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13-TF-0049

JUN 14 2013

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Department of Ecology
3100 Port of Benton Blvd.
Richland, Washington 99354

Ms. Hedges:

SUBMITTAL OF THE 241-AY-102 PUMPING PLAN

References: 1) ORP letter from K. W. Smith and M. D. Johnson (WRPS) to J. A. Hedges (Ecology), "Analysis of 40 CFR 265.196 Requirements for Double-Shell Tank (DST) System Tank 241-AY-102, and Discussion of Double-Shell Tank Emergency Pumping Guide, HNF-3484, Revision 10," 13-TF-0024, dated May 6, 2013.

2) Washington Department of Ecology letter from J. A. Hedges to K.W. Smith (DOE) and M.D. Johnson (WRPS), Ecology Response to ORP letter 13-TF-0024, dated May 24, 2013.

The U.S. Department of Energy, Office of River Protection (ORP) is submitting the attached 241-AY-102 Pumping Plan (Plan) for your review and comment. ORP is committed to continue to work collaboratively in addressing this situation and our collective path forward.

ORP is proceeding with the planning, procurement and installation of the out-of-tank equipment that will be needed to allow pumping of the solids in the primary tank of 241-AY-102. These activities will require approximately 19 months to complete. This will position ORP to be able to initiate pumping quickly, if warranted. Should the conditions change as set forth in the enclosed Plan, including the discovery of pumpable liquid in the 241-AY-102 annulus, evidence of a waste leak in the 241-AY-102 leak detection pits, or evidence of compromised integrity of the annulus, if warranted, ORP would proceed with installation of the in-tank equipment necessary to pump the contents of tank 241-AY-102 as described in the attached Plan.

As detailed in the Plan, a pump in 241-AY-102 is already installed that could be used to remove supernatant from the primary tank; however, complete removal of the supernatant cannot currently be achieved without introducing a safety issue related to the balance of sludge stored in the tank. ORP is working to procure the equipment to transfer sludge from 241-AY-102, and the Plan sets forth a schedule associated with installation of a sludge removal system. At this time; however, removal of the waste from the primary tank is not practicable, nor is it necessary to prevent release to the environment.

Currently there is not enough material in the annulus for emergency pumping equipment to be able to remove. Flushing of the annulus and refractory material under the primary tank would be required to effectively remove the majority of waste from the annulus; however, flushing could have an adverse effect on the leak rate, would spread contamination throughout the annulus, and could endanger the integrity of the secondary liner. At this time, the secondary containment contains the waste thus preventing it from causing harm to human health or the environment.

Based on a comprehensive review of the information to date, ORP will continue the enhanced monitoring implemented for 241-AY-102 while at the same time proceeding with planning, procurements, and out-of-tank equipment installation necessary to position ORP to be able to initiate removal consistent with the enclosed Plan. Once those activities are completed, a decision will be made on further monitoring and retrieval activities.

We will be glad to brief you on the Pumping Plan details as well as continue working with you on how we will continue to monitor and assess the condition of 241-AY-102.

Harry Charboneau for
Kevin W. Smith
Manager

Attachment

cc w/attach:
M. Bellon, Ecology
R. Albright, EPA
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K. Niles, ODOE
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Environmental Portal, LMSI
Administrative Record: DST
WRPS Correspondence

DOCUMENT RELEASE FORM

(1) Document Number:	RPP-PLAN-55220	(2) Revision Number: A	(3) Effective Date: 6/13/2013
(4) Document Type:	☐ Digital Image ☐ Hard copy ☒ PDF ☐ Video	(a) Number of pages (including the DRF) or number of digital images	19
(5) Release Type	☒ New ☐ Cancel	☐ Page Change	☐ Complete Revision
(6) Document Title:	241-AY-102 Pumping Plan	(7) USQ No. R- ☒ N/A USQ Evaluator Sign/Date	
(8) Change/Release Description:	The 241-AY-102 Pumping Plan provides the approach to the retrieval of tank waste contained in 241-AY-102 and associated activities		
(9) Change Justification:	N/A 6-14-13		

(10) Associated Structure, System, and Component (SSC) and Building Number:	(a) Structure Location: 200E		(c) Building Number: 241-AY-102	(e) Project Number: NA
	(b) System Designator: NA		(d) Equipment ID Number (EIN): NA	
(11) Impacted Documents:	(a) Document Type	(b) Document Number		(c) Document Revision
	NA			

(12) Approvals:

(a) Author (Print/Sign): K. E. Carpenter PER TELEM Date: 6-14-13

(b) Reviewer (Optional, Print/Sign):

N/A Date: Date:

Date: Date:

Date: Date:

(c) Responsible Manager (Print/Sign): J. J. Klos Date: 6-14-13

(13) Distribution:

(a) Name	(b) MSIN	(a) Name	(b) MSIN
N/A			

Release Stamp: DATE: Jun 14, 2013 HANFORD RELEASE

(14) Clearance	(a) Cleared for Public Release	(b) Restricted Information?	(c) Restriction Type:
	☒ Yes ☐ No	☐ Yes ☒ No	

(15) Clearance Review (Print/Sign): APPROVED By Julia Raymer at 10:58 am, Jun 14, 2013 Date:

241-AY-102 Pumping Plan

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EDT/ECN: DRF UC:
Cost Center: Charge Code:
B&R Code: Total Pages: 19

Key Words: 241-AY-102, Plan, Pumping

Abstract: This Pumping Plan addresses the decision logic, strategic approach, and potential schedule to complete the retrieval of the AY-102 supernatant, solid material and removal of waste from the annulus.

APPROVED
By Julia Raymer at 10:59 am, Jun 14, 2013

Release Approval Date

DATE:
Jun 14, 2013
HANFORD RELEASE

Release Stamp

Approved For Public Release

241-AY-102 Pumping Plan

K.E. Carpenter
Washington River Protection Solutions

Date Published
(June 2013)

Prepared for the U.S. Department of Energy
Office of River Protection

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Contract No. DAC27-08RV14

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TERMS / Acronyms

AN-101	DST 241-AN-101
AP-101	DST 241- AP-101
AP-104	DST 241-AP-104
AY-102	DST 241-AY-102
AY-101	DST 241-AY-101
AZ-101	DST 241-AZ-101
AZ-102	DST 241-AZ-102
DOE	United States Department of Energy
DST	Double Shell Tank
EPG	Double Shell Tank Emergency Pumping Guide
Gal	Gallons
HIHTL	Hose-In-Hose-Transfer-Line
IQRPE	Independent Qualified Registered Professional Engineer
Kgal	Thousand Gallon
Mgal	Million Gallon
ORP	Office of River Protection
RPP	River Protection Project
WCA	Waste Compatibility Assessment
WFD	Waste Feed Delivery
WRPS	Washington River Protection Solutions
WTP	Waste Treatment Plant & Immobilization Plant

1.0 PURPOSE & NEED

The purpose of this Pumping Plan (Plan) is to provide the proposed approach for the removal of tank waste contained in double shell tank (DST) 241-AY-102 (AY-102). This Pumping Plan addresses the decision logic, strategic approach, and proposed 2 stage schedule for removal of the AY-102 supernatant, solid material and waste from the annulus.

AY-102 is located in the 241-AY Tank Farm (AY Farm) in the 200 East area on the Hanford Site, and is one of two 1 million gallon (Mgal) tanks in the AY Tank Farm. Routine visual inspections of the annulus between the primary and secondary tank walls of AY-102 in August 2012 identified suspect waste material from the primary containment tank. Further inspections were performed that confirmed a leak in the primary tank. There was consensus among the members of the leak assessment team that the material discovered on the annulus floor of AY-102 was the result of a leak from a breach in the bottom of the primary tank. The probable leak cause was identified as corrosion at high temperatures in a tank whose waste containment margins had been reduced by construction difficulties. Tank AY-102 was declared an Assumed Leaker - Primary Tank in October 2012. At this time, there is no evidence of a leak outside of the secondary containment.

2.0 241-AY-102 WASTE REMOVAL

This section describes the actions that are currently being pursued for the safe storage and removal of waste in AY-102, including the preparations for removal of supernatant from the primary tank, isolation of the AY-102- 02A pit (AY-02A pit) drain line from the DST system, removal of solid material from the primary tank, and removal of waste from the AY-102 annulus. As shown on the schedule in Attachment A, several activities associated with AY-102 are being pursued. This section also describes safety issues, equipment requirements and technical limitations that make removal of waste at this time impracticable. In light of these considerations and the fact that there is no evidence of a leak outside of the secondary containment, ORP does not believe that removal is prudent at this time. ORP proposes to: continue enhanced monitoring of AY-102, to proceed with procurement and the planning necessary to be prepared to remove the waste if conditions change and warrant expeditious removal, and to complete corrosion testing to evaluate the continued integrity of the annulus.

The schedule provided in Attachment A is driven by a critical path, and will be modified given a change in condition concerning safe storage of AY-102 waste. The change conditions which would influence initiating the removal of supernatant and solids material from AY-102 include: discovering pumpable liquid in the AY-102 annulus, evidence of a waste leak in the AY-102 leak detection pits, or evidence of compromised integrity of the annulus.

2.1 REMOVAL OF SUPERNATANT FROM 241-AY-102

If change conditions do not occur and removal is not necessary to prevent release to the environment, then the supernatant from AY-102 would not be removed until commencement of solids removal activities.

Tank 241-AY-102 contains approximately 700 kgal of supernatant. A pump is installed that could remove supernatant from the primary tank; however, complete removal of the supernatant cannot currently be achieved without introducing a safety issue related to the balance of sludge stored in the tank. As described in RPP-RPT-53901, *Management of Supernatant Level After Hypothetical Decant of 241-AY-102*, the recommended supernatant height above the settled solids is one to two feet. A minimum 12 to 15 inches will keep settled solids temperatures within acceptable limits and protect Safety Basis assumptions. If supernatant was reduced to the 12 to 15 inch minimum, due to ongoing evaporation, it

would be necessary to make annual water additions to maintain the minimum 12 to 15 inches supernatant level. In addition, if the supernatant levels were reduced, the annulus ventilation system would have to be operated since ventilation system is the primary method for cooling the high heat solid material in the primary tank.

While leaving a liquid over burden above the solid material in AY-102 is not envisioned in the *Double Shell Tank Emergency Pumping Guide*, HNF-3484 (EPG), it is the best method to moderate extra heat generation in the AY-102 waste and protect Safety Basis assumptions regarding liquid coverage of solid material. The EPG identifies several strategies for emergency pumping once a failure of the primary tank in a DST has been identified. Scenarios include responses to minor leaks and responses to moderate and major leaks. Each scenario described in the EPG provides guidance on how to respond to a leak that occurs at the perimeter of the tank. The existing strategies involve pumping the liquid in the primary tank to below the identified leak point to prevent additional liquid from leaking into secondary containment. When sufficient liquid accumulates in the annulus, it is to be pumped. The failure of the primary tank in tank AY-102 occurred at the bottom of the tank. Although this leak would be classified as a minor leak, the scenarios discussed in the EPG cannot be utilized due to the location of the leak in AY-102.

If change conditions (as described in Section 2.0) occur and removal is deemed necessary to prevent release to the environment, then the pumping of supernatant from AY-102 would be initiated as expeditiously as possible and completed on an aggressive schedule.

At the point that supernatant would be removed, it could be transferred to DST-AP-104 (AP-104). Utilizing the existing and available transfer equipment (pump, jumpers, transfer line, etc.) waste would be transferred from AY-102 to AP-104 via the following compliant transfer route: AY-02A, SN-633, AZ-VP, SN-634, AP-02D, SN-622, AP-02A, SN-612, AP-VP, SN-614, and AP-04A. A Waste Compatibility Assessment (WCA) would be prepared in accordance with TFC-ENG-CHEM-P-13, *Tank Waste Compatibility Assessment*, to ensure that the waste transfer would comply with specific administrative control, safety, regulatory, programmatic, and operational decision rules related to waste chemistry and waste properties to meet controls for criticality, tank bumps, flammable gas deflagrations, organic solvent fires, and tank chemistry after the transfer. There are no known samples that would need to be taken to support this transfer.

As shown on the schedule in Attachment A, the removal of supernatant from AY-102 is primarily driven by the development of transfer specific procedures and the associated transfer specific training. Typically, the development of all requisite transfer paperwork takes 36 working days or seven weeks to complete. If change conditions occurred, and if warranted, ORP would try to accelerate the schedule for removal of supernatant.

There are some technical challenges associated with the transfer of supernatant from AY-102 to AP-104. These technical challenges include the movement of the supernatant from AP-104 to AW-105 following the AY-102 to AP-104 transfer. In addition, given that the supernatant would be moved from its current location at AY-102 to AP-104, additional modeling and evaporator campaigns would be required to manage the DST space.

2.2 ISOLATION OF AY-102-02A PIT DRAIN LINE

The drain line in the AY- 02A pit provides a path for liquids entering the pit to be routed/drained into the primary tank of AY-102. Currently there is only one path that would allow the introduction of additional liquids into the AY-02A pit; that is a liquid transfer from AY-101, through the AY- 02A pit and on to the AZ valve pit and the DST transfer system. From the perspective of safe storage of waste and the

continuous buildup of condensate in AY-101, waste additions into AY-102 during near-term transfers out of AY-101 will be prevented via the waste transfer administrative control program and engineered controls for the purpose of isolating liquid entries into the AY-02A pit. Prior to an AY-101 transfer, the drain blocker in the AY-02A pit would be functionally tested for operability, and a camera would be inserted into the AY-02A pit to provide continuous monitoring of the transfer route. The jumper used for this transfer is certified by an Independent Qualified Registered Professional Engineer (IQRPE). The protective coatings in the AY-02A pit are also certified by an IQRPE. A drip-wise leak during the AY-101 transfer would be a shutdown criterion for these waste transfers in the near-term, and would prevent the potential for additional liquids entering the primary tank of AY-102 until the situation was investigated and resolved. An additional physical parameter that provides a hydraulic advantage on preventing additional liquids entering AY-102 is the fact that the AY-02A pit is the high point in the transfer from AY-101 to the AZ valve pit; hence, free liquid in the lines will drain away from the AY-02A pit if a transfer was shut down.

With the knowledge we have today, the path forward for isolating the AY-02A pit from AY-101 transfers and other liquid intrusions is: removing all excess equipment from the AY-02A pit, sealing penetrations, and adding a new sump pump and jumper that will allow liquids to be removed from AY-02A and sent back to AY-101. A new jumper configuration would still allow supernatant transfers to occur out of AY-102, and would not preclude removal of solids materials via sluicing. As shown in the schedule in Attachment A, a realistic schedule for designing, procuring, installing, and testing the isolation of the AY-02A pit is approximately four months.

2.3 REMOVAL OF SOLID MATERIAL FROM 241-AY-102

Tank AY-102 contains approximately 151 kgal of solid material. Schedule A details the planning, procurement and installation of out-of-tank equipment activities ORP proposes to undertake in order to position ORP to be able to initiate removal. At the point that ORP undertakes removal of this material, ORP proposes to remove it using modified sluicing technology. Primary discriminators that influenced the selection of utilizing modified sluicing technology over mixer pump technology include concerns with waste heating and thermal cycling of the tank associated with using mixer pump technology, and Hanford site familiarity with modified sluicing technology as evidenced by retrieval of C-Farm waste tanks.

The AY-102 modified sluicing system, when installed, would provide the capability to remove the solid material contents using recycled supernatant as the sluicing medium. Several sluicers would be deployed around the perimeter of the tank and optimized for tank coverage during detailed design activities. A hard to remove heel technology (e.g. jet pumps) is conceptualized to be required for the removal of waste at the bottom of AY-102. A dual-purpose supernatant/slurry pump would be installed near the center of the tank. Requisite jumpers, monitoring systems, and other ancillary equipment would be installed in support of the retrieval operations. Hose-in-Hose-Transfer Lines (HIHTLs) would be routed to/from the sending and receiving tanks with appropriate valve boxes to allow transfer routes to be established between one of two designated DST receiver tanks. Primary equipment in the receiving tanks would include a supernatant pump, slurry distributor, valve box(es), and the requisite jumpers, monitoring systems, and other ancillary equipment required for retrieval operations.

As described above and as shown in Attachment A, ORP will proceed with the procurements and planning necessary for removal of the solid material in the tank. These activities include: the field work package preparation and approval for all work packages required to install the entire retrieval system, the installation of the retrieval system control trailer and electrical equipment, the installation of the valve box and associated jumpers, the excavation and installation of the HIHTLs, and the installation of electrical

conduit and associated wiring. The remaining installation activities will include the installation of the sluicers in AY-102, the supernatant/slurry pumps in AY-102 and the receiving tanks, the slurry distributors in the receiver tanks, the final HIHTL and wire terminations, and requisite testing and readiness activities; these activities will be initiated upon determination of a change condition.

Due to ending volumes, heat load, and future DST space considerations, the current process strategy is to split the sludge contents of AY-102 between two receiving DSTs. DSTs 241-AZ-101 (AZ-101) and 241-AZ-102 (AZ-102) have been identified as the receiver tanks for the AY-102 waste.

Due to DST space limitations, the movement of the AY-102 supernatant in preparation for retrieval using modified sluicing would require multiple DST to DST transfers to transfer the supernatant out of AY-102. In addition, the conditioning/dilution of AZ-101 supernatant for use as the sluicing medium in AY-102 would require thirteen DST decants/transfers between AZ, AW, and AP Tank Farms prior to retrieval operations. These AZ-101 conditioning/dilution activities/transfers require one evaporator campaign for required DST storage space. The transfers and evaporator campaign are in addition to those transfers and evaporator campaigns required to support ongoing planned single shell tank retrievals. Also, the AY-102 retrieval process is modeled to require three initiating DST transfers to provide the proper initial conditions in AY-102, AZ-101, and AZ-102 for the modified sluicing retrieval operations. These three decants/transfers include supernatant transfers from AZ-102 to DST-241-AW-102 (AW-102), from DST 241-AN-101 (AN-101) to AZ-101, and from DST-241-AY-101(AY-101) to AZ-101.

When the requisite conditioning is completed, and the retrieval systems are installed and tested, retrieval operations could be conducted on day and swing shifts Monday through Friday. Major steps during the retrieval process would include;

1. Pump AY-102 supernatant to minimum level above sludge (approximately 12 to 15 inches supernatant residual – minimum supernatant required to negate waste drying and heating prior to sluicing operations). This is the starting point for sluicing operations.
2. Remove half of the AY-102 sludge content and send to AZ-102.
3. Adjust receiving tank to AZ-101.
4. Complete removal of solid material waste from AY-102 to AZ-101 to facilitate Step 5.
5. Obtain videos of AY-102 tank bottom and visually determine location of leak sites.
6. Evaluate AY-102 for repair or closure.

2.4 CORROSION TESTING OF ANNULUS WASTE AND REMOVAL OF WASTE FROM 241-AY-102 ANNULUS

If the corrosion testing results, from testing identified in this section, and/or subsequent testing predicts a time frame for failure of the secondary liner shorter than the time necessary to prepare a staging tank, this pumping plan will be reevaluated to address the change condition. Otherwise, this plan assumes the secondary containment will remain intact until waste from tank AY-102 can be removed and the "repair or close" decision made.

Under current conditions where there has been no release of tank waste from the secondary containment. waste removal from the annulus is planned to occur after waste is removed from the primary AY-102 tank to allow the "repair or close" decision to be made in accordance with 40 code of Federal Regulations (CFR) 265.196(e) incorporated by reference at Washington Administrative Code (WAC) 173-303-400(3) (a). Two key technical challenges requiring resolution prior to initiating waste removal from the annulus under current conditions include:

- Corrosion Testing: Testing of the waste in contact with the annulus liner to estimate the rate of corrosion and thus available waste removal options. The ongoing annulus corrosion testing will assist in estimating the susceptibility of the secondary liner to corrosion and selection of the best waste removal technology.
    - Testing will confirm the thermodynamic waste evaporation model used to determine the expected pH shift in the waste during drying due to carbon dioxide absorbance. Understanding the pH shift of the waste, during and after drying is one critical factor in determining the waste's propensity to corrode the annulus liner.
    - Testing (Cyclic Potentiodynamic Polarization and Slow Strain Rate) will directly measure the corrosion propensity of waste in contact with the liner. This testing conducted on steel coupons of similar vintage as the annulus liner will provide a specific corrosion rate for the analysis.
- Waste Removal Method: As noted in the AY-102 Leak Assessment Report (RPP-ASMT-53793), many of the radioactive constituents were absorbed into the thermal refractory below the primary tank liner. Testing will be required to determine the most effective methods to remove (e.g., flushing or chemical leaching) waste from the refractory while ensuring the overall structural integrity of the tank is protected (i.e., removal of the radioactive material does not significantly damage the thermal refractory).

Removal of the waste from the AY-102 annulus under current conditions is not recommended until after completion of waste removal from the primary tank for the following reasons:

- The waste currently contained within the-AY-102 annulus consists of wet salts created during the drying of the supernatant and interstitial liquids in the presence of air. This material, in its current state, restricts waste flow into the annulus as observed in the annulus along the perimeter of the tank. Liquid additions to the annulus, to facilitate waste removal from the annulus, would dissolve the wet salts and increase leakage into the annulus from the primary tank. In addition, there is no pumpable liquid in the annulus at this time to prime the annulus pump for removal of the annulus material.

The appropriate removal method cannot be determined until waste in the primary tank has been removed. Should repair of tank AY-102 prove to be impractical and closure is selected, then more aggressive waste removal actions (e.g., caustic or dilute acids) may be required to clean the tank to a point to allow its closure in accordance with WAC173-303-610, as required by the Hanford Federal Facility Agreement and Consent Order, Action Plan, Section 5.3.

As shown in Attachment A, ORP and WRPS propose to develop a plan for cleaning the waste from the annulus within six months following the completion of the annulus liner corrosion testing and refractory testing (as discussed above) that will include an evaluation and determination of cleaning alternatives for

both a "repair and return to service" approach and a "closure" approach. The schedule also provides for updating the following document: *Stress Corrosion Cracking Evaluation for the Secondary Liner Exposed to In-Specification Waste In Double-Shell Tank Annulus,* January 2006 (RPP-ASMT-27062, Revision 0) to document the completed corrosion testing work.

In accordance with the EPG ORP and WRPS will continue to maintain staged equipment and waste transfer documents required to pump the-AY-102 annulus should the leak increase, such that pumpable liquid exists.

3.0 DECISION TREE

3.1 241-AY-102 REMOVAL DECISION LOGIC

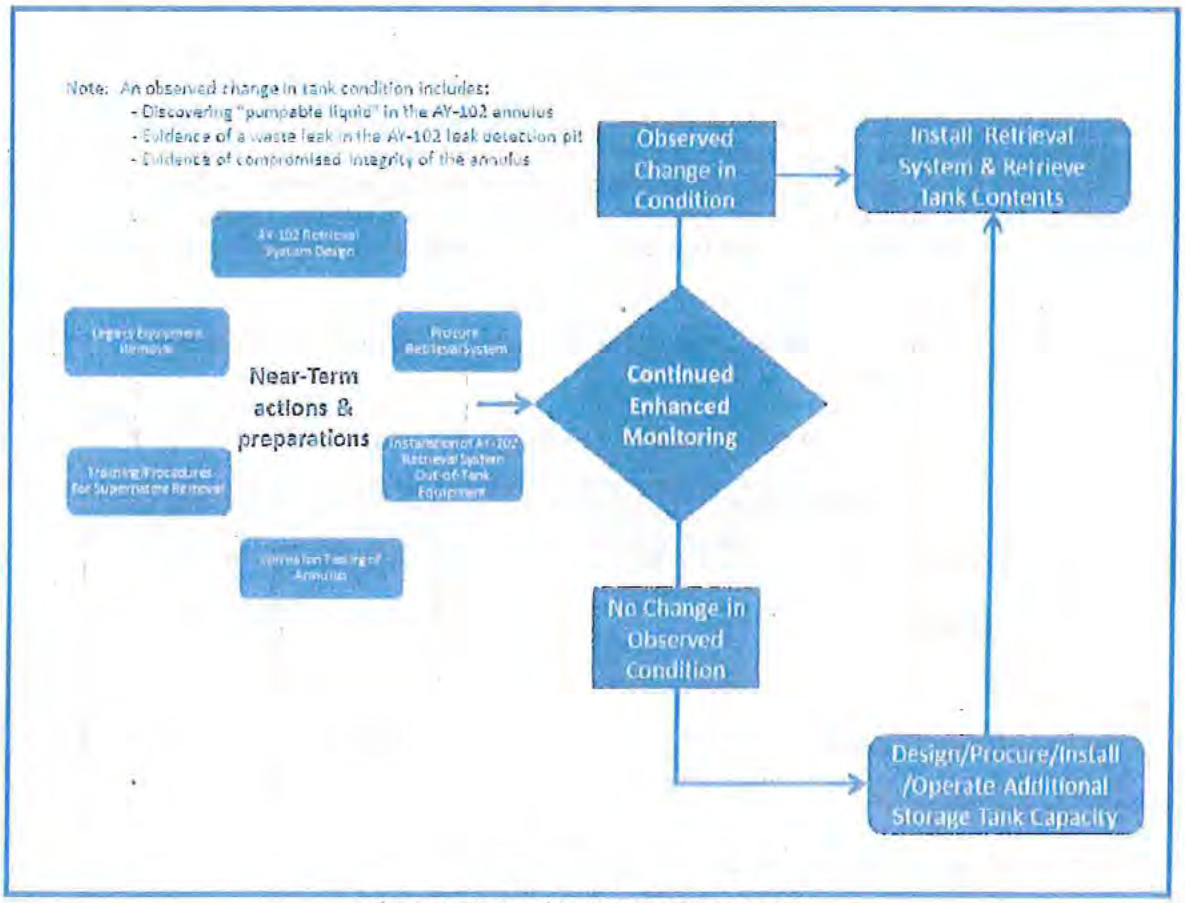


Figure 3-1 241-AY-102 Decision Logic

Figure 3-1 illustrates the decision logic for AY-102 Tank waste retrieval. The logic describes the design and procurement activities related to AY-102 retrieval, and the plans for system installation and operations, but defers the execution of the system installation and retrieval operations until change conditions occur. After preparation activities are complete, and as long as conditions remain stable, the alternate logic path is enabled by a decision to initiate the design, procurement, and installation of additional tank capacity beyond what is currently in the DST system.

As an important part of the current Waste Feed Delivery (WFD) program, the retrieval of waste from AY-102 must be optimized in support of the River Protection Project (RPP) mission. Per the current System Plan, ORP-11242, 2011, *River Protection Project System Plan,* Rev. 6, the waste currently stored in AY-102 has been identified as the first Low-Activity and High-Level waste feeds for Waste Treatment Plant (WTP) hot commissioning. If the waste from AY-102 is moved to different DSTs prior to serving the WFD activities, then additional characterization and conditioning of the new/different hot commissioning waste would be required prior to feeding the waste to the vitrification facility. While it is desirable not to comingle the waste in AY-102 to maintain the characterization data, it was not a consideration in the development of this plan.

4.0 PROJECT SCHEDULE

4.1 SCHEDULE

The schedule in Attachment A, summarized in Table 4-1 provides start and finish dates for the activities associated with the preparation for waste removal of AY-102. In addition Attachment A identifies the activities that would be pursued if change conditions occur. These activities are summarized in Table 4-2. The schedule includes details for the transfer of supernatant from AY-102 to AP-104, the isolation of AY-102-02A pit drain line, the removal of sludge from AY-102 and removal of waste from the AY-102 annulus.

Technical challenges, funding, or other factors could have a negative influence on the schedule durations and end dates.

Table 4-1 AY-102 Retrieval Schedule Activities

Activity Name	Start Date	Finish Date
Preparation for Removal of Supernatant from AY-102	01-Jul-13	05-Aug-13
Isolate AY-02A Pit Drain Line	01-Jul-13	15-Oct-13
AY-102 Sludge Removal Design & Engineering Support	01-Jul-13	12-Mar-14
AY-102 Sludge Removal Procurement	08-Oct-13	26-Jun-14
AY-102 Equipment Removal	05-Dec-13	07-May-14
AY-102 Infrastructure Construction Activities	13-Mar-14	05-Dec-14
Receiver Tank Design & Engineering Support	01-Jul-13	09-Apr-14
Receiver Tank Procurement	09-Oct-13	25-Jul-14
Receiver Tank Equipment Removal	06-Dec-13	05-Jun-14
Receiver Tank Infrastructure Construction Activities	13-Mar-14	26-Jan-15

Activity Name	Start Date	Finish Date
AY-102 Annulus Drying System	03-Jun-13	31-Mar-16
AY-102 Annulus Testing	13-May-13	24-Oct-14
Prepare Staging Tank	01-Jul-13	31-Dec-19

Table 4-1 Continued from Previous Page

Table 4-2 AY-102 Pumping Plan Change Conditions Schedule

Activity Name	Duration in Days
Remove Supernatant from AY-102 (DST to DST Transfer)	15
AY-102 Final Retrieval System Construction	55
AY-102 Startup and Readiness	47
AY-102 Retrieval Operations	227
Receiver Tank Construction	40
Receiver Tank Startup & Readiness	47

5.0 REFERENCES

1. Letter, K.W. Smith, ORP and M.D. Johnson, WRPS, to J. A. Hedges Ecology, *Analysis of 40 CFR 265.196 Requirements for double-shell tank (DST) System Tank 241-AY-102 and Discussion of Double-Shell Tank Emergency Pumping Guide, HNF-3483, Revision 10, J3-TF-0024,* dated May 6, 2013.

2. Letter, J. A. Hedges Ecology, to K.W. Smith, ORP and M.D. Johnson, WRPS, Ecology Response to Letter 13-TF-024, "*Analysis of 40 CFR 265.196 Requirements for Double-Shell Tank (DST) System Tank 241-AY-102 and Discussion of Double-Shell Tank Emergency Pumping Guide, HNF-3483, Revision 10*", 13-NWP-056, dated May 24, 2013.

3. HNF-3484, *Double Shell Tank Emergency Pumping Guide, Revision 10,* WRPS, Richland, Washington

4. 40 CFR 265, *Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities*

5. WAC 173-303, "*Dangerous Waste Regulations*" Washington Administrative Code, as amended.

6. RPP-ASMT-53793, *Tank 241-AY-102 Leak Assessment Report.* WRPS, Richland, Washington

7. TFC-ENG-CHEM-P-13, *Tank Waste Compatibility Assessments,* WRPS, Richland, Washington.

8. *Hanford Federal Facility Agreement and Consent Order, U. S. Department of Energy, U. S. Environmental Protection Agency,* Washington State Department of Ecology, 1989 as amended

9. RPP-RPT-53901, *Management Of Supernatant Level After Hypothetical Decant Of 241-AY-102,* WRPS, Richland, Washington.

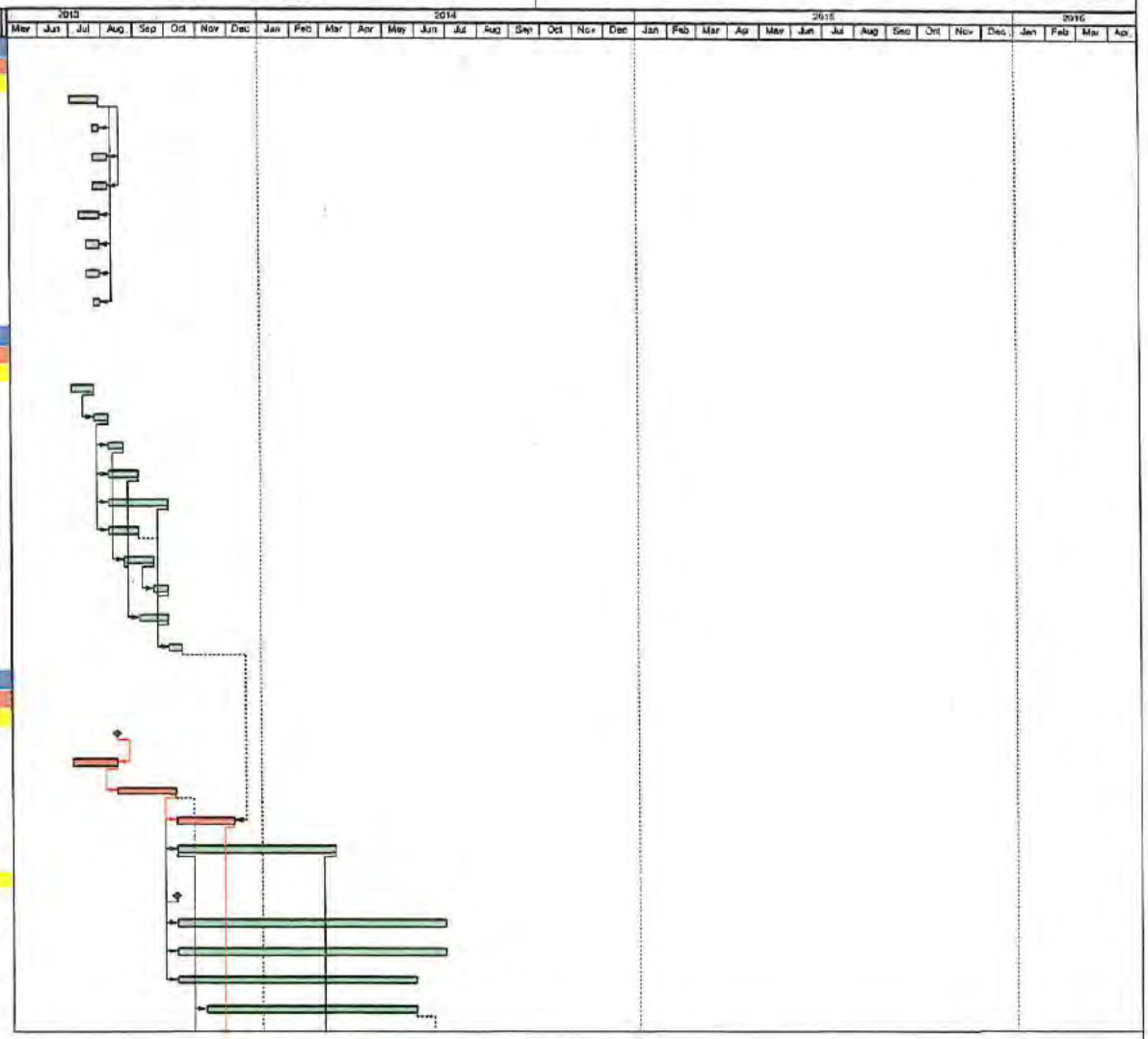
10. RPP-ASMT-27062, *Stress Corrosion Cracking Evaluation for the Secondary Liner Exposed to In-Specification Waste In Double-Shell Tank Annulus,* January 2006, CH2M Hill Hanford Group, Richland, Washington.

11. ORP-11242, Rev 6, *River Protection System Plan,* 2011, U. S. Department of Energy, Office of River Protection, Richland Washington

Attachment A. Schedule

Run Date: 14-Jun-13 | IPMB LC - AY-102 Pumping Plan | Data Date 01-Oct-06

Activity ID	Activity Name	OD	Start	Finish
Remove Supernatant from AY-102				
DST to DST Transfers		25	01-Jul-13	05-Aug-13
WTA-AY2002	Develop / Approve / Issue Transfer Procedure	20	01-Jul-13*	29-Jul-13
WTA-AY2004	Develop / Approve / Issue Waste Compatibility	5	23-Jul-13	29-Jul-13
WTA-AY2006	Develop / Approve / Issue Radcon Monitoring Plan	10	23-Jul-13	05-Aug-13
WTA-AY2008	Develop / Approve / Issue Industrial Health Plan	10	23-Jul-13	05-Aug-13
WTA-AY2010	Develop / Approve / Issue SECD Tech Evaluation	15	09-Jul-13	29-Jul-13
WTA-AY2012	Develop / Approve / Issue Leak Path Tech Evaluation	10	16-Jul-13	29-Jul-13
WTA-AY2014	Develop / Approve / Issue Overpressure Protection Tech Evaluation	10	16-Jul-13	29-Jul-13
WTA-AY2016	Develop / Approve / Issue Freeze Protection Tech Evaluation	5	23-Jul-13	29-Jul-13
Isolate AY-02A Pit Drain Line				
DST to DST Transfers		75	01-Jul-13	15-Oct-13
ISO-AY2A002	Bid/Award Design Contract for AY-02A Pit Isolation	15	01-Jul-13*	22-Jul-13
ISO-AY2A004	Prepare Design Media to Support Procurement	10	23-Jul-13	05-Aug-13
ISO-AY2A006	Prepare Design Media to Remove Equipment in AY-02A Pit	10	06-Aug-13	19-Aug-13
ISO-AY2A008	Prepare Design Media to Install Jumper in AY-02A Pit	20	06-Aug-13	03-Sep-13
ISO-AY2A010	Award PO / Procure Jumper	40	06-Aug-13	01-Oct-13
ISO-AY2A012	Award PO / Procure Sump Pump	20	06-Aug-13	03-Sep-13
ISO-AY2A014	Prepare Work Packages to Remove Equipment from AY-02A Pit	20	20-Aug-13	17-Sep-13
ISO-AY2A016	Remove Equipment from AY-02A Pit	10	18-Sep-13	01-Oct-13
ISO-AY2A018	Prepare Work Packages to Install Jumper / Sump Pump in AY-02A Pit	20	04-Sep-13	01-Oct-13
ISO-AY2A020	Install Jumper / Sump Pump in AY-02A Pit	10	02-Oct-13	15-Oct-13
Design / Procure / Early Install AY-102 Sludge Removal System				
AY-102 Design & Engineering Support		175	01-Jul-13	12-Mar-14
JJA-022001	Critical Decision - Authorization to Proceed with Design	0		12-Aug-13
JJA-022005	AY-102 Bid/Award Design Contract for AY-102 Retrieval	30	01-Jul-13*	12-Aug-13
JJA-022010-01	Prepare Design Media to support Procurement	40	13-Aug-13	08-Oct-13
JJA-022010-03	Prepare Design Media for Equipment Removal	40	09-Oct-13	05-Dec-13
JJA-022010-05	Prepare Design Media for Waste Retrieval System Installation	105	09-Oct-13	12-Mar-14
AY-102 Procurement		180	09-Oct-13	26-Jun-14
JJA-022009	Critical Decision - Authorization to Proceed with Procurement	0		09-Oct-13
JJA-022010-01	Award PO / Procure Dual Purpose Supernatant/Slurry Pump & Assembly	180	09-Oct-13	26-Jun-14
JJA-022010-03	Award PO / Procure Sluicers (5)	180	09-Oct-13	26-Jun-14
JJA-022010-05	Award PO / Procure Jet Pump & Assembly	160	09-Oct-13	29-May-14
JJA-022010-07	Award PO / Procure Jumpers	140	06-Nov-13	29-May-14

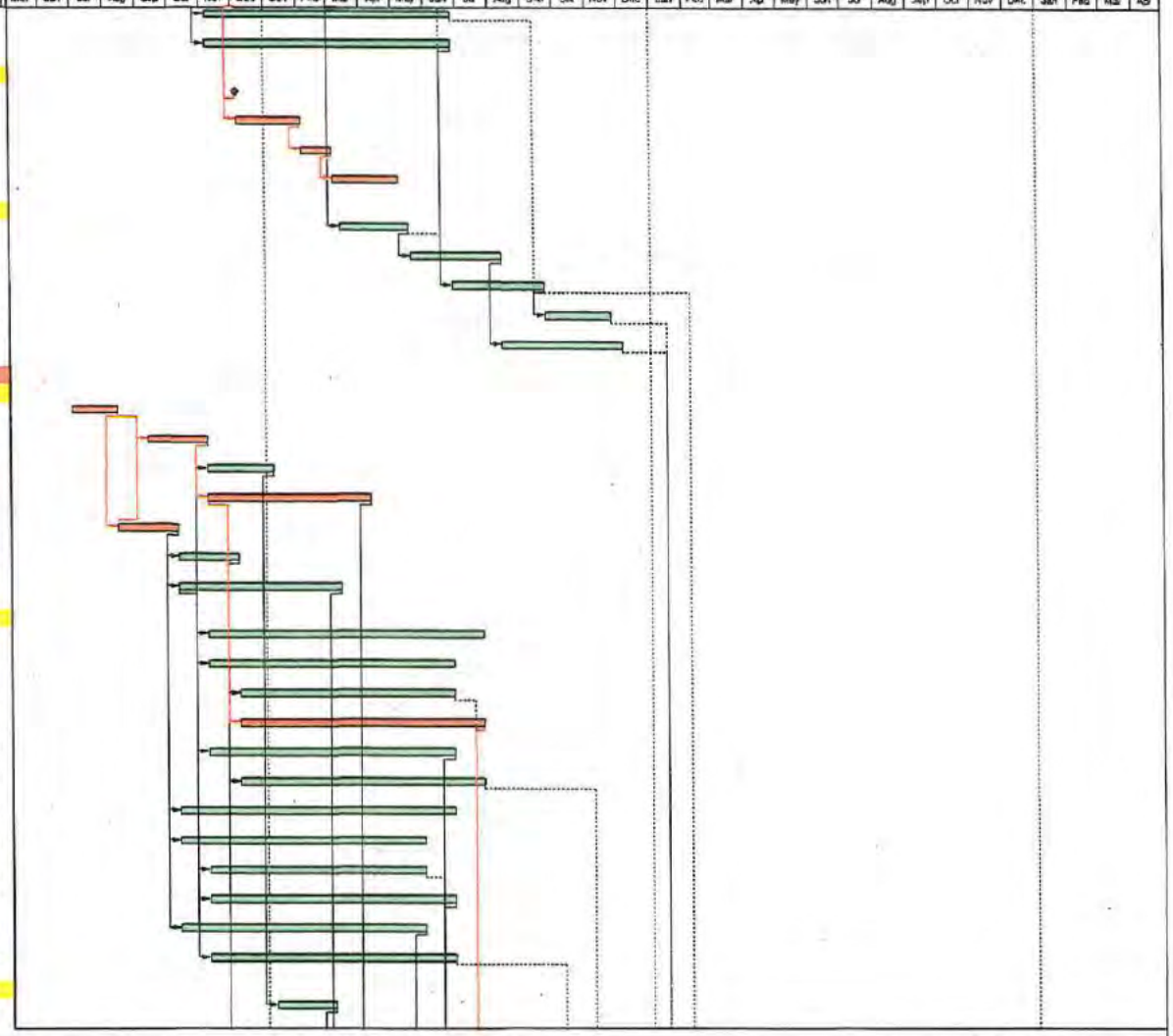


Actual Work | Remaining Work | Critical Remaining ...
Actual Level of Effort | Remaining Level of Effort | Milestone

RPP-PLAN-55220, Rev.A - Appendix A
AY-102 Pumping Plan - Preparation
Technical challenges, funding, or other factors could have a negative influence on the schedule durations and end dates.

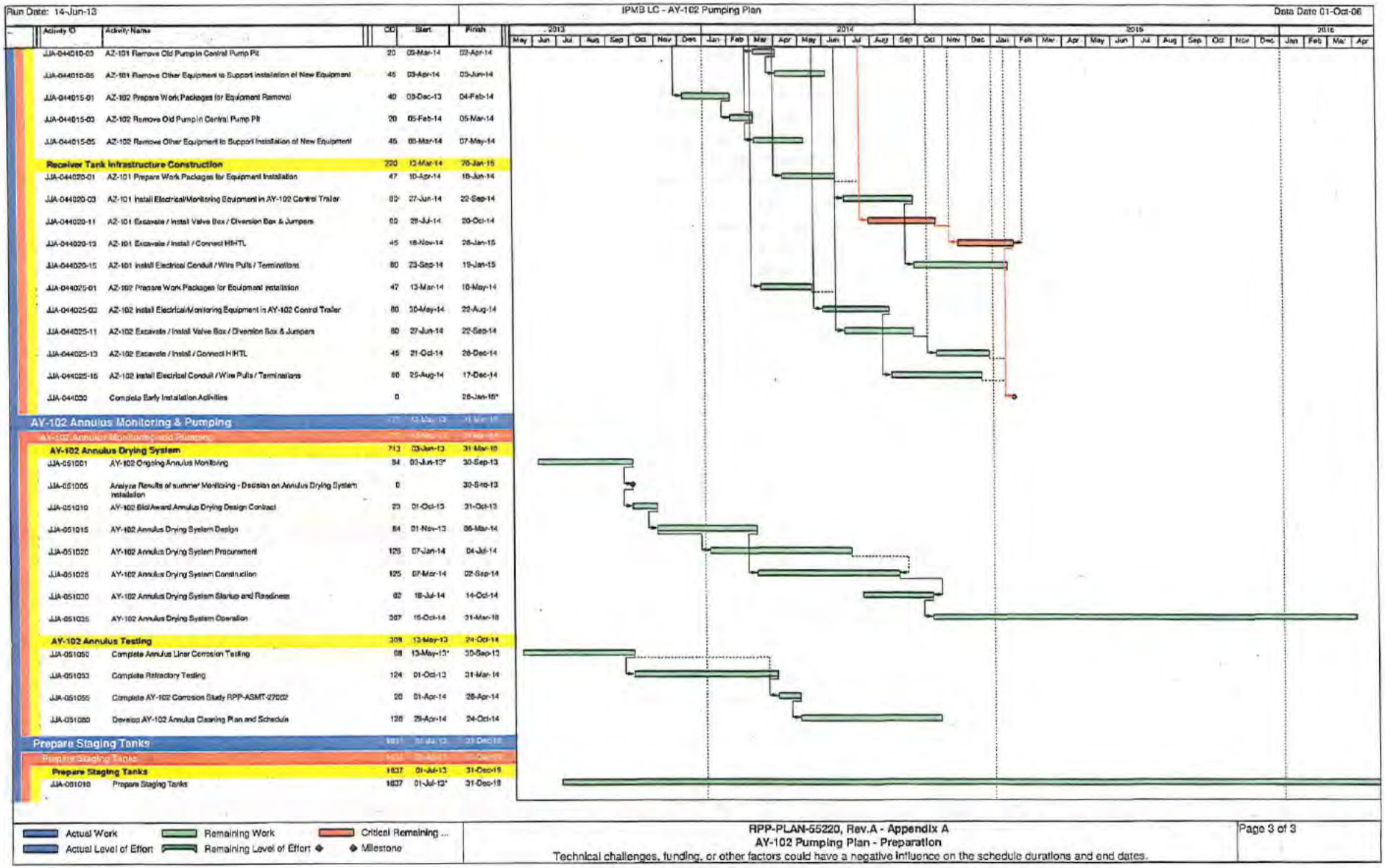
Run Date: 14-Jun-13 | IPMB LC - AY-102 Pumping Plan | Data Date 01-Oct-06

Activity ID	Activity Name	OD	Start	Finish
JJA-023010-09	Award PO / Procure Hose-in-Hose Transfer Line (HIHTL)	180	08-Nov-13	28-Jun-14
JJA-023010-11	Award PO / Procure Valve Switching Box	180	08-Nov-13	28-Jun-14
AY-102 Equipment Removal		155	06-Dec-13	07-Mar-14
JJA-024000	Critical Decision - Authorization to Proceed with Equipment Removal	0		05-Dec-13
JJA-024010-01	Prepare Work Packages for Equipment Removal	40	06-Dec-13	04-Feb-14
JJA-024010-03	Remove Old Pump from Central Pump Pit	20	05-Feb-14	05-Mar-14
JJA-024010-05	Remove Necessary Items from Risers used for Sluicer Installation	45	06-Mar-14	07-May-14
AY-102 Infrastructure Construction		187	12-Mar-14	05-Dec-14
JJA-024020-01	Prepare Work Packages for Waste Retrieval System Installation	47	13-Mar-14	16-May-14
JJA-024020-03	Install Control Trailer with Electrical/Monitoring Equipment	60	19-May-14	12-Aug-14
JJA-024020-11	Excavate / Install Valve Switching Box & Jumpers	60	27-Jun-14	22-Sep-14
JJA-024020-13	Excavate / Install / Connect HIHTL	45	23-Sep-14	24-Nov-14
JJA-024020-15	Install Electrical Conduit / Wire Pulls / Terminations	60	13-Aug-14	05-Dec-14
Replace Tank for AY-102 Waste				
Receiver Tank Design & Engineering Support		195	01-Jul-13	09-Apr-14
JJA-042000	AZ-101 / AZ-102 Bid/Award Design Contract	30	01-Jul-13*	12-Aug-13
JJA-042010-01	AZ-101 Prepare Design Media to support Procurement	40	11-Sep-13	05-Nov-13
JJA-042010-03	AZ-101 Prepare Design Media for Equipment Removal	40	06-Nov-13	07-Jan-14
JJA-042010-05	AZ-101 Prepare Design Media for Waste Retrieval System Installation	105	06-Nov-13	08-Apr-14
JJA-042015-01	AZ-102 Prepare Design Media to support Procurement	40	13-Aug-13	05-Oct-13
JJA-042015-03	AZ-102 Prepare Design Media for Equipment Removal	40	08-Oct-13	05-Dec-13
JJA-042015-05	AZ-102 Prepare Design Media for Waste Retrieval System Installation	105	08-Oct-13	12-Mar-14
Receiver Tank Procurement		200	09-Oct-13	30-Jul-14
JJA-043010-01	AZ-101 Award PO / Procure Supernatant Pump & Assembly	180	06-Nov-13	25-Jul-14
JJA-043010-03	AZ-101 Award PO / Procure Slurry Distributor	160	08-Nov-13	28-Jun-14
JJA-043010-05	AZ-101 Award PO / Procure Jumpers	140	06-Dec-13	28-Jun-14
JJA-043010-07	AZ-101 Award PO / Procure Valve Boxes	160	06-Dec-13	25-Jul-14
JJA-043010-09	AZ-101 Award PO / Procure Monitoring Systems	160	06-Nov-13	28-Jun-14
JJA-043010-11	AZ-101 Award PO / Procure HIHTL	160	06-Dec-13	25-Jul-14
JJA-043015-01	AZ-102 Award PO / Procure Supernatant Pump & Assembly	180	09-Oct-13	28-Jun-14
JJA-043015-03	AZ-102 Award PO / Procure Slurry Distributor	160	09-Oct-13	28-May-14
JJA-043015-05	AZ-102 Award PO / Procure Jumpers	140	08-Nov-13	28-May-14
JJA-043015-07	AZ-102 Award PO / Procure Valve Boxes	160	08-Nov-13	28-Jun-14
JJA-043015-09	AZ-102 Award PO / Procure Monitoring Systems	160	09-Oct-13	28-May-14
JJA-043015-11	AZ-102 Award PO / Procure HIHTL	160	08-Nov-13	28-Jun-14
Receiver Tank Equipment Removal		135	06-Dec-13	05-Jun-14
JJA-044010-01	AZ-101 Prepare Work Packages for Equipment Removal	40	06-Jan-14	05-Mar-14

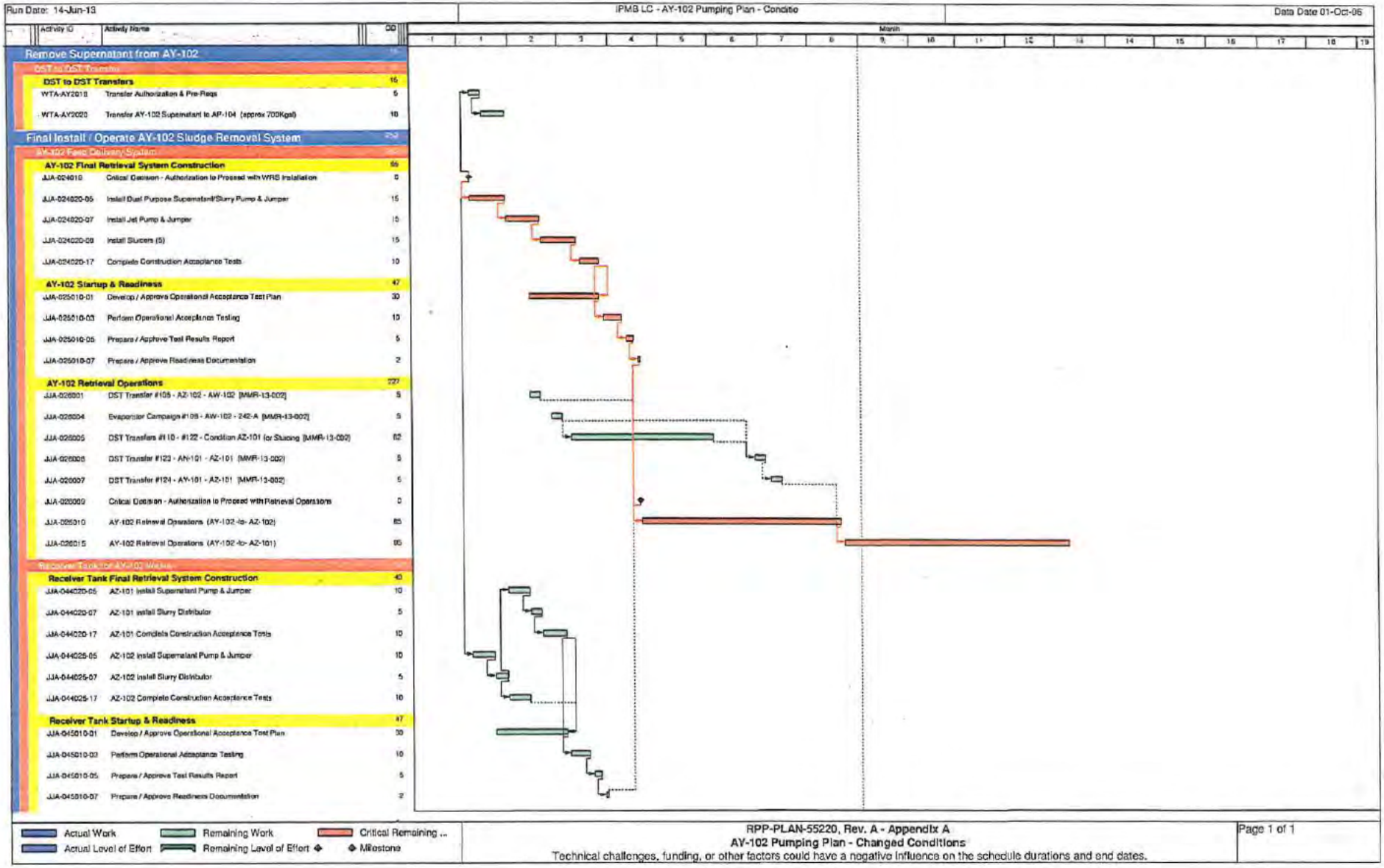


Actual Work | Remaining Work | Critical Remaining ...
Actual Level of Effort | Remaining Level of Effort | Milestone

RPP-PLAN-55220, Rev.A - Appendix A
AY-102 Pumping Plan - Preparation
Technical challenges, funding, or other factors could have a negative influence on the schedule durations and end dates.



RPP-PLAN-55220, Rev.A - Appendix A
AY-102 Pumping Plan - Preparation
Technical challenges, funding, or other factors could have a negative influence on the schedule durations and end dates.


Run Date: 14-Jun-13
IPMB LC - AY-102 Pumping Plan - Conditio
Data Date 01-Oct-06
Activity ID
Activity Name
OD
Remove Supernatant from AY-102
DST to DST Transfers
DST to DST Transfers 16
WTA-AY2010 Transfer Authorization & Pre-Reqs 5
WTA-AY2020 Transfer AY-102 Supernatant to AP-104 (approx 700Kgal) 10
Final Install / Operate AY-102 Sludge Removal System
AY-102 Feed Delivery System
AY-102 Final Retrieval System Construction 55
JJA-024010 Critical Decision - Authorization to Proceed with WRS Installation 0
JJA-024020-05 Install Dual Purpose Supernatant/Slurry Pump & Jumper 15
JJA-024020-07 Install Jet Pump & Jumper 15
JJA-024020-09 Install Sluicers (5) 15
JJA-024020-17 Complete Construction Acceptance Tests 10
AY-102 Startup & Readiness 47
JJA-025010-01 Develop / Approve Operational Acceptance Test Plan 30
JJA-025010-03 Perform Operational Acceptance Testing 10
JJA-025010-05 Prepare / Approve Test Results Report 5
JJA-025010-07 Prepare / Approve Readiness Documentation 2
AY-102 Retrieval Operations 227
JJA-026001 DST Transfer #105 - AZ-102 - AW-102 [MMR-13-002] 5
JJA-026004 Evaporator Campaign #109 - AW-102 - 242-A [MMR-13-002] 5
JJA-026005 DST Transfers #110 - #122 - Condition AZ-101 for Sluicing [MMR-13-002] 62
JJA-026006 DST Transfer #123 - AN-101 - AZ-101 [MMR-13-002] 5
JJA-026007 DST Transfer #124 - AY-101 - AZ-101 [MMR-13-002] 5
JJA-026009 Critical Decision - Authorization to Proceed with Retrieval Operations 0
JJA-026010 AY-102 Retrieval Operations (AY-102 -to- AZ-102) 85
JJA-026015 AY-102 Retrieval Operations (AY-102 -to- AZ-101) 95
Receiver Tank for AY-102 Waste
Receiver Tank Final Retrieval System Construction 40
JJA-044020-05 AZ-101 Install Supernatant Pump & Jumper 10
JJA-044020-07 AZ-101 Install Slurry Distributor 5
JJA-044020-17 AZ-101 Complete Construction Acceptance Tests 10
JJA-044025-05 AZ-102 Install Supernatant Pump & Jumper 10
JJA-044025-07 AZ-102 Install Slurry Distributor 5
JJA-044025-17 AZ-102 Complete Construction Acceptance Tests 10
Receiver Tank Startup & Readiness 47
JJA-045010-01 Develop / Approve Operational Acceptance Test Plan 30
JJA-045010-03 Perform Operational Acceptance Testing 10
JJA-045010-05 Prepare / Approve Test Results Report 5
JJA-045010-07 Prepare / Approve Readiness Documentation 2
Month
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
Actual Work
Remaining Work
Critical Remaining ...
Actual Level of Effort
Remaining Level of Effort
Milestone
RPP-PLAN-55220, Rev. A - Appendix A
AY-102 Pumping Plan - Changed Conditions
Technical challenges, funding, or other factors could have a negative influence on the schedule durations and end dates.
Page 1 of 1