Center	1	each	1	FM-6th Floor	58.0	1,492.0	29.5	1,711	29.50	100%	1,711	30
Welder	1	each	1	FM-6th Floor	42.0	391.0	9.3	389	9.25	100%	389	9
Hoist - 500# Cap. - Portable	1	each	1	FM-6th Floor	58.0	56.0	0.6	34	0.58	100%	34	1
Hoist-"A" Reductor BU. Filter	1	each	1	FM-6th Floor	98.0	80.0	0.8	78	0.80	100%	78	1
Hoist - B-1 Filter	1	each	1	FM-6th Floor	98.0	80.0	0.8	78	0.80	100%	78	1
Hoist - B-2 Filter	1	each	1	FM-6th Floor	98.0	80.0	0.8	78	0.80	100%	78	1
Hoist - F-496 & F-497 Fluorinator Filter	1	each	1	FM-6th Floor	98.0	80.0	0.8	78	0.80	100%	78	1
Hoist - F-493 & F-494 Fluorinator Filter	1	each	1	FM-6th Floor	98.0	80.0	0.8	78	0.80	100%	78	1
Hoist - AB HF Filter	1	each	1	FM-6th Floor	98.0	80.0	0.8	78	0.80	100%	78	1
Hoist - A1 & A2 HF Filter	1	each	1	FM-6th Floor	98.0	80.0	0.8	78	0.80	100%	78	1
Hoist - "B" Reductor BU Filter	1	each	1	FM-6th Floor	98.0	80.0	0.8	78	0.80	100%	78	1
Hoist - A2 Fri & BU Flation Filter	1	each	1	FM-6th Floor	98.0	80.0	0.8	78	0.80	100%	78	1
Hoist - B1 BU Flation Filter & A6 HF Filter	1	each	1	FM-6th Floor	98.0	80.0	0.8	78	0.80	100%	78	1
Hoist - Ash Dust Coll.	1	each	1	FM-6th Floor	98.0	80.0	0.8	78	0.80	100%	78	1
Hoist - A1 & B2 BU & B2 Pnim-Flation Filters	1	each	1	FM-6th Floor	98.0	80.0	0.8	78	0.80	100%	78	1
Hoist - A1 & B2 BU & B2 Pnim-Flation Filters	1	each	1	FM-6th Floor	98.0	80.0	0.8	78	0.80	100%	78	1
Hoist - "B" Red. Prim. Filters	1	each	1	FM-6th Floor	98.0	80.0	0.8	78	0.80	100%	78	1
Hoist - "C" Flator Prim. Filters	1	each	1	FM-6th Floor	98.0	80.0	0.8	78	0.80	100%	78	1
Hoist - "C" Flator BU Filters	1	each	1	FM-6th Floor	98.0	80.0	0.8	78	0.80	100%	78	1
3000# Monorail	1	each	1	FM-6th Floor	153.0	238.0	1.6	245	1.60	100%	245	2
2000# Monorail - "C" Flaton Pri Filters	1	each	1	FM-6th Floor	145.0	647.0	4.5	653	4.50	100%	653	5

Table A-13  
MISCELLANEOUS ITEM VOLUME ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

DESCRIPTION	LOC CODE	UNITS	NO. OF UNITS	MAT'L OF CONST.	BULK DENSITY (lb/ft <sup>3</sup> )	UNIT WEIGHT (lb)	UNIT VOLUME (ft <sup>3</sup> )	TOTAL WEIGHT (pound)	TOTAL VOLUME (ft <sup>3</sup> )	PERCENT DIRECT BURY (vol %)	ESOLUTIONS DISPOSAL WEIGHT (pound)	ESOLUTIONS DISPOSAL VOLUME (ft <sup>3</sup> )
2000# Monorail - "C" Flator Sec. Filter	1	each	1	FM-6th Floor	145.0	518.0	3.6	522	3.60	100%	522	4
6000# Monorail - A1 & B2 BU & B2 Fri Flation Fil.	1	each	1	FM-6th Floor	124.0	518.0	4.2	521	4.20	100%	521	4
4000# Monorail - B1 BU Flation & A6 HF Flit.	1	each	1	FM-6th Floor	145.0	474.0	3.3	479	3.30	100%	479	3
3500# Monorail-A1 BU, B1 Fri. & B2 BU Flation	1	each	1	FM-6th Floor	124.0	460.0	3.7	459	3.70	100%	459	4
4000# Monorail - A2 Fri & A2 BU Flation Fil.	1	each	1	FM-6th Floor	124.0	345.0	2.8	347	2.80	100%	347	3
1500# Monorail - #2 Wet Oxide Dust Coll.	1	each	1	FM-6th Floor	145.0	345.0	2.4	348	2.40	100%	348	2
4000# Monorail - A1 HF Filter	1	each	1	FM-6th Floor	124.0	863.0	7.0	868	7.00	100%	868	7
4000# Monorail - A1 & A2 HF Filter	1	each	1	FM-6th Floor	124.0	575.0	4.6	570	4.60	100%	570	5
4000# Monorail - "A" UF4 Sec. Dust Coll	1	each	1	FM-6th Floor	124.0	575.0	4.6	570	4.60	100%	570	5
4500# Monorail - "A" Red. BU Filter	1	each	1	FM-6th Floor	145.0	259.0	1.8	261	1.80	100%	261	2
6000# Monorail - "B" Reductor BU Filter	1	each	1	FM-6th Floor	153.0	214.0	1.4	214	1.40	100%	214	1
1900# Monorail - "B" Reductor BU Filter	1	each	1	FM-6th Floor	145.0	323.0	2.2	319	2.20	100%	319	2
1700# Monorail - B2 HF Filter	1	each	1	FM-6th Floor	145.0	323.0	2.2	319	2.20	100%	319	2
5500# Monorail - B1 HF Filter	1	each	1	FM-6th Floor	145.0	323.0	2.2	319	2.20	100%	319	2
3000# Monorail - #1 Low Boiler Condenser	1	each	1	FM-6th Floor	145.0	302.0	2.1	305	2.10	100%	305	2
3000# Monorail - #2 Low Boiler Condenser	1	each	1	FM-6th Floor	145.0	302.0	2.1	305	2.10	100%	305	2
3000# Monorail - #3 Low Boiler Condenser	1	each	1	FM-6th Floor	145.0	302.0	2.1	305	2.10	100%	305	2
3000# Monorail - #4 Low Boiler Condenser	1	each	1	FM-6th Floor	145.0	302.0	2.1	305	2.10	100%	305	2
2000# Monorail - Ash Dust Coll. Blower	1	each	1	FM-6th Floor	145.0	173.0	1.2	174	1.20	100%	174	1
2000# Monorail - Ash Dust Coll. Blower Motor	1	each	1	FM-6th Floor	145.0	173.0	1.2	174	1.20	100%	174	1
10000# Monorail	1	each	1	FM-6th Floor	127.0	438.0	3.4	432	3.40	100%	432	3
10000# Monorail	1	each	1	FM-6th Floor	127.0	525.0	4.1	521	4.10	100%	521	4
Monorail - F-496 & F-497 Fluorinator Filter	1	each	1	FM-6th Floor	145.0	518.0	3.6	522	3.60	100%	522	4
Monorail - F-493 & F-494 Fluorinator Filter	1	each	1	FM-6th Floor	145.0	518.0	3.6	522	3.60	100%	522	4
Silencer - Ash Vac Cl. Exhst.	1	each	1	FM-6th Floor	76.0	417.0	5.5	418	5.50	100%	418	6
"A" UF4 D.C. Exhauster	1	each	1	FM-6th Floor	58.0	375.0	75.0	4,350	75.00	100%	4,350	75
Wet Oxide Dust Coll. Blower	1	each	1	FM-6th Floor	58.0	330.0	65.9	3,822	65.90	100%	3,822	66
UF4 BU D.C. Blower	1	each	1	FM-6th Floor	58.0	300.0	60.0	3,480	60.00	100%	3,480	60
"A" Reducton Exit Cooling Blower	1	each	1	FM-6th Floor	58.0	90.0	18.0	1,044	18.00	100%	1,044	18
Ash Vac. Cl. Exhausten	1	each	1	FM-6th Floor	58.0	400.0	80.0	4,640	80.00	100%	4,640	80
Dry Oxide D.C. Blower	1	each	1	FM-6th Floor	58.0	688.0	137.5	7,975	137.50	100%	7,975	138
"A" HF Pri. Jet Scrubber-East	1	each	1	FM-6th Floor	58.0	91.0	1.6	93	1.60	100%	93	2
Ash D.C. Exhauster	1	each	1	FM-6th Floor	58.0	120.0	24.0	1,392	24.00	100%	1,392	24
"A" HF Sec. Jet Scrubber -West	1	each	1	FM-6th Floor	58.0	91.0	1.6	93	1.60	100%	93	2
Dravo H&V Unit #1	1	each	1	FM-6th Floor	58.0	200.0	198.0	11,484	198.00	100%	11,484	198
Dravo H&V Unit #2	1	each	1	FM-6th Floor	58.0	200.0	198.0	11,484	198.00	100%	11,484	198
Dravo H&V Unit #4	1	each	1	FM-6th Floor	58.0	200.0	198.0	11,484	198.00	100%	11,484	198
Dravo Induced Draft Fan	1	each	1	FM-6th Floor	58.0	200.0	198.0	11,484	198.00	100%	11,484	198
Dravo Induced Draft Fan	1	each	1	FM-6th Floor	58.0	200.0	198.0	11,484	198.00	100%	11,484	198
Dravo Induced Draft Fan	1	each	1	FM-6th Floor	58.0	200.0	198.0	11,484	198.00	100%	11,484	198
Roof Exhaust Blower Nxe	1	each	1	FM-6th Floor	58.0	990.0	198.0	11,484	198.00	100%	11,484	198
Roof Exhaust Blower Hoist Well	1	each	1	FM-6th Floor	58.0	990.0	198.0	11,484	198.00	100%	11,484	198
Trane Vent Unit No 317-1	1	each	1	FM-6th Floor	58.0	475.0	95.1	5,516	95.10	100%	5,516	95

Table A-13  
MISCELLANEOUS ITEM VOLUME ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

DESCRIPTION	LOC CODE	UNITS	NO. OF UNITS	MAT'L OF CONST.	BULK DENSITY (lb/ft <sup>3</sup> )	UNIT WEIGHT (lb)	UNIT VOLUME (ft <sup>3</sup> )	TOTAL WEIGHT (pound)	TOTAL VOLUME (ft <sup>3</sup> )	PERCENT DIRECT BURY (vol %)	ESOLUTIONS DISPOSAL WEIGHT (pound)	ESOLUTIONS DISPOSAL VOLUME (ft <sup>3</sup> )
Tnane Vent Unit No 222-1	1	each	1	FM-6th Floor	58.0	800.0	160.0	9,280	160.00	100%	9,280	160
Exhaust Fan - Sxw	1	each	1	FM-6th Floor	58.0	230.0	32.0	1,856	32.00	100%	1,856	32
Exhaust Fan - Wxs	1	each	1	FM-6th Floor	58.0	230.0	32.0	1,856	32.00	100%	1,856	32
Exhaust Fan - Wxn	1	each	1	FM-6th Floor	58.0	230.0	32.0	1,856	32.00	100%	1,856	32
Fan - Man Cooler	1	each	1	FM-6th Floor	58.0	100.0	1.9	110	1.90	100%	110	2
Vent Fan	1	each	1	FM-6th Floor	58.0	100.0	1.9	110	1.90	100%	110	2
"B" Reductor Exit Gas Cooler Blower	1	each	1	FM-6th Floor	40.0	300.0	7.5	300	7.50	100%	300	8
Drinking Water Cooler	1	each	1	FM-6th Floor	13.8	83.0	6.0	83.0	6.00	0%	0	0
Scrubber, A Green Salt Dust Collector	1	each	1	FM-6th Floor	58.0	498.0	13.1	760	13.10	100%	760	13
Scrubber, B Green Salt Dust Collector	1	each	1	FM-6th Floor	58.0	498.0	13.1	760	13.10	100%	760	13
SW-22 Switchboard - See Dwg MTW-A0029	1	each	1	FM-6th Floor	40.0	660.0	16.5	660	16.50	100%	660	17
SW-23 Switchboard - See Dwg MTW-A0030	1	each	1	FM-6th Floor	40.0	660.0	15.0	600	15.00	100%	600	15
UF4 Hopper	1	each	1	FM-6th Floor	58.0	9,625.0	1,925.0	111,650	1,925.00	100%	111,650	1,925
Spar Decay Hopper	1	each	1	FM-6th Floor	58.0	21,321.6	4,264.3	247,329	4,264.30	100%	247,329	4,264
Air Blow Back Surge Tank	1	each	1	FM-6th Floor	58.0	338.0	8.4	487	8.40	100%	487	8
"A" Reductor Feed Hopper	1	each	1	FM-6th Floor	58.0	2,650.0	250.0	14,500	250.00	100%	14,500	250
"B" Reductor Feed Hopper	1	each	1	FM-6th Floor	58.0	2,650.0	250.0	14,500	250.00	100%	14,500	250
Vibrtr-On No2 Dry Ox Dust Coil Hppr(F412)	1	each	1	FM-6th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - On"A"Sec UF4 Dust Coil	1	each	1	FM-6th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - On"B"Sec UF4 Dust Coll(F450)	1	each	1	FM-6th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - On"A" Red Exit Gas Cooler(E625)	1	each	1	FM-6th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - On"B"Red Exit Gas Cooler(E632)	1	each	1	FM-6th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Vibrator - On (F-450)	1	each	1	FM-6th Floor	123.0	9.0	0.1	12	0.10	100%	12	0
Rotary Valve-"A"UF4 Sec D.C. Disch	1	each	1	FM-6th Floor	58.0	68.0	1.2	70	1.20	100%	70	1
Rotary Valve-"B" UF4 Sec D.C. Disch	1	each	1	FM-6th Floor	58.0	68.0	1.2	70	1.20	100%	70	1
Contaminated Debris at Sampling Plant Railroad Tracks	4	ft <sup>3</sup>	88	Debris	40.0	40.0	1.0	3,520	88.00	100%	3,520	88
BM/FF building LLRW Trash in drums	2	drum	2,250	DAW	40.0	300.0	7.5	675,000	16,875.00	100%	675,000	16,875
Material on Waste Pad / Other	3	drum	8	DAW	40.0	300.0	7.5	2,400	60.00	100%	2,400	60
BM/FF building LLRW Trash in B-25 Boxes	2	B-25 box	128	DAW	40.0	3,552.0	88.8	454,656	11,366.40	100%	454,656	11,366
BM/FF building LLRW Trash in Blue Boxes	2	blue box	25	DAW	40.0	2,180.0	54.5	54,500	1,362.50	100%	54,500	1,363
Scrap Metal on Metals Pad	3	ft <sup>3</sup>	96,602	Metals	100.0	100.0	1.0	9,660,200	96,602.00	0%	0	0
New Scrap Metal on Metals Pad	3	ft <sup>3</sup>	1,458	Metals	100.0	100.0	1.0	145,800	1,458.00	0%	0	0
16"x16"x8" cubes for disposal on Metals Pad	3	ft <sup>3</sup>	432	Metals	100.0	100.0	1.0	43,200	432.00	0%	0	0
Imhoff Sludge in Crusher Building	2	drum	217	sludge	90.0	675.0	7.5	146,475	1,627.50	100%	146,475	1,628
Outfall Material in Crusher Building	2	drum	15	sludge	90.0	675.0	7.5	10,125	112.50	100%	10,125	113
Equipment Sodium Removal/Ion Exchange Bldg	1	ft <sup>2</sup>	3,808	Metals	62.2			407,471	6,546.00	90%	366,724	5,892
Equipment Sodium Removal/Ion Exchange Bldg	1	ft <sup>2</sup>	2,520	Metals	62.2			269,650	4,332.00	90%	242,685	3,899
Equipment KOH Muds Building	1	ft <sup>2</sup>	2,394	Metals	62.2			256,167	4,116.00	90%	230,551	3,704
Equipment Uranium Recovery Building	1	ft <sup>2</sup>	4,560	Metals	62.2			487,938	7,839.00	90%	439,144	7,055
Equipment Uranium Recovery Building	1	ft <sup>2</sup>	1,100	Metals	62.2			117,704	1,891.00	90%	105,934	1,702

Table A-13  
MISCELLANEOUS ITEM VOLUME ESTIMATE  
Honeywell - Metropolis Works (MTW) Metropolis, Illinois

DESCRIPTION	LOC CODE	UNITS	NO. OF UNITS	MAT'L OF CONST.	BULK DENSITY (lb/ft <sup>3</sup> )	UNIT WEIGHT (lb)	UNIT VOLUME (ft <sup>3</sup> )	TOTAL WEIGHT (pound)	TOTAL VOLUME (ft <sup>3</sup> )	PERCENT DIRECT BURY (vol %)	ESOLUTIONS DISPOSAL WEIGHT (pound)	ESOLUTIONS DISPOSAL VOLUME (ft <sup>3</sup> )
Equipment FM Building Southeast pad	1	ft <sup>2</sup>	3,888	Metals	62.2			416,031	6,684.00	90%	374,428	6,016
Equipment FM Building Southwest pad	1	ft <sup>2</sup>	3,564	Metals	62.2			381,362	6,127.00	90%	343,226	5,514
Equipment Sample Plant	1	ft <sup>2</sup>	4,488	Metals	62.2			480,234	7,715.00	50%	240,117	3,858
Equipment Pond Muds Filter Calciner Bldg	2	ft <sup>2</sup>	1,125	Metals	62.2			120,379	1,934.00	95%	114,360	1,837
Equipment Cylinder wash Building	2	ft <sup>2</sup>	504	Metals	62.2			26,965	866.00	0%	0	0
Equipment Drum crusher Building	2	ft <sup>2</sup>	5,340	Metals	62.2			57,140	9,180.00	0%	0	0
FM Building Demolition Debris	1	ft <sup>3</sup>	109,043	Debris	33.3			5,670,249	170,371.00	100%	5,670,249	170,371
FM Building Demolition Concrete Rubble	1	ft <sup>3</sup>	6,048	concrete rubble	75.0			725,760	9,677.00	0%	0	0
Na Removal Building Demolition Debris	1	ft <sup>3</sup>	13,796	Debris	34.8			717,392	20,610.00	100%	717,392	20,610
U Recovery Building Demolition Debris	1	ft <sup>3</sup>	14,141	Debris	52.0			735,332	20,955.00	100%	735,332	20,955
KOH Muds Building Demolition Debris	1	ft <sup>3</sup>	1,193	Debris	52.0			62,010	1,193.00	100%	62,010	1,193
Sample Plant Building Demolition Debris	1	ft <sup>3</sup>	14,231	Debris	52.0			740,012	21,045.00	100%	740,012	21,045
Calciner Building Demolition Debris	2	ft <sup>3</sup>	981	Debris	52.0			51,025	981.00	100%	51,025	981
FM Pads Demolition Concrete Rubble	1	ft <sup>3</sup>	2,355	concrete rubble	106.6			282,600	2,650.00	0%	0	0
Excavated Pipe	4	ft <sup>3</sup>	1,556	Steel	42.3			65,770	1,556.00	100%	65,770	1,556
Cold Concrete (Construction Rubble)	3	ft <sup>3</sup>	5,250	concrete rubble	60.0			315,000	5,250.00	0%	0	0
Soil from HF Mitigation & Fire Water Line Ruptures	3	ft <sup>3</sup>	12,000	soil	75.0			900,000	12,000.00	0%	0	0
Rad. Contaminated Concrete from HF Mitigation	3	ft <sup>3</sup>	10,000	concrete rubble	60.0			600,000	10,000.00	100%	600,000	10,000
Hot Concrete (Construction Rubble)	3	ft <sup>3</sup>	1,350	concrete rubble	60.0			81,000	1,350.00	100%	81,000	1,350
Hot Asbestos	2	ft <sup>3</sup>	2,500	Asbestos	7.0			17,500	2,500.00	100%	17,500	2,500
Large Rad. Scrap Metal (Fluorinator shell & Cold Trap)	3	lbs	25,000	steel	21.0			25,000	1,190.00	100%	25,000	1,190
Crushed Unwashed Ore Drums	3	ft <sup>3</sup>	6,200		50.0			310,000	6,200.00	100%	310,000	6,200
DAW: Construction Rubble (Block Wall), Broken Filter Tubes (Fluorination), Dust Collector Bags, Trash, PPE, Floor sweeping, Incinerator Ash	3	ft <sup>3</sup>	8,000	debris	15.0			120,000	8,000.00	100%	120,000	8,000
Cold Special / Chemical Waste	2	ft <sup>3</sup>	9,105	chemical waste	15.0			136,575	9,105.00	0%	0	0
RAM Flat Compactor	2	each	1	steel	70.0	3,525	50.4	3,525	50.00	100%	3,525	50
Conveyor for RAM Flat Compactor	2	each	1	steel	20.0	1,500	75	1,500	75.00	0%	0	0
HEPA Unit for RAM Flat Compactor	2	each	1	steel	30.0	600	20	600	20.00	100%	600	20
Drum Washer	2	each	1	steel	30.0	1,500	50	1,500	50.00	100%	1,500	50
TOTALS:								29,674,776	621,343	100%	16,680,307	396,076

Note

(1) Due to rounding of values the calculated values may not be exact (see Table A-13 in the 2006 Report prepared by Duratek).



## 1.0 INTRODUCTION

As described in NUREG-1307 Revision 15, the adjustment of the total decommissioning cost estimate can be expressed as:

$$\text{Estimated Cost (Year X)} = [\text{Base Cost}] [A * L_x + B * E_x + C * B_x]$$

Where, per NUREG-1307, A, B, and C are the fractions of the total base cost that are attributable to labor (0.65), energy (0.13), and burial (0.22), respectively. These fractions sum to 1.0.

The factors  $L_x$ ,  $E_x$ , and  $B_x$  are the Labor Cost, Energy Cost, and the Low-Level Waste (LLW) Burial/Disposition Cost Adjustments respectively.

The above equation, when adjusted to reference the 2015 Honeywell-Metropolis estimate, can be expressed as follows:

$$\text{Estimated Cost (2015)} = [\text{2012 Cost}] [A * L_{2015} + B * E_{2015} + C * B_{2015}]$$

where A, B, and C are the fractions of the total 2012 Honeywell-Metropolis dollar costs that are attributable to labor, energy, and burial, respectively. These values sum to 1.0.

The factors  $L_{2015}$ ,  $E_{2015}$ , and  $B_{2015}$  are based on the latest available data and are defined as:

$L_{2015}$  = Labor Cost Adjustment, Q1 2012 to Q1 2015,

$E_{2015}$  = Energy Cost Adjustment, 2012 Annual Average to 2015 Annual Average, and

$B_{2015}$  = LLW Burial/Disposition Cost Adjustment, 2012 to 2015, (i.e., burial/disposition cost in 2015 divided by the burial/disposition cost in 2012)

Licensees are to evaluate  $L_x$  and  $E_x$  for the years subsequent to 1986 based on the national producer price indexes, national consumer price indexes, and on local conditions for a given site (NUREG-1307, Rev. 15). For the Metropolis plant, the estimates will be adjusted based on the indexes for 2015.

Calculation of the Honeywell-Metropolis factors and adjustments are detailed in the following sections.

---

**2.0     CALCULATION OF LABOR, ENERGY, AND BURIAL FRACTIONS**

A, B, and C are the fractions of the total 2012 Honeywell-Metropolis dollar costs that are attributable to labor, energy, and burial, respectively. These values are based on Table 4-1 in the 2012 Decommissioning Cost Estimate and are calculated as follows:

Cost for labor plus travel & living =	\$45,829,356
Cost for equipment, contracts, and supplies =	\$2,892,108
Cost for burial & disposition =	\$112,228,445
Total Cost =	\$160,949,909
A = \$45,829,356/\$160,949,909 =	<b>0.285</b>
B = \$2,892,108/\$160,949,909 =	<b>0.018</b>
C = \$112,228,445/\$160,949,909 =	<b>0.697</b>



### 3.0 CALCULATION OF HONEYWELL LABOR COST ADJUSTMENT FACTOR L<sub>x</sub>

Current employment cost indexes for labor were obtained from the U.S. Department of Labor, Bureau of Labor Statistics website by the following sequence:

1. Browse to the BLS website at [www.bls.gov](http://www.bls.gov).
2. Select "Subjects"
3. Select "National Compensation Data".
4. Scroll down to "Pay & Cost of Benefits".
5. Select the database "Employment Cost Index" one-screen data search.

To generate the correct report select the following options:

Employment Cost Index			HELP	
<b>1</b> Ownership <input type="text"/> Find Civilian workers Private industry workers State and local government workers	<b>2</b> Component <input type="text"/> Find 01 Total compensation 02 Wages and salaries 03 Total benefits	<b>3</b> Occupation <input type="text"/> Find All workers Management, professional and related Management, business, and financial		
<b>4</b> Industry <input type="text"/> Find All workers Goods producing Construction	<b>5</b> Subcategory <input type="text"/> Find All workers BARGAINING STATUS Union Nonunion	<b>6</b> Area <input type="text"/> Find Middle Atlantic Census Division South Region South Atlantic Census Division		
<b>7</b> Periodicity <input type="checkbox"/> 12 month percent change <input checked="" type="checkbox"/> Index number <input type="checkbox"/> 3-month percent change	<b>8</b> Seasonal <input checked="" type="checkbox"/> Seasonally adjusted <input checked="" type="checkbox"/> Not seasonally adjusted			
<b>9</b> <input type="button" value="Get Data"/> OR for Multiple Queries <input type="button" value="Add To Your Selection -&gt;"/>	Your Selection: (0 series selected) NOTE: Select a maximum of 200 series. <div style="border: 1px solid black; height: 40px; width: 100%;"></div>			

The following data report was extracted.

**Employment Cost Index**
**Original Data Value**

**Series Id:** CIU2010000000220I  
**Not seasonally adjusted**  
**Series Title:** Total compensation for Private industry workers in South, Index  
**Ownership:** Private industry workers  
**Component:** Total compensation  
**Occupation:** All workers  
**Industry:** All workers  
**Subcategory:** All workers  
**Area:** South Region  
**Periodicity:** Index number  
**Years:** 2005 to 2015

Year	Qtr1	Qtr2	Qtr3	Qtr4
2005	98.9	99.3	99.7	100.0
2006	101.0	101.6	102.8	103.5
2007	104.3	105.3	106.1	106.7
2008	107.8	108.5	109.1	109.3
2009	109.8	110.1	110.6	110.7
2010	111.5	112.0	112.5	112.8
2011	113.4	114.3	114.7	115.0
2012	116.0	116.8	117.2	117.7
2013	118.6	119.3	119.7	120.1
2014	120.6	121.7	122.3	122.7
2015	123.2			

Footnote B: Includes wages, salaries, and employer costs for employee benefits.

Q1 2012 is used as the baseline Labor Index to calculate  $L_x$  for the 2015 report. The Labor Adjustment Factor calculation is shown below.

LABOR ADJUSTMENT FACTOR CALCULATION		
Base Year (Q1, 2012) Labor Index	Estimate Year (Q1, 2015) Labor Index	Honeywell $L_{2015}$ Estimate Year/ Base Year
116.0	123.2	<b>1.062</b>

---

#### **4.0     CALCULATION OF HONEYWELL ENERGY COST ADJUSTMENT FACTOR $E_x$**

The adjustment factor for energy,  $E_x$ , is a weighted average of two components, namely, industrial electric power,  $P_x$ , and light fuel oil,  $F_x$ .

For Honeywell,  $E_x$  is given by:

$$E_x (\text{PWR}) = 0.58P_x + 0.42F_x$$

At Honeywell, the PWR energy fractions were based on equal use of electric power and natural gas. The current values of  $P_x$  and  $F_x$  are calculated from the Producer Price Indexes (PPI), available in the "PPI Detailed Report", published by the U.S. Department of Labor, Bureau of Labor Statistics. Current Producer Price Indexes for energy were obtained from the U.S. Department of Labor, Bureau of Labor Statistics website by the following sequence:

1. Browse to the BLS website at [www.bls.gov](http://www.bls.gov).
2. Select "Subjects".
3. Select "Inflation & Prices".
4. Select "Producer Price Indexes".
5. Scroll down to "PPI Databases".
6. Select the database "Commodity Data including "headline" FD-ID indexes" one-screen data search.

To generate the correct report for industrial electric power, select the following options:

**Producer Price Index Commodity Data**
**HELP**
**1 Select a Group**  

- 00 All commodities
- 01 Farm products
- 02 Processed foods and feeds
- 03 Textile products and apparel
- 04 Hides, skins, leather, and related products
- 05 Fuels and related products and power**
- 06 Chemicals and allied products
- 07 Rubber and plastic products
- 08 Lumber and wood products
- 09 Pulp, paper, and allied products
- 10 Metals and metal products

**2 Select one or more Items**  

- 05320105 Butane
- 05320108 Ethane, gas mixtures and other natural gas liquids
- 054 Electric power
- 0541 Residential electric power
- 054121 Residential electric power
- 05412101 Residential electric power
- 0542 Commercial electric power
- 054221 Commercial electric power
- 05422101 Commercial electric power
- 0543 Industrial electric power**
- 054301 Industrial electric power

**3 Select Seasonal Adjustment**

- ☐ Seasonally Adjusted
- ☒ Not Seasonally Adjusted

**4 Get Data**

OR for Multiple Queries

Your Selection: (0 series selected) NOTE: Select a maximum of 200 series.



The following PPI data report was extracted for industrial electric power:

**Producer Price Index-Commodities**  
**Original Data Value**

**Series** WPU0543

**Id:**

**Not Seasonally Adjusted**

**Group:** Fuels and related products and power

**Item:** Industrial electric power

**Base** 198200

**Date:**

**Years:** 2005 to 2015

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2005	148.9	148.0	148.1	148.7	151.1	159.7	162.1	162.5	162.8	159.5	161.1	161.4	156.2
2006	167.0	168.6	167.4	169.6	170.8	181.2	181.9	180.2	181.0	171.2	167.2	167.8	172.8
2007	171.9	175.7	172.1	173.1	179.2	186.7	187.0	187.6	188.4	182.7	180.3	180.0	180.4
2008	181.9	180.0	183.1	185.2	189.5	191.9	196.1	197.1	195.9	193.0	187.7	188.3	189.1
2009	190.3	190.3	187.6	186.9	190.5	193.3	196.2	194.7	194.9	189.9	186.0	186.0	190.6
2010	186.3	186.1	189.0	188.8	192.0	197.8	199.8	200.8	200.0	194.6	190.9	191.4	193.1
2011	193.1	194.4	195.0	194.1	196.9	205.7	215.3	216.6	215.8	206.6	204.0	204.4	203.5
2012	201.1	200.3	199.8	198.1	201.5	207.7	221.5	222.1	222.8	214.1	212.3	213.8	209.6
2013	199.2	199.4	199.0	198.8	203.5	211.9	211.4	210.4	210.3	201.2	199.0	200.5	203.7
2014	215.1	214.4	214.8	210.8	215.2	224.0	227.5	227.7	225.1	217.0	210.7	213.9	218.0
2015	222.4	221.0	217.9	213.7	216.5								218.3

Note 1: Annual data is not included in the extracted reports.

Note 2: 2015 data is preliminary.

To generate the correct report for light fuel oils, select the following options:

Producer Price Index Commodity Data		HELP
<b>1</b> Select a Group <input type="text"/> <input type="button" value="Find"/>	<b>2</b> Select one or more Items <input type="text"/> <input type="button" value="Find"/>	
<div> 00 All commodities  01 Farm products  02 Processed foods and feeds  03 Textile products and apparel  04 Hides, skins, leather, and related products  <b>05 Fuels and related products and power</b>  06 Chemicals and allied products  07 Rubber and plastic products  08 Lumber and wood products  09 Pulp, paper, and allied products  10 Metals and metal products </div>	<div> 05710504 Unleaded mid-premium gasoline  0572 Kerosene and jet fuels  057202 Kerosene  05720201 Kerosene  057203 Jet fuel  05720301 Jet fuel  <b>0573 Light fuel oils</b>  057302 Home heating oil and distillates  05730201 Home heating oil and distillates  057303 No. 2 diesel fuel  05730301 No. 2 diesel fuel </div>	
<b>3</b> Select Seasonal Adjustment <input type="checkbox"/> Seasonally Adjusted <input checked="" type="checkbox"/> Not Seasonally Adjusted		
<b>4</b> <input type="button" value="Get Data"/>	Your Selection: (0 series selected) NOTE: Select a maximum of 200 series.	
<input type="button" value="OR for Multiple Queries"/>		
<input type="button" value="Add To Your Selection -&gt;"/>		

The following PPI data report was extracted for light fuel oils:

**Producer Price Index-Commodities**  
**Original Data Value**

**Series** WPU0573  
**Id:**  
**Not Seasonally Adjusted**  
**Group:** Fuels and related products and power  
**Item:** Light fuel oils  
**Base** 198200  
**Date:**  
**Years:** 2005 to 2015

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2005	138.5	146.0	169.4	170.9	165.3	180.6	186.2	194.5	209.9	252.0	199.1	193.6	183.8
2006	191.8	190.0	199.2	221.9	231.4	238.1	231.6	241.4	203.1	198.1	198.2	200.4	212.1
2007	180.0	191.5	215.1	231.8	225.3	222.4	237.8	225.5	238.9	243.3	288.2	266.7	230.5
2008	273.8	280.2	339.6	352.5	384.9	410.5	423.8	343.9	335.1	279.0	218.2	163.0	317.0
2009	159.8	145.6	136.8	159.9	158.6	183.7	165.2	196.1	186.6	193.3	207.8	197.5	174.2
2010	220.7	200.2	217.0	231.5	226.0	212.4	209.3	221.4	220.0	235.8	245.3	250.0	224.1
2011	260.4	278.8	307.5	325.1	315.1	316.9	311.5	296.9	306.5	299.6	322.7	301.0	303.5
2012	308.8	316.5	330.8	327.1	315.6	284.6	287.9	313.4	330.4	334.1	311.6	303.3	313.7
2013	303.6	327.7	308.7	303.9	296.4	294.9	300.4	307.4	315.3	306.8	295.3	302.9	305.3
2014	297.5	309.1	306.5	306.7	304.4	296.5	295.3	293.9	291.0	271.4	260.9	218.9	287.7
2015	173.6	182.9	186.6	177.7	197.3								183.6

*Note 1: Annual data is not included in the extracted reports.*

*Note 2: 2015 data is preliminary.*

The Energy Adjustment Factor is then calculated as follows:

<b>ELECTRIC ENERGY ADJUSTMENT FACTOR CALCULATION</b>		
Base Year 2012 Annual Power Index	Estimate Year 2015 Annual Power Index	Honeywell P <sub>2015</sub> Estimate Year/ Base Year
209.6	218.3	1.042
<b>LIGHT FUEL OIL ENERGY ADJUSTMENT FACTOR CALCULATION</b>		
Base Year 2012 Annual Power Index	Estimate Year 2015 Annual Power Index	Honeywell F <sub>2015</sub> Estimate Year/ Base Year
313.7	183.6	0.585

$$E_{2015} = 0.58P_{2015} + 0.42F_{2015}$$

$$E_{2015} = (0.58) (1.042) + (0.42) (0.585)$$

$$E_{2015} = \mathbf{0.850}$$



---

**5.0 CALCULATION OF LLW BURIAL/DISPOSITION COST ADJUSTMENT FACTOR,  $B_x$** 

The calculated adjustment factors for LLW burial/disposition,  $B_x$ , are based on data included in Table 2.1 of NUREG-1307 Revision 15.

**5.1 Waste Fraction Calculation**

At Honeywell, waste will be sent to an offsite waste processor or the EnergySolutions of Utah Burial site. The adjustment factor for waste burial/disposition  $B_x$ , is a weighted average of these two components. For Honeywell,  $B_x$  is given by:

$$B_x = D * WP_x + E * ES_x$$

Where D, and E are the fractions of the total 2012 waste dollar costs that are attributable to an offsite waste processor and EnergySolutions of Utah burial site respectively. These values were based on Table 4-1 in the 2012 Decommissioning Cost Estimate and are calculated as follows:

Cost for waste processing and transport =	\$30,678,534
Cost for shipment and disposal of radiological waste =	\$81,549,911
Total Cost burial and disposition =	\$112,228,445
$D = \$30,678,534 / \$112,228,445 =$	<b>0.273</b>
$E = \$81,549,911 / \$112,228,445 =$	<b>0.727</b>

**5.2 Adjustment Factors Calculation**

The adjustment factors for Waste Processors ( $WP_x$ ) and EnergySolutions ( $ES_x$ ) are calculated by extrapolating data provided in Table 2.1 of NUREG-1307 Revision 15. Values for “Generic Disposal Site” were determined as follows:

- “Compact-Affiliated Facility Only (PWR)” was used for offsite waste processor.
- “Combination of Compact-Affiliated and Non-Compact Affiliated Facility (PWR) was used for EnergySolutions.

The 2015 waste processing values were estimated using the Microsoft Excel ‘trend’ function to extrapolate from the available data for years 2008 through 2012.

The adjustment factors ( $WP_x$  and  $ES_x$ ) were calculated by dividing the 2015 values by the 2012 values, as summarized below:

Year	Compact-Affiliated Facility Only (PWR) <sup>(1)</sup>	Combination of Compact-Affiliated and Non-Compact Affiliated Facility (PWR) <sup>(2)</sup>
2008	25.231	9.872
2010	27.292	12.28
2012	30.581	13.885
2015 <sup>(3)</sup>	34.389	17.029
<b>Adjustment Factors (<math>WP_{2015}</math>, <math>ES_{2015}</math>)</b>	<b>1.125</b>	<b>1.226</b>

*Note 1: Formerly "Direct Disposal" (used for  $WP_x$ )*

*Note 2: Formerly "Direct Disposal with Vendors" (used for  $ES_x$ )*

*Note 3: Extrapolated by Excel trend function*

### 5.3 Burial Adjustment Factor ( $B_x$ ) Calculation

The  $B_x$  factor for the year 2015 is calculated as follows:

$$B_{2015} = D \cdot WP_{2015} + E \cdot ES_{2015}, \text{ or}$$

$$B_{2015} = (0.273) (1.125) + (0.727) (1.226), \text{ or}$$

$$B_{2015} = \mathbf{1.198}$$

---

## **6.0     2015 ESCALATION FACTOR CALCULATION**

As described in NUREG-1307 Revision 15, the adjustment of the total decommissioning cost estimate can be expressed as:

$$\text{Escalation Factor for Year 2015} = [A * L_{2015} + B * E_{2015} + C * B_{2015}]$$

Fractions of the total 2012 Honeywell-Metropolis costs for labor, energy, and burial were recalculated in previous sections as summarized below:

$$A = 0.285 \text{ (labor)}$$

$$B = 0.018 \text{ (energy)}$$

$$C = 0.697 \text{ (burial)}$$

As presented in previous sections, adjustment factors for labor, energy, and burial have been recalculated as summarized below:

$$L_{2015} = 1.065$$

$$E_{2015} = 0.850$$

$$B_{2015} = 1.198$$

The 2015 escalation factor is then calculated as:

$$\text{2015 Escalation Factor} = (0.285) (1.062) + (0.018) (0.850) + (0.697) (1.198), \text{ or}$$

$$\text{2015 Escalation Factor} = 0.303 + 0.015 + 0.835$$

$$\textbf{2015 Escalation Factor} = \textbf{1.153}$$

**APPENDIX A-15**

Title: Honeywell-MTW  
Decommissioning Cost Estimate Waste Water  
Treatment Plant

By: JMS Date : 7/14/2015  
Checked By: MLS Date: 12/7/2015

Purpose:

To estimate the cost of decommissioning the Site Waste Water Treatment Plant (WWTP) which was installed after the preparation of the 2012 Decommissioning Cost Estimate.

References:

- 1) Drawing No. GA-180-C4656-01 (Rev. C) titled "Site Waste Water Treatment Plant Installation General Arrangement" dated 10/17/14.
- 2) Drawing No. 15802-01A (Rev. 2) titled "Steel Lift Station - w/ Lift-Out Grinder Pumps, Controls and Lifting Hoist 6'-0" Dia. x 18'-0" Tall Lift Station" dated 8/12/14.
- 3) Drawing No. 15786-10A (assumed Rev. 2) titled "55,000 GPD Prefabricated Package Wastewater Treatment Plant Plan & Elevation Views" date obscured.
- 4) RSMeans Site Work & Landscape Cost Data (34th Annual Edition)(2015).
- 5) Drawing Nos. P-180-C4656-02, P-180-C4656-03, and P-180-C4656-04 titled "Site Waste Water Treatment Plant Installation Piping Plan", Rev. 0.
- 6) "Site Reclamation Cost Estimate for Plant Located in Metropolis, Illinois", Rev. 0 dated May 2006 prepared by Duratek.
- 7) "Decommissioning Cost Estimate for Honeywell Metropolis Works", Rev. 1 dated July 27, 2010 prepared by Enercon Services, Inc.
- 8) "Decommissioning Cost Estimate for Honeywell Metropolis Works", Rev. 0 dated August 15, 2012 prepared by Enercon Services, Inc.
- 9) Letter dated November 11, 2015 from EnergySolutions with subject "Decommissioning Cost Estimate".

Calculations:

The WWTP is receiving sanitary sewer water from the lift station that was installed to divert water transported by the 8" diameter VCP (sanitary) line to the WWTP (and away from the Imhoff Tank which was removed and demolished). Based on a phone conversation with Ross Lindberg (Honeywell), the primary reason the sanitary water is being considered as rad impacted is due to wastewater from the on-site laundry. Most of the waste associated with the WWTP will be dispositioned as BSFR at the EnergySolutions facility located near Oak Ridge, Tennessee. This calculation will examine the cost to dispose of the WWTP as Bulk Survey for Release (BSFR). Some radwaste will be assumed to be generated when the WWTP and associated piping and systems are decommissioned. It will be assumed that this waste will be disposed at the EnergySolutions facility in Clive, Utah.

*Decommissioning Cost of WWTP (and associated items)*

The total weight of the WWTP is approximately 87,000 pounds (Reference 3). This weight and the disposal rates provided in the decommissioning cost estimate (Table A-12) will be used to estimate the cost to dispose of the WWTP as BSFR. This estimate will assume that there will be a small quantity of waste that will be disposed as radwaste. The BSFR rate of \$0.30/pound is from Reference 9. Waste that does not meet the BSFR criteria will cost \$2.50/pound (Reference 9) for disposition.

BSFR Disposal Cost =  $(\$0.30/\text{pound})(\text{direct cost}) + (\$0.02/\text{pound})(\text{State of Tennessee tax})$   
\$0.32 per pound

BSFR Disposal Cost = \$0.32/pound

Disposal Cost =  $(\$0.32/\text{pound})(87,000 \text{ pounds})$

BSFR Disposal Cost = **\$27,900**

Assume a 5% failure rate (in accordance with Table A-12)

Failed BSFR Disposition Cost =  $(\$2.50/\text{pound})(\text{direct cost}) + (\$0.02/\text{pound})(\text{State of Tennessee tax})$   
\$2.52 per pound

Added Charge for failed BSFR =  $(0.05)(87,000 \text{ pounds})(\$2.52/\text{pound})$

Added Charge for failed BSFR = **\$11,000**

Assume that three intermodals containers will be required for shipping the waste for disposal as BSFR. Assume the cost will be \$10,000 for each shipment.

Title: Honeywell-MTW  
Decommissioning Cost Estimate Waste Water  
Treatment Plant

By: JMS Date : 7/14/2015  
Checked By: MLS Date: 12/7/2015

T&D Cost = **\$30,000**

There will be costs associated with sizing the WWTP for disposal. For this cost it will be assumed that the tank can be cut with a torch with the following crew and rates (Reference 4):

	Quantity	Daily Rate	Daily Cost	
Labor foreman	1	\$487.60	\$487.60	RSMeans Page 721 Crew B-21C
Laborers	2	\$462.80	\$925.60	RSMeans Page 721 Crew B-21C
Cutting torches	2	\$12.54	\$25.08	RSMeans Page 721 Crew B-21C
Set of gases	2	\$167.20	\$334.40	RSMeans Page 721 Crew B-21C
Equipment Operator	1	\$614.00	\$614.00	RSMeans Page 720 Crew B-14K
F.E. loader, 10 C.Y.	1	\$3,236.20	\$3,236.20	RSMeans Page 720 Crew B-14K
HP technician	2	\$708.40	\$1,416.81	Table 4-10 from Reference 8 adjusted for inflation
Total Daily Cost =				\$7,039.69

Assume it will take approximately 5 days to size and load the waste into shipping containers.

Cost = **\$35,200**

*Decommissioning Costs of Associated Items*

Assume piping from lift station to the WWTP is waste.[See Reference 5 (Drawing No. P-180-C4656-02)]

$$LF = 2' + 6.5' + 13.75' + 4' + 15' (7) + 15' + 40' + 10.5' + 12' (2) + 6.5' + 5' + 7.67'$$

$$LF = 240$$

Assume the piping will weigh approximately 11 pounds/linear foot (see attached).

Weight (pipe) = 2640 pounds

The pumps (Zoeller Model 7110) weigh approximately 250 pounds (see attached). There are two pumps (see PLAN VIEW Reference 2).

Total disposal weight = 3140 pounds (includes two 250 pound pumps)

Assume time size piping is included with sizing for tank. Assume piping and pumps can be disposed in a B-25 (IP-1) waste container which has a payload weight of 6,000 pound and approximately 90 cubic feet (CF) of storage volume. The disposal rate of \$123/cubic foot is from Reference 6 (Table 4-8). Costs were adjusted for inflation using inflation factors.

$$\text{Disposal Costs} = (90\text{ft}^3)(\$123/\text{ft}^3)(1.126)(1.141)(1.153)$$

Disposal Costs = **\$16,400**

Assume shipping of the B-25 waste container will cost approximately \$2,500 per Table A-5. (Reference 8)

Shipping Cost = **\$2,500**

*Lift Station Decommissioning*

Assume the following crew will be required to remove the lift station from the subgrade and decon the lift station. (Reference 4)

	Quantity	Daily Rate	Daily Cost	
Labor foreman	1	\$487.60	\$487.60	RSMeans Page 721 Crew B-21C
Laborer(s)	1	\$462.80	\$462.80	RSMeans Page 721 Crew B-21C
Equipment Operator	1	\$614.00	\$614.00	RSMeans Page 720 Crew B-14K
1 Hyd. Exc., 2.5 CY	1	\$1,765.00	\$1,765.00	RSMeans Page 718 Crew B-12S
HP technician	1	\$708.40	\$708.40	Table 4-10 from Reference 8 adjusted for inflation
Total Daily Cost =				\$4,037.80

Title: Honeywell-MTW  
Decommissioning Cost Estimate Waste Water  
Treatment Plant

By: JMS Date : 7/14/2015  
Checked By: MLS Date: 12/7/2015

Assume it will take the crew about 2 days to remove the lift station and 2 days to complete the decon of the lift station.

Cost = **\$17,000**

Assume the following crew will take one day to size (cut) and load the metal into a container for disposal. (Reference 4)

	Quantity	Daily Rate	Daily Cost	
Labor foreman	1	\$487.60	\$487.60	RSMeans Page 721 Crew B-21C
Laborer(s)	2	\$462.80	\$925.60	RSMeans Page 721 Crew B-21C
Cutting torches	2	\$12.54	\$25.08	RSMeans Page 721 Crew B-21C
Set of gases	2	\$167.20	\$334.40	RSMeans Page 721 Crew B-21C
Equipment Operator	1	\$614.00	\$614.00	RSMeans Page 720 Crew B-14K
F.E. loader, 10 C.Y.	1	\$3,236.20	\$3,236.20	RSMeans Page 720 Crew B-14K
HP technician	1	\$708.40	\$708.40	Table 4-10 from Reference 8 adjusted for inflation
		Total Daily Cost =	\$6,331.28	
		Total Daily Cost =	\$7,000	

Cost = **\$7,000**

Assume the lift station can be disposed of as BSFR (assume no failure rate as steel has an epoxy coating on the interior and exterior). The lift station is made of 1/4" thick A36 carbon steel. (Reference 2 Drawing No. 15802-01A Note 2). A36 carbon steel weighs approximately 484 pounds/ft<sup>3</sup>.

The volume is estimated as follows (dimensions are from Reference 2 Drawing No. 15802-01A):

Outside diameter is 6.04166' so  $r_{out} = 3.0208'$ . (Reference 2 View A-A and Note 2)

Inside diameter is 6' so  $r_{in} = 3'$  (Reference 2 View A-A)

Length = 18' (Reference 2 View B-B)

$$V = (A_{in} - A_{out})(length) = (\pi r_{out}^2 - \pi r_{in}^2)(length)$$

$$A_{out} = \pi r_{out}^2 = \pi (3.0208')^2$$

$$A_{out} = 28.67 \text{ ft}^2$$

$$A_{in} = \pi r_{in}^2 = \pi (3')^2$$

$$A_{in} = 28.27 \text{ ft}^2$$

$$V = (28.67 - 28.27) \text{ ft}^2 (18') = 7.1 \text{ ft}^3$$

$$\text{Weight} = (484 \text{ lb/ft}^3)(7.1 \text{ ft}^3) = 3428 \text{ pounds}$$

$$\text{Weight} = 3,500 \text{ pounds}$$

$$\text{BSFR Disposal Cost} = \$0.32/\text{pound}$$

$$\text{Disposal Cost} = (\$0.32/\text{pound})(3,500 \text{ pounds})$$

$$\text{BSFR Disposal Cost} = \$2,000$$

Therefore the total cost to decommission the WWTP and associated items is as follows:

Title: Honeywell-MTW  
Decommissioning Cost Estimate Waste Water  
Treatment Plant

By: JMS Date : 7/14/2015  
Checked By: MLS Date: 12/7/2015

Total Cost (\$) = (27,900 + 11,000 + 30,000 + 35,200 + 16,400 + 2,500 + 17,000 + 7,000 + 2,000)

Total Cost = \$150,000

Conclusion:

It was conservatively assumed that the WWTP would be rad impacted. Based on the estimate in this calculation, it will cost approximately \$150,000 to decommission and dispose of the WWTP and associated items. As required for decommissioning cost estimates, no credit was taken for potential scrap or reuse of the WWTP or lift station.



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# Reference Data

## STANDARD WEIGHT SCHEDULE 40 STEEL PIPE

Nominal Tubing Size		Outside Diameter		Inside Diameter		Nominal Weight Per 100 Ft. (30.5m) Plain End		Weight of Pipe Filled With Water Per 100 Ft. (30.5m)	
		In.	mm	In.	mm	Lbs.	kg	Lbs.	kg
3/8"	(10)	.675	(17.1)	.493	(12.5)	57.0	(25.9)	65.3	(29.6)
1/2"	(15)	.840	(21.3)	.622	(15.8)	85.0	(38.6)	98.2	(44.5)
3/4"	(20)	1.050	(26.7)	.824	(20.9)	113.0	(51.3)	136.1	(61.7)
1"	(25)	1.315	(33.4)	1.049	(26.6)	168.0	(76.2)	205.5	(93.2)
1 1/4"	(32)	1.660	(42.2)	1.380	(35.1)	227.0	(103.0)	291.8	(132.4)
1 1/2"	(40)	1.900	(48.3)	1.610	(40.9)	272.0	(123.4)	360.2	(163.4)
2"	(50)	2.375	(60.3)	2.067	(52.5)	365.0	(165.6)	510.4	(231.5)
2 1/2"	(65)	2.875	(73.0)	2.469	(62.7)	579.0	(262.6)	786.5	(356.8)
3"	(80)	3.500	(88.9)	3.068	(77.9)	758.0	(343.8)	1078.4	(489.2)
3 1/2"	(90)	4.000	(101.9)	3.548	(90.1)	911.0	(413.2)	1339.5	(607.6)
4"	(100)	4.500	(114.3)	4.026	(102.3)	1079.0	(489.4)	1630.7	(739.7)
5"	(125)	5.563	(141.3)	5.047	(128.2)	1462.0	(663.2)	2329.1	(1056.4)
6"	(160)	6.625	(168.3)	6.065	(154.1)	1897.0	(860.5)	3149.1	(1428.4)
8"	(200)	8.625	(219.1)	7.981	(202.7)	2855.0	(1295.0)	5023.2	(2278.5)
10"	(250)	10.750	(273.1)	10.020	(254.5)	4048.0	(1836.1)	7485.6	(3386.3)
12"	(300)	12.750	(323.9)	12.000	(304.8)	4956.0	(2248.0)	9857.7	(4471.4)
14"	(350)	14.000	(355.6)	13.250	(336.6)	5437.0	(2475.3)	11433.1	(5185.9)
16"	(400)	16.000	(406.4)	15.250	(387.4)	6258.0	(2838.6)	14174.3	(6429.4)
18"	(450)	18.000	(457.2)	17.250	(438.2)	7059.0	(3201.9)	17187.9	(7796.3)
20"	(500)	20.000	(508.0)	19.250	(489.0)	7860.0	(3565.2)	20473.7	(9286.7)
24"	(600)	24.000	(609.6)	23.250	(590.6)	9482.0	(4291.9)	27862.5	(12638.2)

Dimensions taken from ASTM A 53-82.

1 cubic ft. of water weighs 62.41 Lbs.

1 cubic meter of water weighs 999.972 kg.

1 gallon (U.S.) weighs 8.335 Lbs.

1 liter weighs .999 kg.

## TRAPEZE HANGERS USING B-LINE STRUT OR ANGLE IRON

Length of Trapeze Bar	Nominal Pipe Sizes							
	2 1/2" (65mm) or less	3" (80mm)	3 1/2" (90mm)	4" (100mm)	5" (125mm)	6" (150mm)	8" (200mm)	10" (250mm)
1'-6" (0.46m)	1 1/2" x 1 1/2" x 3/16" B24SH	1 1/2" x 1 1/2" x 3/16" B24SH	1 1/2" x 1 1/2" x 3/16" B24SH	2" x 1 1/2" x 3/16" B22SH	2" x 1 1/2" x 3/16" B22SH	2 1/2" x 1 1/2" x 3/16" B12SH	3" x 2" x 3/16" B11SH	3" x 2" x 1/4" B11SH
2'-0" (0.61m)	1 1/2" x 1 1/2" x 3/16" B24SH	2" x 1 1/2" x 3/16" B22SH	2" x 1 1/2" x 3/16" B22SH	2" x 1 1/2" x 3/16" B22SH	2 1/2" x 1 1/2" x 3/16" B12SH	2 1/2" x 1 1/2" x 3/16" B12SH	3" x 2" x 3/16" B11SH	3" x 2" x 1/4" B11SH
2'-6" (0.76m)	2" x 1 1/2" x 3/16" B22SH	2" x 1 1/2" x 3/16" B22SH	2" x 1 1/2" x 3/16" B22SH	2 1/2" x 1 1/2" x 3/16" B12SH	2 1/2" x 1 1/2" x 3/16" B12SH	3" x 2" x 3/16" B11SH	3" x 2" x 1/4" B11SH	3" x 2" x 1/4" B11SH
3'-0" (0.91m)	2" x 1 1/2" x 3/16" B22SH	2" x 1 1/2" x 3/16" B22SH	2 1/2" x 1 1/2" x 3/16" B12SH	2 1/2" x 1 1/2" x 3/16" B12SH	3" x 2" x 3/16" B11SH	3" x 2" x 3/16" B11SH	3 1/2" x 2 1/2" x 1/4" B12SHA	3 1/2" x 2 1/2" x 5/16" B12SHA
4'-0" (1.22m)	2 1/2" x 1 1/2" x 3/16" B12SH	2 1/2" x 1 1/2" x 3/16" B12SH	2 1/2" x 1 1/2" x 3/16" B12SH	3" x 2" x 3/16" B11SH	3" x 2" x 3/16" B11SH	3" x 2" x 1/4" B11SH	3 1/2" x 2 1/2" x 5/16" B12SHA	4" x 3" x 5/16" B12SHA
5'-0" (1.52m)	2 1/2" x 1 1/2" x 3/16" B12SH	2 1/2" x 1 1/2" x 3/16" B12SH	3" x 2" x 3/16" B11SH	3" x 2" x 3/16" B11SH	3" x 2" x 1/4" B11SH	3 1/2" x 2 1/2" x 5/16" B12SHA	4" x 3" x 5/16" B12SHA	5" x 3 1/2" x 5/16" B11SHA
6'-0" (1.83m)	2 1/2" x 1 1/2" x 3/16" B12SH	3" x 2" x 3/16" B11SH	3" x 2" x 3/16" B11SH	3" x 2" x 1/4" B11SH	3 1/2" x 2 1/2" x 5/16" B12SHA	4" x 3" x 5/16" B12SHA	4" x 3" x 5/16" B12SHA	5" x 3 1/2" x 5/16" B11SHA
7'-0" (2.13m)	3" x 2" x 3/16" B11SH	3" x 2" x 3/16" B11SH	3" x 2" x 1/4" B11SH	3" x 2" x 1/4" B11SH	3 1/2" x 2 1/2" x 5/16" B12SHA	4" x 3" x 5/16" B12SHA	5" x 3 1/2" x 5/16" B11SHA	6" x 4" x 1/4" 2-B11SHA
8'-0" (2.44m)	3" x 2" x 3/16" B11SH	3" x 2" x 1/4" B11SH	3" x 2" x 1/4" B11SH	3 1/2" x 2 1/2" x 5/16" B12SHA	3 1/2" x 2 1/2" x 5/16" B12SHA	4" x 3" x 5/16" B12SHA	5" x 3 1/2" x 5/16" B11SHA	6" x 4" x 1/4" 2-B12SHA
9'-0" (2.74m)	3" x 2" x 3/16" B11SH	3" x 2" x 1/4" B11SH	3 1/2" x 2 1/2" x 5/16" B12SHA	3 1/2" x 2 1/2" x 5/16" B12SHA	3 1/2" x 2 1/2" x 5/16" B12SHA	4" x 3" x 5/16" B12SHA	5" x 3 1/2" x 5/16" B11SHA	6" x 4" x 3/8" 2-B11SHA
10'-0" (3.05m)	3" x 2" x 1/4" B11SH	3" x 2" x 1/4" B11SH	3 1/2" x 2 1/2" x 5/16" B12SHA	3 1/2" x 2 1/2" x 5/16" B12SHA	4" x 3" x 5/16" B12SHA	5" x 3 1/2" x 5/16" B11SHA	6" x 4" x 1/4" 2-B12SHA	6" x 4" x 3/8" 2-B11SHA

Reference: Table 3-14.1.6 standard for the installation of Sprinkler Systems, NFPA No. 13-1985, published by National Fire Protection Association.





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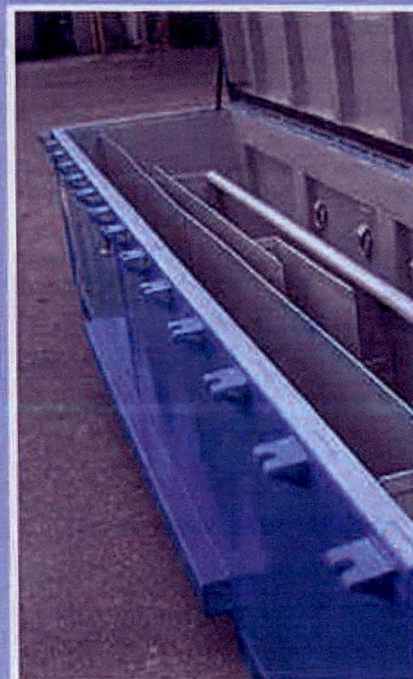
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## B-25 Waste Containers

### B25 Standard Waste Box - Bolt Style Closure

Classification:	IP-1
Width (inches):	46
Length (inches):	72
Height (inches):	47
Payload Weight (pounds):	6,000
Empty Weight (pounds):	776
Notes:	See options



Equipment Container



Title: Honeywell-MTW  
Decommissioning Cost Estimate Aggregate in  
Waste Storage Area

By: JMS Date : 8/5/2015  
Checked By: MLS Date: 12/7/2015

Purpose:

To estimate the cost of disposal of the aggregate currently in the Waste Storage Area. For this estimate it will be assumed that the aggregate can be disposed of as low-level radioactive waste (LLRW)(Reference 7 and 8).

References:

- 1) RSMeans Site Work & Landscape Cost Data (34th Annual Edition)(2015).
- 2) "Site Reclamation Cost Estimate for Plant Located in Metropolis, Illinois", Rev. 0 dated May 2006 prepared by Duratek.
- 3) "Decommissioning Cost Estimate for Honeywell Metropolis Works", Rev. 1 dated July 27, 2010 prepared by Enercon Services, Inc.
- 4) "Decommissioning Cost Estimate for Honeywell Metropolis Works", Rev. 0 dated August 15, 2012 prepared by Enercon Services, Inc.
- 5) "Crushed Return Concrete as Aggregates for New Concrete, Final Report", RMC Research & Education Foundation, dated September 2007 and located at <http://www.rmc-foundation.org/images/CCA%20Study%20Final%20Report%2009-07.pdf>.
- 6) Letter dated November 11, 2015 from EnergySolutions with subject "Decommissioning Cost Estimate".
- 7) E-mail from Ross Lindberg (Honeywell) dated Wednesday, September 16, 2015 (4:20 PM) with subject Honeywell - MTE update to decommissioning cost estimate.
- 8) E-mail from Ross Lindberg (Honeywell) dated Wednesday, December 2, 2015 (11:48 PM) with subject Sanders Comments to the DCP Draft Rev 0B (attachment with Ross Lindberg's revisions to quantities).

Calculations:

The estimated volume of the aggregate in the Waste Storage Area is approximately 15,000 cubic feet (Reference 7 and Reference 8).

*Disposal of aggregate as LLRW*

In order to calculate the weight of the aggregate, a unit weight will be estimated. The unit weight will be used to convert the volume to a weight. For this calculation, a unit weight of 125 pounds per cubic foot will be used. Based on the information presented in Reference 5, this value is considered conservative.

Volume = 15,000 ft<sup>3</sup>  
Unit Weight = 125 lb/ft<sup>3</sup>  
Weight = 1,875,000 pounds

The LLRW disposal rate is from Reference 4 (Table 4-10) and the cost have been inflated as follows:

LLRW Disposal Cost = (\$158.03/cubic foot)(1.153) = \$182.21 /cubic foot  
\$0.32 per pound  
BSFR Disposal Cost = \$0.32/pound

Disposal Cost = (\$182.21/cubic foot)(15,000 cubic feet)  
BSFR Disposal Cost = **\$2,733,130**

The following number of IMCs will be required (assumed 59,800 pounds could be loaded into IMC):

# of IMCs = 32 containers

Assume the cost will be \$10,000 for each shipment.

T&D Cost = **\$320,000**

There will be costs associated with loading the aggregate for disposal. For this task assume that the following crew and rate apply (Reference 1):

Quantity	Daily Rate	Daily Cost
----------	------------	------------

Title: Honeywell-MTW  
Decommissioning Cost Estimate Aggregate in  
Waste Storage Area

By: JMS Date : 8/5/2015  
Checked By: MLs Date: 12/7/2015

Labor foreman	1	\$487.60	\$487.60	RSMeans Page 721 Crew B-21C
Laborers	2	\$462.80	\$925.60	RSMeans Page 721 Crew B-21C
Equipment Operator	1	\$614.00	\$614.00	RSMeans Page 720 Crew B-14K
F.E. loader, 10 C.Y.	1	\$3,236.20	\$3,236.20	RSMeans Page 720 Crew B-14K
HP technician	2	\$708.40	\$1,416.81	Table 4-10 from Reference 4 adjusted for inflation
Total Daily Cost =		\$6,681		

Assume it will take approximately 5 days to load the waste into shipping containers.

Cost = **\$34,000**

Therefore the total cost to load and ship the aggregate in the Waste Storage Area is as follows:

Disposal	\$2,733,130
T&D	\$320,000
Labor/Equip.	\$34,000
Total =	\$3,088,000

Conclusion:

It is assumed that the aggregate in the Waste Storage Area can be disposed of as LLRW.

The cost to load, ship, and dispose of approximately 15,000 ft<sup>3</sup> of aggregate (LLRW) is \$3,088,000.

Title: Honeywell-MTW  
Decommissioning Cost Estimate Costs Associated  
with Seismic Upgrades

By: JMS Date : 11/23/2015  
Checked By: MLS Date: 12/7/2015

Purpose:

To estimate the future cost of disposal of various debris/waste generated by seismic upgrades. For this estimate it will be assumed that the aggregate (crushed concrete) can be disposed of as Bulk Survey for Release (BSFR). A five percent failure rate will be assumed for BSFR. Material that fails the BSFR requirements will be disposed of as low-level radioactive waste (LLRW). Other debris (56 valves, structural steel, and pipe hangers) will be assumed to require disposal as LLRW. A summary of the items addressed in this calculation are as follows:

- 56 valves replaced (1,000 cubic feet of LLRW)
- 5,000 cubic feet of structural steel (LLRW)
- 5,000 cubic feet of pipe hangers (LLRW)
- 5,000 cubic feet of aggregate (crushed concrete)(BSFR)
- 1,000 cubic feet of aggregate (BSFR)

Note the 1,000 cubic feet at the bottom of the list is for the installation of the liquid hydrogen unit.

This information was obtained from Honeywell (References 7 and 8).

References:

- 1) RSMeans Site Work & Landscape Cost Data (34th Annual Edition)(2015).
- 2) "Site Reclamation Cost Estimate for Plant Located in Metropolis, Illinois", Rev. 0 dated May 2006 prepared by Duratek.
- 3) "Decommissioning Cost Estimate for Honeywell Metropolis Works", Rev. 1 dated July 27, 2010 prepared by Enercon Services, Inc.
- 4) "Decommissioning Cost Estimate for Honeywell Metropolis Works", Rev. 0 dated August 15, 2012 prepared by Enercon Services, Inc.
- 5) "Crushed Return Concrete as Aggregates for New Concrete, Final Report", RMC Research & Education Foundation, dated September 2007 and located at <http://www.rmc-foundation.org/images/CCA%20Study%20Final%20Report%2009-07.pdf>.
- 6) Letter dated November 11, 2015 from EnergySolutions with subject "Decommissioning Cost Estimate".
- 7) E-mail from Ross Lindberg (Honeywell) dated Friday, November 13, 2015 (2:15 PM) with subject DCE Additional Areas.
- 8) E-mail from Ross Lindberg (Honeywell) dated Wednesday, December 2, 2015 (11:48 PM) with subject Sanders Comments to the DCP Draft Rev 0B (attachment with Ross Lindberg's revisions to quantities).

Calculations:

**Aggregate (crushed concrete)**

It has been assumed that the aggregate can be sent for disposal as BSFR to a Class I landfill with a five percent failure rate. Material that fails BSFR will be disposed of as LLRW.

*Disposal of aggregate as BSFR/LLRW*

In order to calculate the weight of the aggregate, a unit weight will be estimated. The unit weight will be used to convert the volume to a weight. For this calculation, a unit weight of 125 pounds per cubic foot will be used. Based on the information presented in Reference 5, this value is considered conservative.

Volume = 6,000 ft<sup>3</sup>  
Unit Weight = 125 lb/ft<sup>3</sup>  
Weight = 750,000 pounds

The BSFR rate of \$0.32/pound is from Reference 6.

BSFR Disposal Cost = (\$0.32/pound)  
\$0.32 per pound

Title: Honeywell-MTW  
Decommissioning Cost Estimate Costs Associated  
with Seismic Upgrades

By: JMS Date : 11/23/2015  
Checked By: MLS Date: 12/7/2015

BSFR Disposal Cost = \$0.32/pound

Disposal Cost = (\$0.32/pound)(750,000 pounds)

BSFR Disposal Cost = **\$240,000**

Assume a 5% failure rate (in accordance with Table A-12)(Reference 4)

Added Charge for failed BSFR = (0.05)(750,000 pounds)(\$2.52/pound)(see Reference 6)

Added Charge for failed BSFR = **\$95,000**

The following number of IMCs will be required (assumed 59,800 pounds could be loaded into IMC):

# of IMCs = 13 containers

Assume the cost will be \$10,000 for each shipment.

T&D Cost = **\$130,000**

There will be costs associated with loading the aggregate and debris for disposal. For this task assume that the following crew and rate apply (Reference 1):

	Quantity	Daily Rate	Daily Cost	
Labor foreman	1	\$487.60	\$487.60	RSMeans Page 721 Crew B-21C
Laborers	2	\$462.80	\$925.60	RSMeans Page 721 Crew B-21C
Equipment Operator	1	\$614.00	\$614.00	RSMeans Page 720 Crew B-14K
F.E. loader, 10 C.Y.	1	\$3,236.20	\$3,236.20	RSMeans Page 720 Crew B-14K
HP technician	2	\$708.40	\$1,416.81	Table 4-10 from Reference 4 adjusted for inflation
Total Daily Cost =			\$6,681	

Assume it will take approximately 2 days to load the waste into shipping containers.

Cost = **\$14,000**

Therefore the total cost to dispose, load, and ship the aggregate associated with the seismic upgrades is as follows:

Disposal	\$335,000
T&D	\$130,000
Labor/Equip.	\$14,000
<b>Total =</b>	<b>\$479,000</b>

#### Valves, Structural Steel, and Pipe Hangers

There are a total of 11,000 cubic feet of LLRW assumed for the valves, structural steel, and pipe hangers for the seismic upgrades.

Valves (56)	1000 cubic feet
Structural Steel	5000 cubic feet
Pipe Hangers	5000 cubic feet
<b>Total =</b>	<b>11000 cubic feet</b>

The unit rate for LLRW was estimated using \$123/cubic feet from Reference 2 and inflated to account for cost escalation as follows:

Disposal Cost for LLRW = (\$123/cubic feet)(inflation factors)

Disposal Cost for LLRW = (\$123/cubic feet)(1.126)(1.141)(1.153)

Disposal Cost for LLRW = **\$182.20 per cubic feet**

Title: Honeywell-MTW  
Decommissioning Cost Estimate Costs Associated  
with Seismic Upgrades

By: JMS Date : 11/23/2015  
Checked By: MLS Date: 12/7/2015

Disposal Cost = (11,000 cubic feet)(\$182.20/cubic feet)  
Disposal Cost = **\$2,005,000**

Assume that it will take 30 IMCs to ship the waste.

Assume the cost will be \$10,000 for each shipment.

T&D Cost = **\$300,000**

Assume it will take approximately 5 days to load the waste/debris into shipping containers and the following crew:

	Quantity	Daily Rate	Daily Cost	
Labor foreman	1	\$487.60	\$487.60	RSMeans Page 721 Crew B-21C
Laborers	2	\$462.80	\$925.60	RSMeans Page 721 Crew B-21C
Equipment Operator	1	\$614.00	\$614.00	RSMeans Page 720 Crew B-14K
F.E. loader, 10 C.Y.	1	\$3,236.20	\$3,236.20	RSMeans Page 720 Crew B-14K
HP technician	2	\$708.40	\$1,416.81	Table 4-10 from Reference 4 adjusted for inflation
		Total Daily Cost =	\$6,681	

Cost = **\$34,000**

Therefore the total cost to dispose, load, and ship the debris is as follows:

Disposal	\$2,005,000
T&D	\$300,000
Labor/Equip.	\$34,000
<b>Total =</b>	<b>\$2,339,000</b>

Conclusion:

It is assumed that the aggregate can be disposed of as BSFR. A five percent failure rate for BSFR was assumed.

The failed material will require disposal as LLRW.

The cost to load, ship, and dispose of approximately 6,000 cubic feet of aggregate is \$479,000.

The cost to load, ship, and dispose of approximately 11,000 cubic feet of debris is \$2,339,000.



Title: Honeywell-MTW  
Decommissioning Cost Estimate Aggregate to  
Disposed as LLRW

By: JMS Date : 11/24/2015  
Checked By: MLS Date: 12/7/2015

Purpose:

To estimate the cost of disposal of the aggregate (crushed concrete) for the following:

- 775 ft<sup>3</sup> of aggregate (project performed on NW side of the North Pad of Feed Materials Building (FMB)
- 775 ft<sup>3</sup> of aggregate (project performed on northern edge of Waste Storage Area - south of HF rail line)

For this estimate it will be assumed that the aggregate will be disposed of as low-level radioactive waste (LLRW).

References:

- 1) RSMMeans Site Work & Landscape Cost Data (34th Annual Edition)(2015).
- 2) "Site Reclamation Cost Estimate for Plant Located in Metropolis, Illinois", Rev. 0 dated May 2006 prepared by Duratek.
- 3) "Decommissioning Cost Estimate for Honeywell Metropolis Works", Rev. 1 dated July 27, 2010 prepared by Enercon Services, Inc.
- 4) "Decommissioning Cost Estimate for Honeywell Metropolis Works", Rev. 0 dated August 15, 2012 prepared by Enercon Services, Inc.
- 5) "Crushed Return Concrete as Aggregates for New Concrete, Final Report", RMC Research & Education Foundation, dated September 2007 and located at <http://www.rmc-foundation.org/images/CCA%20Study%20Final%20Report%2009-07.pdf>.
- 6) Letter dated November 11, 2015 from EnergySolutions with subject "Decommissioning Cost Estimate".
- 7) E-mail from Ross Lindberg (Honeywell) dated Wednesday, September 16, 2015 (4:20 PM) with subject Honeywell - MTE update to decommissioning cost estimate.

Calculations:

The estimated volume of the aggregate is provided in Table 1-1 (Reference 7).

*Disposal of aggregate as LLRW*

The unit rate for LLRW was estimated using \$123/cubic feet from Reference 2 and inflated to account for cost escalation as follows:

Disposal Cost for LLRW = (\$123/cubic feet)(inflation factors)  
Disposal Cost for LLRW = (\$123/cubic feet)(1.126)(1.141)(1.153)  
Disposal Cost for LLRW = \$182.20 per cubic feet

Disposal Cost = (1,550 cubic feet)(\$182.20/cubic feet)  
Disposal Cost = **\$283,000**

Assume that it will take 5 IMCs to ship the waste.

Assume the cost will be \$10,000 for each shipment.

T&D Cost = **\$50,000**

There will be costs associated with loading the aggregate for disposal. For this task assume that the following crew and rate apply (Reference 1):

	Quantity	Daily Rate	Daily Cost	
Labor foreman	1	\$487.60	\$487.60	RSMMeans Page 721 Crew B-21C
Laborers	2	\$462.80	\$925.60	RSMMeans Page 721 Crew B-21C
Equipment Operator	1	\$614.00	\$614.00	RSMMeans Page 720 Crew B-14K
F.E. loader, 10 C.Y.	1	\$3,236.20	\$3,236.20	RSMMeans Page 720 Crew B-14K
HP technician	2	\$708.40	\$1,416.81	Table 4-10 from Reference 4 adjusted for inflation
		Total Daily Cost =	\$6,681	

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By: JMS Date : 11/24/2015  
Checked By: MLS Date: 12/7/2015

Assume it will take approximately 2 days to load the waste into shipping containers.

Cost = **\$14,000**

Therefore the total cost to load, ship, and dispose of the aggregate is as follows:

Disposal	\$283,000
T&D	\$50,000
Labor/Equip.	\$14,000
Total =	\$347,000

Conclusion:

The cost to load, ship, and dispose of approximately 1,550 ft<sup>3</sup> of aggregate is \$347,000.